



# PCAN-UDS 2.x API

API Implementation of the UDS Standard  
(ISO 14229-1:2020)

## User Manual

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# 1 PCAN-UDS 2.x API Documentation

Welcome to the documentation of PCAN-UDS 2.x API, a PEAK CAN API that implements ISO 14229-1:2013, UDS in CAN, an international standard that allows a diagnostic tester (client) to control diagnostic functions in an on-vehicle Electronic Control Unit (ECU or server).

In the following chapters, you will find all the information needed to take advantage of this API.

- └ Introduction on page 11
- └ DLL API Reference on page 15
- └ Additional Information on page 768

## 2 Introduction

PCAN-UDS 2.x is a simple programming interface intended to support Windows automotive applications that use PEAK-Hardware to communicate with Electronic Control Units (ECU) connected to the bus systems of a car, for maintenance purpose.

### 2.1 Understanding PCAN-UDS 2.x

UDS stands for Unified Diagnostic Services and is a communication protocol of the automotive industry. This protocol is described in the norm ISO 14229-1:2013.

The UDS protocol is the result of 3 other standardized diagnostic communication protocols:

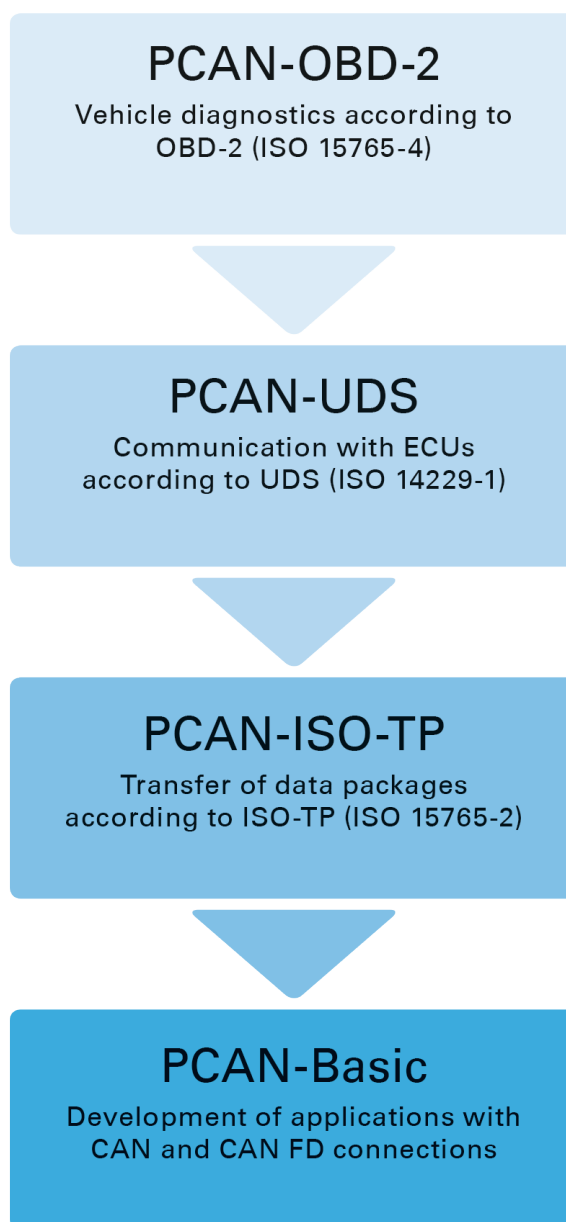
- ISO 14230-3, as known as Keyword 2000 Protocol (KWP2000)
- ISO 14229-1:2013, as known as Diagnostic on CAN
- ISO 15765-2, as known as ISO-TP

The idea of this protocol is to contact all electronic data units installed and interconnected in a car, to provide maintenance, as checking for errors, actualizing of firmware, etc.

UDS is a Client/Server oriented protocol. In a UDS session (diagnostic session), a program application on a computer constitutes the client (within UDS, it is called Tester), the server is the ECU being *tested*, and the diagnostic requests from client to server are called services. The client always starts with a request and this ends with a positive or negative response from the server (ECU).

Since the transport protocol of UDS is done using ISO-TP, an international standard for sending data packets over a CAN bus, the maximum data length that can be transmitted in a single data block is 4 Gigabytes.

PCAN-UDS 2.x API is an implementation of the UDS on CAN standard. The physical communication is carried out by PCAN-Hardware (PCAN-USB, PCAN-PCI, etc.) through the PCAN-ISO-TP 3.x and PCAN-Basic API (free CAN APIs from PEAK-System). Because of this, it is necessary to have also the PCAN-ISO-TP 3.x and PCAN-Basic APIs (PCAN-ISO-TP.dll and PCANBasic.dll) present on the working computer where UDS is intended to be used. PCAN-UDS 2.x, PCAN-ISO-TP 3.x, and PCAN-Basic APIs are free and available for all people that acquire a PCAN-Hardware.



## 2.2 Using PCAN-UDS 2.x

Since PCAN-UDS 2.x API is built on top of the PCAN-ISO-TP 3.x API and PCAN-Basic APIs, it shares similar functions. It offers the possibility to use several PUDS channels within the same application in an easy way. The communication process is divided in 3 phases: initialization, interaction, and finalization of a PUDS-Channel.

**Initialization:** To perform UDS on CAN communication using a channel, it is necessary to initialize it first. This is done by making a call to the function `UDS_Initialize_2013` (**class-method:** `Initialize_2013`).

**Interaction:** After successful initialization, a channel is ready to communicate with the connected CAN bus. Further configuration is not needed. The functions starting with `UDS_Svc` (**class-methods:** starting with `Svc`) can be used to transmit UDS requests and the utility functions starting with `UDS_WaitFor` (**class-methods:** starting with `WaitFor`) are used to retrieve the results of a previous request. The `UDS_Read_2013` and `UDS_Write_2013` (**class-methods:** `Read_2013` and `Write_2013`) are lower-level functions to read and write UDS messages from scratch. If desired, an extra configuration can be made to improve a communication session, like service request timeouts or PCAN-ISO-TP 3.x parameters.

**Finalization:** When the communication is finished, the function `UDS_Uninitialize_2013` (**class-method:** `Uninitialize_2013`) should be called in order to release the PUDS-Channel and the resources allocated for it. In this way the channel is marked as "Free" and can be used from other applications.

## 2.3 Features

- Implementation of the UDS protocol (14229-1:2013) for the communication with control units
- Windows DLLs for the development of applications for the platforms Windows® 11 (x64/ARM64), 10 (x86/x64)
- Physical communication via CAN using a CAN interface of the PCAN series
- Uses the PCAN-Basic programming interface to access the CAN hardware in the computer
- Uses the PCAN-ISO-TP 3.x programming interface (ISO 15765-2) for the transfer of data packages up to 4 Gigabytes via the CAN bus

## 2.4 System Requirements

- Windows 11 (x64/ARM64), Windows 10 (x64)
- PC CAN interface from PEAK-System
- PCAN-Basic API
- PCAN-ISO-TP 3.x API

## 2.5 Scope of Supply

- Interface DLLs for Windows (x86/x64/ARM64)
- Examples and header files for all common programming languages
- Documentation in PDF format

## 2.6 Backward Compatibility Notes

Until version 1.x, the PCAN-UDS API implemented the protocol UDS as described in the ISO norm 14229-1, revision 2006. Support for the ISO norm 14229-1, revision 2013, was introduced with version 2.0 of the API PCAN-UDS. New features of the norm 14229-1 caused changes in the API, that are to be considered when porting projects written with older versions of the PCAN-UDS API.

### 2.6.1 PCAN-ISO-TP Compatibility

The PCAN-UDS 2.x API is now based on PCAN-ISO-TP 3.x API. The legacy PCAN-UDS 1.0 API was based on PCAN-ISO-TP 2.0 API. Porting PCAN-UDS project requires to upgrade PCAN-ISO-TP. Backward compatibility notes for PCAN-ISO-TP 3.x are given in PCAN-ISO-TP user manual.

### 2.6.2 Binary Compatibility

The new `PCAN-UDS.dll`, version 2.x, is full compatible with applications written using earlier versions of the API. Existing applications don't need to be rebuilt when updating the `PCAN-UDS.dll`.

However, in some cases, a known issue can occur: writing UDS message or calling service function returns an unexpected `PUDS_ERROR_ALREADY_INITIALIZED` error. This new error occurred when PCAN-UDS 2.x detects that a message with the same service identifier is already pending in the reception queue (see `PUDS_STATUS_SERVICE_ALREADY_PENDING` in `uds_status` on page 32): this could lead to a possible shift between similar UDS requests and their responses. To correct this issue, the user must read a response for his previous request before writing the new message or clear the reception queue by calling `UDS_Reset`.

### 2.6.3 Code Compatibility

Both revisions of the ISO norm 14229-1 mentioned before are visually split into different header files for the supported programming languages, `PCAN-UDS_2006.*` and `PCAN-UDS_2013.*` (for Delphi `PUDS_2006.pas`, and `PUDS_2013.pas`). Additionally, for the C/C++ languages, a header file called the same as in the previous API version, `PCAN-UDS.h`, is now used for backward compatibility, making easier the update of existing C/C++ projects.

All these files are included in the PCAN-UDS package under the folder "Include" (header files with suffix `_2013`) and its subfolder "Backward Compatibility" (other header files).


Depending on the needs of a developer and his project, he can:

#### a. Start a new UDS:2013 project (recommended)

The header file called `PCAN-UDS_2013.*` (for Delphi, `PUDS_2013.pas`) is to be used. No other UDS header file is needed.

#### b. Start a new UDS:2006 project


The header file called `PCAN-UDS_2006.*` (for Delphi `PUDS_2006.pas`) is to be used. No other UDS header file is needed. The content of this file represents the content of the file `PCAN-UDS.*` (for Delphi, `PUDS.pas`) from the version 1.x of the PCAN-UDS API.

 **Note:** In C/C++: This header doesn't include the required dependency "`Window.h`". It may be needed to include this reference manually, depending on the configuration of the project.

## c. Updating an existing project based on version 1.x of the PCAN-UDS API

### ▶ C/C++ projects:

1. Copy all 3 header files, `PCAN-UDS.h`, `PCAN-UDS_2006.h`, and `PCAN-UDS_2013.h` into the project folder.

 **Note:** The header file called `PCAN-UDS.h` will be replaced by the new backward-compatible header file of the same name. This header ensures that the old interface, i.e. all function prototypes from the PCAN-UDS 1.x API, and also the new interface introduced with version 2.0, are available for the project.

2. Open and re-compile the project / solution.

### ▶ .NET and Delphi projects (Support for the revision 2006 only):

1. Copy the header file `PCAN-UDS_2006.*` (for Delphi, `PUDS_2006.pas`) into the project folder.
2. Load the project / solution.
3. Exclude the file `PCAN-UDS.*` (for Delphi, `PUDS.pas`) from the project.
4. Include the file `PCAN-UDS_2006.*` (for Delphi, `PUDS_2006.pas`) to the project.
5. Save and compile the project / solution.

### ▶ .NET and Delphi projects (Support for both revisions, 2006 and 2013):

1. Copy the header files `PCAN-UDS_2006.*`, and `PCAN-UDS_2013.*` (for Delphi, `PUDS_2006.pas` and `PUDS_2013.pas`) into the project folder.
2. Exclude the file `PCAN-UDS.*` (for Delphi, `PUDS.pas`) from the project.
3. Include the files `PCAN-UDS_2006.*`, `PCAN-UDS_2013.*` (for Delphi, `PUDS_2006.pas` and `PUDS_2013.pas`).
4. Edit the file `PCAN-UDS_2013.*` (for Delphi, `PUDS_2013.pas`), and enable the commented define directive for `PUDS_API_COMPATIBILITY_ISO_2006`, within the description of the header file.
5. Save and compile the project / solution.

## 2.6.4 Remark

Beginning with version 2.1, the parameters of `UDS_WaitFor*_2013` functions have a new order. They do not keep the order of the previous version.

## 3 DLL API Reference

This section contains information about the data types (classes, structures, types, defines, enumerations) and API functions which are contained in the PCAN-UDS 2.x API.

### 3.1 Namespaces

**PEAK** offers the implementation of some specific programming interfaces as namespaces for the .NET Framework programming environment. The following namespaces are available:

#### Namespaces

	Name	Description
⌋	Peak	Contains all namespaces that are part of the managed programming environment from PEAK-System
⌋	Peak.Can	Contains types and classes for using the PCAN API from PEAK-System
⌋	Peak.Can.Light	Contains types and classes for using the PCAN-Light API from PEAK-System
⌋	Peak.Can.Basic	Contains types and classes for using the PCAN-Basic API from PEAK-System
⌋	Peak.Can.Ccp	Contains types and classes for using the CCP API implementation from PEAK-System
⌋	Peak.Can.Xcp	Contains types and classes for using the XCP API implementation from PEAK-System
⌋	Peak.Can.IsoTp	Contains types and classes for using the PCAN-ISO-TP 3.x API implementation from PEAK-System
⌋	Peak.Can.Uds	Contains types and classes for using the PCAN-UDS 2.x API implementation from PEAK-System
⌋	Peak.Can.ObdII	Contains types and classes for using the PCAN-OBDS II API implementation from PEAK-System
⌋	Peak.Lin	Contains types and classes used to handle with LIN devices from PEAK-System
⌋	Peak.RP1210A	Contains types and classes used to handle with CAN devices from PEAK-System through the TMC Recommended Practices 1210, version A, as known as RP1210(A)


#### 3.1.1 Peak.Can.Uds

The `Peak.Can.Uds` namespace contains types and classes to use the PCAN-UDS 2.x API within the .NET Framework programming environment and handle PCAN devices from PEAK-System.






#### Remarks

Under the Delphi environment, these elements are enclosed in the PUDS-Unit. The functionality of all elements included here is just the same. The difference between this namespace and the Delphi unit consists in the fact that Delphi accesses the Windows API directly (it is not Managed Code).

#### Classes

	Class	Description
	UDSApi	Defines a class which represents the PCAN-UDS 2.x API.

#### Structures
































	Structure	Description
	uds_msg	Represents the content of a UDS message.
	uds_sessioninfo	Represents the diagnostic session information of a server (ECU).
	uds_netaddrinfo	Represents the network addressing information of a UDS message.
	uds_msgconfig	Represents a PUDS message (uds_msg) configuration.
	uds_mapping	Represents a mapping between a network address information and a CAN identifier.



uds\_msgaccess

This structure provides accessors to the corresponding data in the uds\_msg structure.

## Enumerations

Name	Description
 uds_errstatus	Represents PUDS error codes (used in uds_status)
 uds_status	Represents a PUDS status or error code.
 uds_parameter	Represents a PUDS parameter to be read or set.
 uds_service	Represents a service identifier defined in ISO 14229-1.
 uds_address	Represents a standardized ISO-15765-4 address.
 uds_can_id	Represents a standardized ISO-15765-4 CAN identifier.
 uds_msgprotocol	Represents a standardized and supported network communication protocol.
 uds_status_offset	Defines constants used by the uds_status enumeration.
 uds_msgtype	Represents types and flags for a uds_msg.
 uds_nrc	Represents a UDS negative response code (NRC).
 uds_svc_param_dsc	Represents the subfunction parameter for the UDS service DiagnosticSessionControl.
 uds_svc_param_er	Represents the subfunction parameter for the UDS service ECUReset.
 uds_svc_param_cc	Represents the subfunction parameter for the UDS service CommunicationControl.
 uds_svc_param_tp	Represents the subfunction parameter for the UDS service TesterPresent.
 uds_svc_param_cdts	Represents the subfunction parameter for the UDS service ControlDTCSetting.
 uds_svc_param_roe	Represents the subfunction parameter for the UDS service ResponseOnEvent.
 uds_svc_param_roe_recommended_service_id	Represents the recommended service to respond to for the UDS service ResponseOnEvent.
 uds_svc_param_lc	Represents the subfunction parameter for the UDS service LinkControl.
 uds_svc_param_lc_baudrate_identifier	Represents the standard baud rate identifier for the UDS service LinkControl.
 uds_svc_param_di	Represents the data identifier parameter for the UDS services like ReadDataByIdentifier.
 uds_svc_param_rdbpi	Represents the subfunction parameter for the UDS service ReadDataByPeriodicIdentifier.
 uds_svc_param_ddd	Represents the subfunction parameter for the UDS service DynamicallyDefineDataIdentifier.
 uds_svc_param_rdtci	Represents the subfunction parameter for the UDS service ReadDTCInformation.
 uds_svc_param_rdtci_dtcsvm	Represents the DTC severity mask for the UDS service ReadDTCInformation.
 uds_svc_param_iocbi	Represents the subfunction parameter for the UDS service InputOutputControlByIdentifier.
 uds_svc_param_rc	Represents the subfunction parameter for the UDS service RoutineControl.
 uds_svc_param_rc_rid	Represents the routine identifier for the UDS service RoutineControl.
 uds_svc_param_atp	Represents the subfunction parameter for the UDS service AccessTimingParameter.
 uds_svc_param_rft_moop	Represents the mode of operation parameter for the UDS service RequestFileTransfer.
 uds_svc_authentication_subfunction	Represents the subfunction parameter for UDS service Authentication.
 uds_svc_authentication_return_parameter	Represents the return parameter for UDS service Authentication.



## 3.2 Units

**PEAK** offers the implementation of some specific programming interfaces as Units for the Delphi's programming environment. The following units are available to be used:

### Namespaces

	Alias	Description
	PUDS Unit.	Delphi unit for using the PCAN-UDS 2.x API from PEAK-System.


### 3.2.1 PUDS Unit

The PUDS-Unit contains types and classes to use the PCAN-UDS 2.x API within Delphi's programming environment and handle PCAN devices from PEAK-System.







### Remarks

For the .NET Framework, these elements are enclosed in the `Peak.Can.Uds` namespace. The functionality of all elements included here is just the same. The difference between this Unit and the .NET namespace consists in the fact that Delphi accesses the Windows API directly (it is not Managed Code).














### Classes



















	Class	Description
	TUdsApi	Defines a class which represents the PCAN-UDS 2.x API.

### Structures

	Structure	Description
	uds_msg	Represents the content of a UDS message.
	uds_sessioninfo	Represents the diagnostic session information of a server (ECU).
	uds_netaddrinfo	Represents the network addressing information of a UDS message.
	uds_msgconfig	Represents a PUDS message (uds_msg) configuration.
	uds_mapping	Represents a mapping between a network address information and a CAN identifier.
	uds_msgaccess	This structure provides accessors to the corresponding data in the uds_msg structure.

### Enumerations



	Name	Description
	uds_errstatus	Represents PUDS error codes (used in uds_status)
	uds_status	Represents a PUDS status or error code.
	uds_parameter	Represents a PUDS parameter to be read or set.
	uds_service	Represents a service identifier defined in ISO 14229-1.
	uds_address	Represents a standardized ISO-15765-4 address.
	uds_can_id	Represents a standardized ISO-15765-4 CAN identifier.
	uds_msgprotocol	Represents a standardized and supported network communication protocol.
	uds_status_offset	Defines constants used by the uds_status enumeration.
	uds_msgtype	Represents types and flags for a uds_msg.
	uds_	Represents a UDS negative response code (NRC).
	uds_svc_param_dsc	Represents the subfunction parameter for the UDS service DiagnosticSessionControl.
	uds_svc_param_er	Represents the subfunction parameter for the UDS service ECUReset.
	uds_svc_param_cc	Represents the subfunction parameter for the UDS service CommunicationControl.

	Name	Description
	uds_svc_param_tp	Represents the subfunction parameter for the UDS service TesterPresent.
	uds_svc_param_cdtcs	Represents the subfunction parameter for the UDS service ControlDTCSetting.
	uds_svc_param_roe	Represents the subfunction parameter for the UDS service ResponseOnEvent.
	uds_svc_param_roe_recommended_service_id	Represents the recommended service to respond to for the UDS service ResponseOnEvent.
	uds_svc_param_lc	Represents the subfunction parameter for the UDS service LinkControl.
	uds_svc_param_lc_baudrate_identifier	Represents the standard baud rate identifier for the UDS service LinkControl.
	uds_svc_param_di	Represents the data identifier parameter for the UDS services like ReadDataByIdentifier.
	uds_svc_param_rdbpi	Represents the subfunction parameter for the UDS service ReadDataByPeriodicIdentifier.
	uds_svc_param_ddd	Represents the subfunction parameter for the UDS service DynamicallyDefineDataIdentifier.
	uds_svc_param_rdtci	Represents the subfunction parameter for the UDS service ReadDTCInformation.
	uds_svc_param_rdtci_dtcsvm	Represents the DTC severity mask for the UDS service ReadDTCInformation.
	uds_svc_param_iocbi	Represents the subfunction parameter for the UDS service InputOutputControlByIdentifier.
	uds_svc_param_rc	Represents the subfunction parameter for the UDS service RoutineControl.
	uds_svc_param_rc_rid	Represents the routine identifier for the UDS service RoutineControl.
	uds_svc_param_atp	Represents the subfunction parameter for the UDS service AccessTimingParameter.
	uds_svc_param_rft_moop	Represents the mode of operation parameter for the UDS service RequestFileTransfer.
	uds_svc_authentication_subfunction	Represents the subfunction parameter for UDS service Authentication.
	uds_svc_authentication_return_parameter	Represents the return parameter for UDS service Authentication.

## 3.3 classes

The following classes are offered to make use of the PCAN-UDS 2.x API in a managed or unmanaged way.

### Classes

	Class	Description
	UDSApi	Defines a class to use the PCAN-UDS 2.x API within the Microsoft's .NET Framework programming environment.
	TUdsApi	Defines a class to use the PCAN-UDS 2.x API within the Delphi programming environment.

### 3.3.1 UDSApi

Defines a class that represents the PCAN-UDS 2.x API to be used within the Microsoft's .NET Framework.

#### Syntax

##### C#

```
public static class UDSApi
```

##### C++ / CLR

```
public ref class UDSApi abstract sealed
```

##### Visual Basic


```
Public NotInheritable Class UDSApi
```

#### Remarks

The `UDSApi` class collects and implements the PCAN-UDS 2.x API methods. Each method is called just like the API function with the exception that the prefix `UDS_` is not used. The structure and functionality of the methods and API functions are the same.

Within the .NET Framework from Microsoft, the `UDSApi` class is a static, not inheritable, class. It must directly be used, without any instance of it, e.g.:

```
uds_status res;
// Static use, without any instance
//
res = UDSApi.Initialize_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    cantp_baudrate.PCANTP_BAUDRATE_500K);
```

 **Note:** This class under Delphi is called `TUdsApi`.

**See also:** Methods on page 139, Definitions on page 765.

### 3.3.2 TUdsApi

Defines a class which represents the PCAN-UDS 2.x API to be used within the Delphi programming environment.

## Syntax

### Pascal OO

```
TUDSApi = class
```

## Remarks







`TUDSApi` is a class containing only class-methods and constant members, allowing their use without the creation of any object, just like a static class of other programming languages. It collects and implements the PCAN-UDS 2.x API functions. Each method is called just like the API function with the exception that the prefix `UDS` is not used. The structure and functionality of the methods and API functions are the same.

 **Note:** This class under .NET framework is called `UDSApi`.

**See also:** Methods on page 139, Definitions on page 765.

## 3.4 Structures

The PCAN-UDS 2.x API defines the following structures:

	Name	Description
	uds_msg	Represents the content of a UDS message.
	uds_sessioninfo	Represents the diagnostic session information of a server (ECU).
	uds_netaddrinfo	Represents the network addressing information of a UDS message.
	uds_msgconfig	Represents a PUDS message (uds_msg) configuration.
	uds_mapping	Represents a mapping between a network address information and a CAN identifier.
	uds_msgaccess	This structure provides accessors to the corresponding data in the uds_msg structure.

### 3.4.1 uds\_msg

Represents the content of a UDS message.

#### Syntax

##### C/C++

```
typedef struct _uds_msg {
    uds_msgtype type;
    uds_msgaccess links;
    cantp_msg msg;
} uds_msg;
```

##### Pascal OO

```
uds_msg = record
    typem: uds_msgtype;
    links: uds_msgaccess;
    msg: cantp_msg;
End;
```

##### C#

```
[StructLayout(LayoutKind.Sequential, Pack = 8)]
public struct uds_msg
{
    [MarshalAs(UnmanagedType.U4)]
    public uds_msgtype type;
    public uds_msgaccess links;
    public cantp_msg msg;
}
```

##### C++ / CLR

```
[StructLayout(LayoutKind::Sequential, Pack = 8)]
public value struct uds_msg
{
    [MarshalAs(UnmanagedType::U4)]
    uds_msgtype type;
    uds_msgaccess links;
    cantp_msg msg;
};
```

## Visual Basic

```
<StructLayout(LayoutKind.Sequential, Pack:=8)>
Public Structure uds_msg
    <MarshalAs(UnmanagedType.U4)>
    Public type As uds_msgtype
    Public links As uds_msgaccess
    Public msg As cantp_msg
End Structure
```

## Fields

Name	Description
type	Type and flags of the message (see uds_msgtype on page 63).
links	Quick accessors to the message data (see uds_msgaccess on page 28).
msg	The PCANTP message encapsulating the UDS data (see cantp_msg on page 118).

## Remarks

The `uds_msg` structure is automatically initialized and allocated by the PCAN-UDS 2.x API using:

- `UDS_MsgAlloc_2013` function or `MsgAlloc_2013` method
- PUDS services functions (suffixed `UDS_Svc`) or methods (suffixed `Svc`)
- `UDS_Read_2013` function or `Read_2013` method
- PUDS `UDS_WaitFor` functions or `WaitFor` methods

Once processed, the `uds_msg` structure should be released using `UDS_MsgFree_2013` function or `MsgFree_2013` method.

Some message related values are predefined in the API: see Messages Related Definitions on page 765.

### 3.4.2 uds\_sessioninfo

Represents the diagnostic session information of a server (ECU).

## Syntax

### C/C++

```
typedef struct _uds_sessioninfo
{
    uds_netaddrinfo nai;
    cantp_can_msgtype can_msg_type;
    uint8_t session_type;
    uint16_t timeout_p2can_server_max;
    uint16_t timeout_enhanced_p2can_server_max;
    uint16_t s3_client_ms;
} uds_sessioninfo;
```

### Pascal OO

```
uds_sessioninfo = record
    nai: uds_netaddrinfo;
    can_msg_type: cantp_can_msgtype;
    session_type: Byte;
    timeout_p2can_server_max: UInt16;
```

```

    timeout_enhanced_p2can_server_max: UInt16;
    s3_client_ms: UInt16;
End;

```

**C#**

```

[StructLayout(LayoutKind.Sequential, Pack = 8)]
public struct uds_sessioninfo
{
    public uds_netaddrinfo nai;
    [MarshalAs(UnmanagedType.U4)]
    public cantp_can_msgtype can_msg_type;
    public Byte session_type;
    public UInt16 timeout_p2can_server_max;
    public UInt16 timeout_enhanced_p2can_server_max;
    public UInt16 s3_client_ms;
}

```

**C++ / CLR**

```

[StructLayout(LayoutKind::Sequential, Pack = 8)]
public value struct uds_sessioninfo
{
    uds_netaddrinfo nai;
    [MarshalAs(UnmanagedType::U4)]
    cantp_can_msgtype can_msg_type;
    Byte session_type;
    UInt16 timeout_p2can_server_max;
    UInt16 timeout_enhanced_p2can_server_max;
    UInt16 s3_client_ms;
};

```

**Visual Basic**

```





<StructLayout(LayoutKind.Sequential, Pack:=8)>
Public Structure uds_sessioninfo
    Public nai As uds_netaddrinfo
    <MarshalAs(UnmanagedType.U4)>
    Public can_msg_type As cantp_can_msgtype
    Public session_type As Byte
    Public timeout_p2can_server_max As UInt16
    Public timeout_enhanced_p2can_server_max As UInt16
    Public s3_client_ms As UInt16
End Structure

```

**Fields**

Name	Description
nai	Network Addressing Information (see uds_netaddrinfo on page 24).
can_msg_type	Type and flags of the CAN/CAN FD frame (see cantp_can_msgtype on page 121).
session_type	Currently activated diagnostic session type (see uds_svc_param_dsc on page 71).
timeout_p2can_server_max	Default P2 CAN server max timing for the activated session (i.e. maximum time allowed for the ECU to transmit a response indication).
timeout_enhanced_p2can_server_max	Enhanced P2 CAN server max timing for the activated session (i.e. maximum time allowed for the ECU to transmit a response indication after having sent a negative response code stating that more time is required: PUDS_NRC_EXTENDED_TIMING, 0x78). Warning: according to the ISO 14229-2, the resolution of this parameter is 10ms.
s3_client_ms	Time between two TesterPresents (using a null s3 timing will disable automatic TesterPresent).

## Predefined Parameters Values

	Type	Name	Value	Description
	Int32	PUDS_P2CAN_SERVER_MAX_DEFAULT	50	Default value in milliseconds for the server performance requirement (see ISO_14229-2_2013 §7.2 table 4).
	Int32	PUDS_P2CAN_ENHANCED_SERVER_MAX_DEFAULT	5000	Default value in milliseconds for the enhanced server performance requirement (see ISO_14229-2_2013 §7.2 table 4). Warning: this parameter is in milliseconds, but the "timeout_enhanced_p2can_server_max" field in uds_sessioninfo has a resolution of 10ms.
	Int32	PUDS_S3_CLIENT_TIMEOUT_RECOMMENDED	2000	Default value in milliseconds for the S3 client performance requirement (see ISO_14229-2_2013 §7.2 table 4).
	Int32	PUDS_P3CAN_DEFAULT	50	Default value in milliseconds for the enhanced server performance requirement (see ISO_14229-2_2013 §7.2 table 4).

**See also:** [uds\\_netaddrinfo](#) on page 24, [UDS\\_SvcDiagnosticSessionControl\\_2013](#) on page 661

**Class-method:** [SvcDiagnosticSessionControl\\_2013](#) on page 258.

### 3.4.3 uds\_netaddrinfo

Represents the network addressing information of a UDS message.

#### Syntax

##### C/C++

```
typedef struct _uds_netaddrinfo {
    uds_msgprotocol protocol;
    cantp_isotp_addressing target_type;
    uint16_t source_addr;
    uint16_t target_addr;
    uint8_t extension_addr;
} uds_netaddrinfo;
```

##### Pascal OO

```
uds_netaddrinfo = record
    protocol: uds_msgprotocol;
    target_type: cantp_isotp_addressing;
    source_addr: UInt16;
    target_addr: UInt16;
    extension_addr: Byte;
End;
```

##### C#

```
[StructLayout(LayoutKind.Sequential, Pack = 8)]
public struct uds_netaddrinfo
{
    [MarshalAs(UnmanagedType.U4)]
    public uds_msgprotocol protocol;
    [MarshalAs(UnmanagedType.U4)]
    public cantp_isotp_addressing target_type;
    public UInt16 source_addr;
    public UInt16 target_addr;
    public Byte extension_addr;
}
```



## C++ / CLR

```
[StructLayout(LayoutKind::Sequential, Pack = 8)]
public value struct uds_netaddrinfo
{
    [MarshalAs(UnmanagedType::U4)]
    uds_msgprotocol protocol;
    [MarshalAs(UnmanagedType::U4)]
    cantp_isotp_addressing target_type;
    UInt16 source_addr;
    UInt16 target_addr;
    Byte extension_addr;
};
```

## Visual Basic

```
<StructLayout(LayoutKind.Sequential, Pack:=8)>
Public Structure uds_netaddrinfo
    <MarshalAs(UnmanagedType.U4)>
    Public protocol As uds_msgprotocol
    <MarshalAs(UnmanagedType.U4)>
    Public target_type As cantp_isotp_addressing
    Public source_addr As UInt16
    Public target_addr As UInt16
    Public extension_addr As Byte
End Structure
```

## Fields

Name	Description
protocol	Represents the protocol being used for communication (see uds_msgprotocol on page 61).
target_type	Represents the target address type (see cantp_isotp_addressing 115).
source_addr	Represents the source address (see uds_address on page 56).
target_addr	Represents the target address (see uds_address on page 56).
extension_addr	Represents the extension address (see uds_address on page 56).

**See also:** [uds\\_address](#) on page 56, [cantp\\_isotp\\_addressing](#) on page 115, [uds\\_msgprotocol](#) on page 61.

### 3.4.4 uds\_mapping

Represents a mapping between a network address information and a CAN identifier.

## Syntax

### C/C++

```
typedef struct _uds_mapping {
    uintptr_t uid;
    uint32_t can_id;
    uint32_t can_id_flow_ctrl;
    cantp_can_msgtype can_msgtype;
    uint8_t can_tx_dlc;
    uds_netaddrinfo nai;
} uds_mapping;
```

### Pascal OO

```
uds_mapping = record
    uid: Pointer;
    can_id: UInt32;
```

```

can_id_flow_ctrl: UInt32;
can_msgtype: cantp_can_msgtype;
can_tx_dlc: Byte;
nai: uds_netaddrinfo;
End;

```

## C#

```

[StructLayout(LayoutKind.Sequential, Pack = 8)]
public struct uds_mapping
{
    public UIntPtr uid;
    public UInt32 can_id;
    public UInt32 can_id_flow_ctrl;
    [MarshalAs(UnmanagedType.U4)]
    public cantp_can_msgtype can_msgtype;
    public Byte can_tx_dlc;
    public uds_netaddrinfo nai;
}

```

## C++ / CLR

```

[StructLayout(LayoutKind::Sequential, Pack = 8)]
public value struct uds_mapping
{
    UIntPtr uid;
    UInt32 can_id;
    UInt32 can_id_flow_ctrl;
    [MarshalAs(UnmanagedType::U4)]
    cantp_can_msgtype can_msgtype;
    Byte can_tx_dlc;
    uds_netaddrinfo nai;
};

```

## Visual Basic

```

<StructLayout(LayoutKind.Sequential, Pack:=8)>
Public Structure uds_mapping
    Public uid As UIntPtr
    Public can_id As UInt32
    Public can_id_flow_ctrl As UInt32
    <MarshalAs(UnmanagedType.U4)>
    Public can_msgtype As cantp_can_msgtype
    Public can_tx_dlc As Byte
    Public nai As uds_netaddrinfo
End Structure

```

## Fields

Name	Description
uid	Read only, mapping's unique identifier.
can_id	CAN identifier mapped to the network address information (see predefined uds_can_id values on page 58).
can_id_flow_ctrl	CAN identifier used for the flow control frame, formerly response CAN identifier (see predefined uds_can_id values on page 58).
can_msgtype	CAN frame message type, only PCANTP_CAN_MSGTYPE_STANDARD or PCANTP_CAN_MSGTYPE_EXTENDED is mandatory (see cantp_can_msgtype on page 121).
can_tx_dlc	Default CAN DLC value to use with segmented messages. Value can be 8 or more if CAN FD communication is supported. If non-zero, this value will supersede parameter PUDS_PARAMETER_CAN_TX_DL for communications involving this mapping.
nai	Network Addressing Information (see uds_netaddrinfo on page 24).

## Remark

By default, some mappings are initialized in the PCAN-UDS 2.x API. See UDS and ISO-TP Network Addressing Information on page 770.

**See also:** [UDS\\_AddMapping\\_2013](#) on page 631, [UDS\\_RemoveMapping\\_2013](#) on page 634, [AddMapping\\_2013](#) on page 164, [RemoveMapping\\_2013](#) on page 168.

### 3.4.5 uds\_msgconfig

Represents a PUDS message ([uds\\_msg](#)) configuration.

## Syntax

### C/C++

```
typedef struct _uds_msgconfig {
    uds_msgtype type;
    uds_netaddrinfo nai;
    uint32_t can_id;
    cantp_can_msgtype can_msgtype;
    uint8_t can_tx_dlc;
} uds_msgconfig;
```

### Pascal OO

```
uds_msgconfig = record
    typem: uds_msgtype;
    nai: uds_netaddrinfo;
    can_id: UInt32;
    can_msgtype: cantp_can_msgtype;
    can_tx_dlc: Byte;
End;
```

### C#

```
[StructLayout(LayoutKind.Sequential, Pack = 8)]
public struct uds_msgconfig
{
    [MarshalAs(UnmanagedType.U4)]
    public uds_msgtype type;
    public uds_netaddrinfo nai;
    public UInt32 can_id;
    [MarshalAs(UnmanagedType.U4)]
    public cantp_can_msgtype can_msgtype;
    public Byte can_tx_dlc;
}
```

### C++ / CLR

```
[StructLayout(LayoutKind::Sequential, Pack = 8)]
public value struct uds_msgconfig
{
    [MarshalAs(UnmanagedType::U4)]
    uds_msgtype type;
    uds_netaddrinfo nai;
    UInt32 can_id;
    [MarshalAs(UnmanagedType::U4)]
    cantp_can_msgtype can_msgtype;
    Byte can_tx_dlc;
};
```

## Visual Basic

```
<StructLayout(LayoutKind.Sequential, Pack:=8)>
Public Structure uds_msgconfig
    <MarshalAs(UnmanagedType.U4)>
    Public type As uds_msgtype
    Public nai As uds_netaddrinfo
    Public can_id As UInt32
    <MarshalAs(UnmanagedType.U4)>
    Public can_msgtype As cantp_can_msgtype
    Public can_tx_dlc As Byte
End Structure
```

## Fields

Name	Description
type	Message specific flags (see uds_msgtype on page 63).
nai	Message Network Addressing Information (see uds_netaddrinfo on page 24).
can_id	Optional, CAN identifier (see predefined uds_can_id values on page 58).
can_msgtype	Optional flags for the CAN layer: 29 bits CAN-ID, FD, BRS etc. (see cantp_can_msgtype on page 121).
can_tx_dlc	If non-zero, Data Length Code of the frame (see Remarks below).

## Remarks

Specifying a non-zero dlc value in this structure will set message's `can_info.dlc` field with this value. That means when the message will be written the value `can_tx_dlc` of the corresponding mapping and the value of the parameter `PUDS_PARAMETER_CAN_TX_DL` will be overridden (see `uds_mapping` on page 25, `uds_parameter` on page 41, `cantp_can_info` on page 124).

See also: `UDS_MsgAlloc_2013` on page 643, `MsgAlloc_2013` on page 211, `UDS_Scv` functions, `Svc` methods.

### 3.4.6 uds\_msgaccess

This structure provides accessors to the corresponding data in the `uds_msg` structure.

## Syntax

### C/C++

```
typedef struct _uds_msgaccess {
    uint8_t* service_id;
    uint8_t* param;
    uint8_t* nrc;
} uds_msgaccess;
```

### Pascal OO

```
uds_msgaccess = record
    service_id: ^Byte;
    param: ^Byte;
    nrc: ^Byte;
End;
```

### C#

```
[StructLayout(LayoutKind.Sequential, Pack = 8)]
public struct uds_msgaccess
{
    public IntPtr service_id;
```

```
public IntPtr param;  
public IntPtr nrc;  
}
```

### C++ / CLR

```
[StructLayout(LayoutKind::Sequential, Pack = 8)]  
public value struct uds_msgaccess  
{  
    Byte *service_id;  
    Byte *param;  
    Byte *nrc;  
};
```

### Visual Basic

```
<StructLayout(LayoutKind.Sequential, Pack:=8)>  
Public Structure uds_msgaccess  
    Public service_id As IntPtr  
    Public param As IntPtr  
    Public nrc As IntPtr  
End Structure
```















## Fields

Name	Description
service_id	Pointer to the UDS Service Identifier in message's data (see <code>uds_service</code> on page 53).
param	Pointer to the first parameter in message's data.
nrc	Pointer to the Negative Response Code in message's data, NULL on positive response (see <code>uds_</code> on page 63).

**See also:** `uds_msg` on page 21.

## 3.5 Types

The PCAN-UDS 2.x API defines the following types:

Name	Description
 uds_errstatus	Represents PUDS error codes (used in uds_status)
 uds_status	Represents a PUDS status or error code.
 uds_parameter	Represents a PUDS parameter to be read or set.
 uds_service	Represents UDS Service Identifiers defined in ISO 14229-1.
 uds_address	Represents a standardized ISO-15765-4 address.
 uds_can_id	Represents a standardized ISO-15765-4 CAN identifier.
 uds_status_offset	Defines constants used by the uds_status enumeration.
 uds_msgprotocol	Represents a standardized and supported network communication protocol.
 uds_msgtype	Represents types and flags for a uds_msg.
 uds_nrc	Represents a UDS negative response code (NRC).
 uds_svc_param_dsc	Represents the subfunction parameter for the UDS service DiagnosticSessionControl.
 uds_svc_param_er	Represents the subfunction parameter for the UDS service ECUReset.
 uds_svc_param_cc	Represents the subfunction parameter for the UDS service CommunicationControl.
 uds_svc_param_tp	Represents the subfunction parameter for the UDS service TesterPresent.
 uds_svc_param_cdtcs	Represents the subfunction parameter for the UDS service ControlDTCSetting.
 uds_svc_param_roe	Represents the subfunction parameter for the UDS service ResponseOnEvent.
 uds_svc_param_roe_recommended_service_id	Represents the recommended service to respond to for the UDS service ResponseOnEvent.
 uds_svc_param_lc	Represents the subfunction parameter for the UDS service LinkControl.
 uds_svc_param_lc_baudrate_identifier	Represents the standard baud rate identifier for the UDS service LinkControl.
 uds_svc_param_di	Represents the data identifier parameter for the UDS services like ReadDataByIdentifier.
 uds_svc_param_rdbpi	Represents the subfunction parameter for the UDS service ReadDataByPeriodicIdentifier.
 uds_svc_param_ddd	Represents the subfunction parameter for the UDS service DynamicallyDefineDataIdentifier.
 uds_svc_param_rdtci	Represents the subfunction parameter for the UDS service ReadDTCInformation.
 uds_svc_param_rdtci_dtcsvm	Represents the DTC severity mask for the UDS service ReadDTCInformation.
 uds_svc_param_iocbi	Represents the subfunction parameter for the UDS service InputOutputControlByIdentifier.
 uds_svc_param_rc	Represents the subfunction parameter for the UDS service RoutineControl.
 uds_svc_param_rc_rid	Represents the routine identifier for the UDS service RoutineControl.
 uds_svc_param_atp	Represents the subfunction parameter for the UDS service AccessTimingParameter. It defines the access type.
 uds_svc_param_rft_moop	Represents the mode of operation parameter for the UDS service RequestFileTransfer.
 uds_svc_authentication_subfunction	Represents the subfunction parameter for UDS service Authentication.
 uds_svc_authentication_return_parameter	Represents the return parameter for UDS service Authentication.

### 3.5.1 uds\_errstatus

Represents a UDS error codes used in uds\_status (see uds\_status on page 32).

#### Syntax

##### C/C++

```
typedef enum _uds_errstatus {
    PUDS_ERRSTATUS_SERVICE_NO_MESSAGE = 1,
    PUDS_ERRSTATUS_SERVICE_TIMEOUT_CONFIRMATION,
    PUDS_ERRSTATUS_SERVICE_TIMEOUT_RESPONSE,
    PUDS_ERRSTATUS_RESET,
    PUDS_ERRSTATUS_ERROR_WAIT_FOR_P3_TIMING,
    PUDS_ERRSTATUS_SERVICE_ALREADY_PENDING,
    PUDS_ERRSTATUS_SERVICE_TX_ERROR,
    PUDS_ERRSTATUS_SERVICE_RX_ERROR,
    PUDS_ERRSTATUS_SERVICE_RX_OVERFLOW,
    PUDS_ERRSTATUS_MESSAGE_BUFFER_ALREADY_USED
}uds_errstatus;
```

##### Pascal OO

```
uds_errstatus = (
    PUDS_ERRSTATUS_SERVICE_NO_MESSAGE = 1,
    PUDS_ERRSTATUS_SERVICE_TIMEOUT_CONFIRMATION,
    PUDS_ERRSTATUS_SERVICE_TIMEOUT_RESPONSE,
    PUDS_ERRSTATUS_RESET,
    PUDS_ERRSTATUS_ERROR_WAIT_FOR_P3_TIMING,
    PUDS_ERRSTATUS_SERVICE_ALREADY_PENDING,
    PUDS_ERRSTATUS_SERVICE_TX_ERROR,
    PUDS_ERRSTATUS_SERVICE_RX_ERROR,
    PUDS_ERRSTATUS_SERVICE_RX_OVERFLOW,
);
```

##### C#

```
public enum uds_errstatus : byte
{
    PUDS_ERRSTATUS_SERVICE_NO_MESSAGE = 1,
    PUDS_ERRSTATUS_SERVICE_TIMEOUT_CONFIRMATION,
    PUDS_ERRSTATUS_SERVICE_TIMEOUT_RESPONSE,
    PUDS_ERRSTATUS_RESET,
    PUDS_ERRSTATUS_ERROR_WAIT_FOR_P3_TIMING,
    PUDS_ERRSTATUS_SERVICE_ALREADY_PENDING,
    PUDS_ERRSTATUS_SERVICE_TX_ERROR,
    PUDS_ERRSTATUS_SERVICE_RX_ERROR,
    PUDS_ERRSTATUS_SERVICE_RX_OVERFLOW,
    PUDS_ERRSTATUS_MESSAGE_BUFFER_ALREADY_USED
}
```

##### C++ / CLR

```
public enum uds_errstatus : Byte
{
    PUDS_ERRSTATUS_SERVICE_NO_MESSAGE = 1,
    PUDS_ERRSTATUS_SERVICE_TIMEOUT_CONFIRMATION,
    PUDS_ERRSTATUS_SERVICE_TIMEOUT_RESPONSE,
    PUDS_ERRSTATUS_RESET,
    PUDS_ERRSTATUS_ERROR_WAIT_FOR_P3_TIMING,
    PUDS_ERRSTATUS_SERVICE_ALREADY_PENDING,
    PUDS_ERRSTATUS_SERVICE_TX_ERROR,
```

```

PUDS_ERRSTATUS_SERVICE_RX_ERROR,
PUDS_ERRSTATUS_SERVICE_RX_OVERFLOW,
PUDS_ERRSTATUS_MESSAGE_BUFFER_ALREADY_USED
};

```

## Visual Basic

```

Public Enum uds_errstatus As Byte
    PUDS_ERRSTATUS_SERVICE_NO_MESSAGE = 1
    PUDS_ERRSTATUS_SERVICE_TIMEOUT_CONFIRMATION
    PUDS_ERRSTATUS_SERVICE_TIMEOUT_RESPONSE
    PUDS_ERRSTATUS_RESET
    PUDS_ERRSTATUS_ERROR_WAIT_FOR_P3_TIMING
    PUDS_ERRSTATUS_SERVICE_ALREADY_PENDING
    PUDS_ERRSTATUS_SERVICE_TX_ERROR
    PUDS_ERRSTATUS_SERVICE_RX_ERROR
    PUDS_ERRSTATUS_SERVICE_RX_OVERFLOW
    PUDS_ERRSTATUS_MESSAGE_BUFFER_ALREADY_USED
End Enum

```

## Values

Name	Value	Description
PUDS_ERRSTATUS_SERVICE_NO_MESSAGE	1	No message available.
PUDS_ERRSTATUS_SERVICE_TIMEOUT_CONFIRMATION	2	Timeout while waiting message confirmation (loopback).
PUDS_ERRSTATUS_SERVICE_TIMEOUT_RESPONSE	3	Timeout while waiting for request message response.
PUDS_ERRSTATUS_RESET	4	UDS reset error.
PUDS_ERRSTATUS_ERROR_WAIT_FOR_P3_TIMING	5	UDS wait for P3 timing error.
PUDS_ERRSTATUS_SERVICE_ALREADY_PENDING	6	A UDS request is already pending. A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with UDS_Reset_2013 (see UDS_Reset_2013 on page 651).
PUDS_ERRSTATUS_SERVICE_TX_ERROR	7	An error occurred during the transmission of the UDS request message.
PUDS_ERRSTATUS_SERVICE_RX_ERROR	8	An error occurred during the reception of the UDS response message.
PUDS_ERRSTATUS_SERVICE_RX_OVERFLOW	9	Service received more messages than input buffer expected.
PUDS_ERRSTATUS_MESSAGE_BUFFER_ALREADY_USED	10	Given message buffer is already allocated, user must release buffer with UDS_MsgFree_2013 or MsgFree_2013 before reusing it.

### 3.5.2 uds\_status

Represents a PUDS status or error code.

## Syntax

### C/C++

```

typedef enum _uds_status {
    PUDS_STATUS_OK = PCANTP_STATUS_OK,
    PUDS_STATUS_NOT_INITIALIZED = PCANTP_STATUS_NOT_INITIALIZED,
    PUDS_STATUS_ALREADY_INITIALIZED = PCANTP_STATUS_ALREADY_INITIALIZED,
    PUDS_STATUS_NO_MEMORY = PCANTP_STATUS_NO_MEMORY,
    PUDS_STATUS_OVERFLOW = PCANTP_STATUS_OVERFLOW,
    PUDS_STATUS_NO_MESSAGE = PCANTP_STATUS_NO_MESSAGE,
    PUDS_STATUS_PARAM_INVALID_TYPE = PCANTP_STATUS_PARAM_INVALID_TYPE,
    PUDS_STATUS_PARAM_INVALID_VALUE = PCANTP_STATUS_PARAM_INVALID_VALUE,
    PUDS_STATUS_MAPPING_NOT_INITIALIZED = PCANTP_STATUS_MAPPING_NOT_INITIALIZED,

```



```

PUDS_STATUS_MAPPING_INVALID = PCANTP_STATUS_MAPPING_INVALID,
PUDS_STATUS_MAPPING_ALREADY_INITIALIZED = PCANTP_STATUS_MAPPING_ALREADY_INITIALIZED,
PUDS_STATUS_PARAM_BUFFER_TOO_SMALL = PCANTP_STATUS_PARAM_BUFFER_TOO_SMALL,
PUDS_STATUS_QUEUE_TX_FULL = PCANTP_STATUS_QUEUE_TX_FULL,
PUDS_STATUS_LOCK_TIMEOUT = PCANTP_STATUS_LOCK_TIMEOUT,
PUDS_STATUS_HANDLE_INVALID = PCANTP_STATUS_HANDLE_INVALID,
PUDS_STATUS_UNKNOWN = PCANTP_STATUS_UNKNOWN,
PUDS_STATUS_FLAG_BUS_LIGHT = PCANTP_STATUS_FLAG_BUS_LIGHT,
PUDS_STATUS_FLAG_BUS_HEAVY = PCANTP_STATUS_FLAG_BUS_HEAVY,
PUDS_STATUS_FLAG_BUS_WARNING = PCANTP_STATUS_FLAG_BUS_WARNING,
PUDS_STATUS_FLAG_BUS_PASSIVE = PCANTP_STATUS_FLAG_BUS_PASSIVE,
PUDS_STATUS_FLAG_BUS_OFF = PCANTP_STATUS_FLAG_BUS_OFF,
PUDS_STATUS_FLAG_BUS_ANY = PCANTP_STATUS_FLAG_BUS_ANY,
PUDS_STATUS_FLAG_NETWORK_RESULT = PCANTP_STATUS_FLAG_NETWORK_RESULT,
PUDS_STATUS_NETWORK_TIMEOUT_A = PCANTP_STATUS_NETWORK_TIMEOUT_A,
PUDS_STATUS_NETWORK_TIMEOUT_Bs = PCANTP_STATUS_NETWORK_TIMEOUT_Bs,
PUDS_STATUS_NETWORK_TIMEOUT_Cr = PCANTP_STATUS_NETWORK_TIMEOUT_Cr,
PUDS_STATUS_NETWORK_WRONG_SN = PCANTP_STATUS_NETWORK_WRONG_SN,
PUDS_STATUS_NETWORK_INVALID_FS = PCANTP_STATUS_NETWORK_INVALID_FS,
PUDS_STATUS_NETWORK_UNEXP_PDU = PCANTP_STATUS_NETWORK_UNEXP_PDU,
PUDS_STATUS_NETWORK_WFT_OVRN = PCANTP_STATUS_NETWORK_WFT_OVRN,
PUDS_STATUS_NETWORK_BUFFER_OVFLW = PCANTP_STATUS_NETWORK_BUFFER_OVFLW,
PUDS_STATUS_NETWORK_ERROR = PCANTP_STATUS_NETWORK_ERROR,
PUDS_STATUS_NETWORK_IGNORED = PCANTP_STATUS_NETWORK_IGNORED,
PUDS_STATUS_CAUTION_INPUT_MODIFIED = PCANTP_STATUS_CAUTION_INPUT_MODIFIED,
PUDS_STATUS_CAUTION_DLC_MODIFIED = PCANTP_STATUS_CAUTION_DLC_MODIFIED,
PUDS_STATUS_CAUTION_DATA_LENGTH_MODIFIED = PCANTP_STATUS_CAUTION_DATA_LENGTH_MODIFIED,
PUDS_STATUS_CAUTION_FD_FLAG_MODIFIED = PCANTP_STATUS_CAUTION_FD_FLAG_MODIFIED,
PUDS_STATUS_CAUTION_RX_QUEUE_FULL = PCANTP_STATUS_CAUTION_RX_QUEUE_FULL,
PUDS_STATUS_CAUTION_BUFFER_IN_USE = PCANTP_STATUS_CAUTION_BUFFER_IN_USE,
PUDS_STATUS_FLAG_PCAN_STATUS = PCANTP_STATUS_FLAG_PCAN_STATUS,
PUDS_STATUS_MASK_ERROR = PCANTP_STATUS_MASK_ERROR,
PUDS_STATUS_MASK_BUS = PCANTP_STATUS_MASK_BUS,
PUDS_STATUS_MASK_ISOTP_NET = PCANTP_STATUS_MASK_ISOTP_NET,
PUDS_STATUS_MASK_INFO = PCANTP_STATUS_MASK_INFO,
PUDS_STATUS_MASK_PCAN = PCANTP_STATUS_MASK_PCAN,
PUDS_STATUS_FLAG_UDS_ERROR = 0x20 << PCANTP_STATUS_OFFSET_UDS,
PUDS_STATUS_MASK_UDS_ERROR = 0x3f << PCANTP_STATUS_OFFSET_UDS,
PUDS_STATUS_SERVICE_NO_MESSAGE = PUDS_STATUS_FLAG_UDS_ERROR |
    (PUDS_ERRSTATUS_SERVICE_NO_MESSAGE << PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_SERVICE_TIMEOUT_CONFIRMATION = PUDS_STATUS_FLAG_UDS_ERROR |
    (PUDS_ERRSTATUS_SERVICE_TIMEOUT_CONFIRMATION << PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_SERVICE_TIMEOUT_RESPONSE = PUDS_STATUS_FLAG_UDS_ERROR |
    (PUDS_ERRSTATUS_SERVICE_TIMEOUT_RESPONSE << PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_RESET = PUDS_STATUS_FLAG_UDS_ERROR | (PUDS_ERRSTATUS_RESET <<
    PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_ERROR_WAIT_FOR_P3_TIMING = PUDS_STATUS_FLAG_UDS_ERROR |
    (PUDS_ERRSTATUS_ERROR_WAIT_FOR_P3_TIMING << PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_SERVICE_ALREADY_PENDING = PUDS_STATUS_FLAG_UDS_ERROR |
    (PUDS_ERRSTATUS_SERVICE_ALREADY_PENDING << PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_SERVICE_TX_ERROR = PUDS_STATUS_FLAG_UDS_ERROR |
    (PUDS_ERRSTATUS_SERVICE_TX_ERROR << PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_SERVICE_RX_ERROR = PUDS_STATUS_FLAG_UDS_ERROR |
    (PUDS_ERRSTATUS_SERVICE_RX_ERROR << PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_SERVICE_RX_OVERFLOW = PUDS_STATUS_FLAG_UDS_ERROR |
    (PUDS_ERRSTATUS_SERVICE_RX_OVERFLOW << PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED = PUDS_STATUS_FLAG_UDS_ERROR |
    (PUDS_ERRSTATUS_MESSAGE_BUFFER_ALREADY_USED << PCANTP_STATUS_OFFSET_UDS),
} uds_status;

```

**C++ / CLR**

```

public enum uds_status : UInt32
{
    PUDS_STATUS_OK = cantp_status::PCANTP_STATUS_OK,
    PUDS_STATUS_NOT_INITIALIZED = cantp_status::PCANTP_STATUS_NOT_INITIALIZED,
    PUDS_STATUS_ALREADY_INITIALIZED = cantp_status::PCANTP_STATUS_ALREADY_INITIALIZED,
    PUDS_STATUS_NO_MEMORY = cantp_status::PCANTP_STATUS_NO_MEMORY,
    PUDS_STATUS_OVERFLOW = cantp_status::PCANTP_STATUS_OVERFLOW,
    PUDS_STATUS_NO_MESSAGE = cantp_status::PCANTP_STATUS_NO_MESSAGE,
    PUDS_STATUS_PARAM_INVALID_TYPE = cantp_status::PCANTP_STATUS_PARAM_INVALID_TYPE,
    PUDS_STATUS_PARAM_INVALID_VALUE = cantp_status::PCANTP_STATUS_PARAM_INVALID_VALUE,
    PUDS_STATUS_MAPPING_NOT_INITIALIZED = cantp_status::PCANTP_STATUS_MAPPING_NOT_INITIALIZED,
    PUDS_STATUS_MAPPING_INVALID = cantp_status::PCANTP_STATUS_MAPPING_INVALID,
    PUDS_STATUS_MAPPING_ALREADY_INITIALIZED =
        cantp_status::PCANTP_STATUS_MAPPING_ALREADY_INITIALIZED,
    PUDS_STATUS_PARAM_BUFFER_TOO_SMALL = cantp_status::PCANTP_STATUS_PARAM_BUFFER_TOO_SMALL,
    PUDS_STATUS_QUEUE_TX_FULL = cantp_status::PCANTP_STATUS_QUEUE_TX_FULL,
    PUDS_STATUS_LOCK_TIMEOUT = cantp_status::PCANTP_STATUS_LOCK_TIMEOUT,
    PUDS_STATUS_HANDLE_INVALID = cantp_status::PCANTP_STATUS_HANDLE_INVALID,
    PUDS_STATUS_UNKNOWN = cantp_status::PCANTP_STATUS_UNKNOWN,
    PUDS_STATUS_FLAG_BUS_LIGHT = cantp_status::PCANTP_STATUS_FLAG_BUS_LIGHT,
    PUDS_STATUS_FLAG_BUS_HEAVY = cantp_status::PCANTP_STATUS_FLAG_BUS_HEAVY,
    PUDS_STATUS_FLAG_BUS_WARNING = cantp_status::PCANTP_STATUS_FLAG_BUS_WARNING,
    PUDS_STATUS_FLAG_BUS_PASSIVE = cantp_status::PCANTP_STATUS_FLAG_BUS_PASSIVE,
    PUDS_STATUS_FLAG_BUS_OFF = cantp_status::PCANTP_STATUS_FLAG_BUS_OFF,
    PUDS_STATUS_FLAG_BUS_ANY = cantp_status::PCANTP_STATUS_FLAG_BUS_ANY,
    PUDS_STATUS_FLAG_NETWORK_RESULT = cantp_status::PCANTP_STATUS_FLAG_NETWORK_RESULT,
    PUDS_STATUS_NETWORK_TIMEOUT_A = cantp_status::PCANTP_STATUS_NETWORK_TIMEOUT_A,
    PUDS_STATUS_NETWORK_TIMEOUT_Bs = cantp_status::PCANTP_STATUS_NETWORK_TIMEOUT_Bs,
    PUDS_STATUS_NETWORK_TIMEOUT_Cr = cantp_status::PCANTP_STATUS_NETWORK_TIMEOUT_Cr,
    PUDS_STATUS_NETWORK_WRONG_SN = cantp_status::PCANTP_STATUS_NETWORK_WRONG_SN,
    PUDS_STATUS_NETWORK_INVALID_FS = cantp_status::PCANTP_STATUS_NETWORK_INVALID_FS,
    PUDS_STATUS_NETWORK_UNEXP_PDU = cantp_status::PCANTP_STATUS_NETWORK_UNEXP_PDU,
    PUDS_STATUS_NETWORK_WFT_OVRN = cantp_status::PCANTP_STATUS_NETWORK_WFT_OVRN,
    PUDS_STATUS_NETWORK_BUFFER_OVFLW = cantp_status::PCANTP_STATUS_NETWORK_BUFFER_OVFLW,
    PUDS_STATUS_NETWORK_ERROR = cantp_status::PCANTP_STATUS_NETWORK_ERROR,
    PUDS_STATUS_NETWORK_IGNORED = cantp_status::PCANTP_STATUS_NETWORK_IGNORED,
    PUDS_STATUS_CAUTION_INPUT_MODIFIED = cantp_status::PCANTP_STATUS_CAUTION_INPUT_MODIFIED,
    PUDS_STATUS_CAUTION_DLC_MODIFIED = cantp_status::PCANTP_STATUS_CAUTION_DLC_MODIFIED,
    PUDS_STATUS_CAUTION_DATA_LENGTH_MODIFIED =
        cantp_status::PCANTP_STATUS_CAUTION_DATA_LENGTH_MODIFIED,
    PUDS_STATUS_CAUTION_FD_FLAG_MODIFIED = cantp_status::PCANTP_STATUS_CAUTION_FD_FLAG_MODIFIED,
    PUDS_STATUS_CAUTION_RX_QUEUE_FULL = cantp_status::PCANTP_STATUS_CAUTION_RX_QUEUE_FULL,
    PUDS_STATUS_CAUTION_BUFFER_IN_USE = cantp_status::PCANTP_STATUS_CAUTION_BUFFER_IN_USE,
    PUDS_STATUS_FLAG_PCAN_STATUS = cantp_status::PCANTP_STATUS_FLAG_PCAN_STATUS,
    PUDS_STATUS_MASK_ERROR = cantp_status::PCANTP_STATUS_MASK_ERROR,
    PUDS_STATUS_MASK_BUS = cantp_status::PCANTP_STATUS_MASK_BUS,
    PUDS_STATUS_MASK_ISOTP_NET = cantp_status::PCANTP_STATUS_MASK_ISOTP_NET,
    PUDS_STATUS_MASK_INFO = cantp_status::PCANTP_STATUS_MASK_INFO,
    PUDS_STATUS_MASK_PCAN = cantp_status::PCANTP_STATUS_MASK_PCAN,
    PUDS_STATUS_FLAG_UDS_ERROR = 0x20 << uds_status_offset::PCANTP_STATUS_OFFSET_UDS,
    PUDS_STATUS_MASK_UDS_ERROR = (UInt32)0x3f << uds_status_offset::PCANTP_STATUS_OFFSET_UDS,
    PUDS_STATUS_SERVICE_NO_MESSAGE = PUDS_STATUS_FLAG_UDS_ERROR |
        (uds_errstatus::PUDS_ERRSTATUS_SERVICE_NO_MESSAGE <<
        uds_status_offset::PCANTP_STATUS_OFFSET_UDS),
    PUDS_STATUS_SERVICE_TIMEOUT_CONFIRMATION = PUDS_STATUS_FLAG_UDS_ERROR |
        (uds_errstatus::PUDS_ERRSTATUS_SERVICE_TIMEOUT_CONFIRMATION <<
        uds_status_offset::PCANTP_STATUS_OFFSET_UDS),
    PUDS_STATUS_SERVICE_TIMEOUT_RESPONSE = PUDS_STATUS_FLAG_UDS_ERROR |
        (uds_errstatus::PUDS_ERRSTATUS_SERVICE_TIMEOUT_RESPONSE <<
        uds_status_offset::PCANTP_STATUS_OFFSET_UDS),

```

```

PUDS_STATUS_RESET = PUDS_STATUS_FLAG_UDS_ERROR | (uds_errstatus::PUDS_ERRSTATUS_RESET <<
    uds_status_offset::PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_ERROR_WAIT_FOR_P3_TIMING = PUDS_STATUS_FLAG_UDS_ERROR |
    (uds_errstatus::PUDS_ERRSTATUS_ERROR_WAIT_FOR_P3_TIMING <<
    uds_status_offset::PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_SERVICE_ALREADY_PENDING = PUDS_STATUS_FLAG_UDS_ERROR |
    (uds_errstatus::PUDS_ERRSTATUS_SERVICE_ALREADY_PENDING <<
    uds_status_offset::PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_SERVICE_TX_ERROR = PUDS_STATUS_FLAG_UDS_ERROR |
    (uds_errstatus::PUDS_ERRSTATUS_SERVICE_TX_ERROR <<
    uds_status_offset::PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_SERVICE_RX_ERROR = PUDS_STATUS_FLAG_UDS_ERROR |
    (uds_errstatus::PUDS_ERRSTATUS_SERVICE_RX_ERROR <<
    uds_status_offset::PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_SERVICE_RX_OVERFLOW = PUDS_STATUS_FLAG_UDS_ERROR |
    (uds_errstatus::PUDS_ERRSTATUS_SERVICE_RX_OVERFLOW <<
    uds_status_offset::PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED = PUDS_STATUS_FLAG_UDS_ERROR |
    (uds_errstatus::PUDS_ERRSTATUS_MESSAGE_BUFFER_ALREADY_USED <<
    uds_status_offset::PCANTP_STATUS_OFFSET_UDS)
};

```

**C#**

```

public enum uds_status : UInt32
{
    PUDS_STATUS_OK = cantp_status.PCANTP_STATUS_OK,
    PUDS_STATUS_NOT_INITIALIZED = cantp_status.PCANTP_STATUS_NOT_INITIALIZED,
    PUDS_STATUS_ALREADY_INITIALIZED = cantp_status.PCANTP_STATUS_ALREADY_INITIALIZED,
    PUDS_STATUS_NO_MEMORY = cantp_status.PCANTP_STATUS_NO_MEMORY,
    PUDS_STATUS_OVERFLOW = cantp_status.PCANTP_STATUS_OVERFLOW,
    PUDS_STATUS_NO_MESSAGE = cantp_status.PCANTP_STATUS_NO_MESSAGE,
    PUDS_STATUS_PARAM_INVALID_TYPE = cantp_status.PCANTP_STATUS_PARAM_INVALID_TYPE,
    PUDS_STATUS_PARAM_INVALID_VALUE = cantp_status.PCANTP_STATUS_PARAM_INVALID_VALUE,
    PUDS_STATUS_MAPPING_NOT_INITIALIZED = cantp_status.PCANTP_STATUS_MAPPING_NOT_INITIALIZED,
    PUDS_STATUS_MAPPING_INVALID = cantp_status.PCANTP_STATUS_MAPPING_INVALID,
    PUDS_STATUS_MAPPING_ALREADY_INITIALIZED =
        cantp_status.PCANTP_STATUS_MAPPING_ALREADY_INITIALIZED,
    PUDS_STATUS_PARAM_BUFFER_TOO_SMALL = cantp_status.PCANTP_STATUS_PARAM_BUFFER_TOO_SMALL,
    PUDS_STATUS_QUEUE_TX_FULL = cantp_status.PCANTP_STATUS_QUEUE_TX_FULL,
    PUDS_STATUS_LOCK_TIMEOUT = cantp_status.PCANTP_STATUS_LOCK_TIMEOUT,
    PUDS_STATUS_HANDLE_INVALID = cantp_status.PCANTP_STATUS_HANDLE_INVALID,
    PUDS_STATUS_UNKNOWN = cantp_status.PCANTP_STATUS_UNKNOWN,
    PUDS_STATUS_FLAG_BUS_LIGHT = cantp_status.PCANTP_STATUS_FLAG_BUS_LIGHT,
    PUDS_STATUS_FLAG_BUS_HEAVY = cantp_status.PCANTP_STATUS_FLAG_BUS_HEAVY,
    PUDS_STATUS_FLAG_BUS_WARNING = cantp_status.PCANTP_STATUS_FLAG_BUS_WARNING,
    PUDS_STATUS_FLAG_BUS_PASSIVE = cantp_status.PCANTP_STATUS_FLAG_BUS_PASSIVE,
    PUDS_STATUS_FLAG_BUS_OFF = cantp_status.PCANTP_STATUS_FLAG_BUS_OFF,
    PUDS_STATUS_FLAG_BUS_ANY = cantp_status.PCANTP_STATUS_FLAG_BUS_ANY,
    PUDS_STATUS_FLAG_NETWORK_RESULT = cantp_status.PCANTP_STATUS_FLAG_NETWORK_RESULT,
    PUDS_STATUS_NETWORK_TIMEOUT_A = cantp_status.PCANTP_STATUS_NETWORK_TIMEOUT_A,
    PUDS_STATUS_NETWORK_TIMEOUT_Bs = cantp_status.PCANTP_STATUS_NETWORK_TIMEOUT_Bs,
    PUDS_STATUS_NETWORK_TIMEOUT_Cr = cantp_status.PCANTP_STATUS_NETWORK_TIMEOUT_Cr,
    PUDS_STATUS_NETWORK_WRONG_SN = cantp_status.PCANTP_STATUS_NETWORK_WRONG_SN,
    PUDS_STATUS_NETWORK_INVALID_FS = cantp_status.PCANTP_STATUS_NETWORK_INVALID_FS,
    PUDS_STATUS_NETWORK_UNEXP_PDU = cantp_status.PCANTP_STATUS_NETWORK_UNEXP_PDU,
    PUDS_STATUS_NETWORK_WFT_OVRN = cantp_status.PCANTP_STATUS_NETWORK_WFT_OVRN,
    PUDS_STATUS_NETWORK_BUFFER_OVFLW = cantp_status.PCANTP_STATUS_NETWORK_BUFFER_OVFLW,
    PUDS_STATUS_NETWORK_ERROR = cantp_status.PCANTP_STATUS_NETWORK_ERROR,
    PUDS_STATUS_NETWORK_IGNORED = cantp_status.PCANTP_STATUS_NETWORK_IGNORED,
    PUDS_STATUS_CAUTION_INPUT_MODIFIED = cantp_status.PCANTP_STATUS_CAUTION_INPUT_MODIFIED,
    PUDS_STATUS_CAUTION_DLC_MODIFIED = cantp_status.PCANTP_STATUS_CAUTION_DLC_MODIFIED,
}

```

```

PUDS_STATUS_CAUTION_DATA_LENGTH_MODIFIED =
    cantp_status.PCANTP_STATUS_CAUTION_DATA_LENGTH_MODIFIED,
PUDS_STATUS_CAUTION_FD_FLAG_MODIFIED = cantp_status.PCANTP_STATUS_CAUTION_FD_FLAG_MODIFIED,
PUDS_STATUS_CAUTION_RX_QUEUE_FULL = cantp_status.PCANTP_STATUS_CAUTION_RX_QUEUE_FULL,
PUDS_STATUS_CAUTION_BUFFER_IN_USE = cantp_status.PCANTP_STATUS_CAUTION_BUFFER_IN_USE,
PUDS_STATUS_FLAG_PCAN_STATUS = cantp_status.PCANTP_STATUS_FLAG_PCAN_STATUS,
PUDS_STATUS_MASK_ERROR = cantp_status.PCANTP_STATUS_MASK_ERROR,
PUDS_STATUS_MASK_BUS = cantp_status.PCANTP_STATUS_MASK_BUS,
PUDS_STATUS_MASK_ISOTP_NET = cantp_status.PCANTP_STATUS_MASK_ISOTP_NET,
PUDS_STATUS_MASK_INFO = cantp_status.PCANTP_STATUS_MASK_INFO,
PUDS_STATUS_MASK_PCAN = cantp_status.PCANTP_STATUS_MASK_PCAN,
PUDS_STATUS_FLAG_UDS_ERROR = 0x20 << uds_status_offset.PCANTP_STATUS_OFFSET_UDS,
PUDS_STATUS_MASK_UDS_ERROR = (UInt32)0x3f << uds_status_offset.PCANTP_STATUS_OFFSET_UDS,
PUDS_STATUS_SERVICE_NO_MESSAGE = PUDS_STATUS_FLAG_UDS_ERROR |
    (uds_errstatus.PUDS_ERRSTATUS_SERVICE_NO_MESSAGE <<
    uds_status_offset.PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_SERVICE_TIMEOUT_CONFIRMATION = PUDS_STATUS_FLAG_UDS_ERROR |
    (uds_errstatus.PUDS_ERRSTATUS_SERVICE_TIMEOUT_CONFIRMATION <<
    uds_status_offset.PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_SERVICE_TIMEOUT_RESPONSE = PUDS_STATUS_FLAG_UDS_ERROR |
    (uds_errstatus.PUDS_ERRSTATUS_SERVICE_TIMEOUT_RESPONSE <<
    uds_status_offset.PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_RESET = PUDS_STATUS_FLAG_UDS_ERROR | (uds_errstatus.PUDS_ERRSTATUS_RESET <<
    uds_status_offset.PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_ERROR_WAIT_FOR_P3_TIMING = PUDS_STATUS_FLAG_UDS_ERROR |
    (uds_errstatus.PUDS_ERRSTATUS_ERROR_WAIT_FOR_P3_TIMING <<
    uds_status_offset.PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_SERVICE_ALREADY_PENDING = PUDS_STATUS_FLAG_UDS_ERROR |
    (uds_errstatus.PUDS_ERRSTATUS_SERVICE_ALREADY_PENDING <<
    uds_status_offset.PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_SERVICE_TX_ERROR = PUDS_STATUS_FLAG_UDS_ERROR |
    (uds_errstatus.PUDS_ERRSTATUS_SERVICE_TX_ERROR <<
    uds_status_offset.PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_SERVICE_RX_ERROR = PUDS_STATUS_FLAG_UDS_ERROR |
    (uds_errstatus.PUDS_ERRSTATUS_SERVICE_RX_ERROR <<
    uds_status_offset.PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_SERVICE_RX_OVERFLOW = PUDS_STATUS_FLAG_UDS_ERROR |
    (uds_errstatus.PUDS_ERRSTATUS_SERVICE_RX_OVERFLOW <<
    uds_status_offset.PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED = PUDS_STATUS_FLAG_UDS_ERROR |
    (uds_errstatus.PUDS_ERRSTATUS_MESSAGE_BUFFER_ALREADY_USED <<
    uds_status_offset.PCANTP_STATUS_OFFSET_UDS)
}

```

## Pascal OO

```

uds_status = (
    PUDS_STATUS_OK = UInt32(PCANTP_STATUS_OK),
    PUDS_STATUS_NOT_INITIALIZED = UInt32(PCANTP_STATUS_NOT_INITIALIZED),
    PUDS_STATUS_ALREADY_INITIALIZED = UInt32(PCANTP_STATUS_ALREADY_INITIALIZED),
    PUDS_STATUS_NO_MEMORY = UInt32(PCANTP_STATUS_NO_MEMORY),
    PUDS_STATUS_OVERFLOW = UInt32(PCANTP_STATUS_OVERFLOW),
    PUDS_STATUS_NO_MESSAGE = UInt32(PCANTP_STATUS_NO_MESSAGE),
    PUDS_STATUS_PARAM_INVALID_TYPE = UInt32(PCANTP_STATUS_PARAM_INVALID_TYPE),
    PUDS_STATUS_PARAM_INVALID_VALUE = UInt32(PCANTP_STATUS_PARAM_INVALID_VALUE),
    PUDS_STATUS_MAPPING_NOT_INITIALIZED = UInt32(PCANTP_STATUS_MAPPING_NOT_INITIALIZED),
    PUDS_STATUS_MAPPING_INVALID = UInt32(PCANTP_STATUS_MAPPING_INVALID),
    PUDS_STATUS_MAPPING_ALREADY_INITIALIZED = UInt32(PCANTP_STATUS_MAPPING_ALREADY_INITIALIZED),
    PUDS_STATUS_PARAM_BUFFER_TOO_SMALL = UInt32(PCANTP_STATUS_PARAM_BUFFER_TOO_SMALL),
    PUDS_STATUS_QUEUE_TX_FULL = UInt32(PCANTP_STATUS_QUEUE_TX_FULL),
    PUDS_STATUS_LOCK_TIMEOUT = UInt32(PCANTP_STATUS_LOCK_TIMEOUT),
    PUDS_STATUS_HANDLE_INVALID = UInt32(PCANTP_STATUS_HANDLE_INVALID),
    PUDS_STATUS_UNKNOWN = UInt32(PCANTP_STATUS_UNKNOWN),

```



```

PUDS_STATUS_FLAG_BUS_LIGHT = UInt32(PCANTP_STATUS_FLAG_BUS_LIGHT),
PUDS_STATUS_FLAG_BUS_HEAVY = UInt32(PCANTP_STATUS_FLAG_BUS_HEAVY),
PUDS_STATUS_FLAG_BUS_WARNING = UInt32(PCANTP_STATUS_FLAG_BUS_WARNING),
PUDS_STATUS_FLAG_BUS_PASSIVE = UInt32(PCANTP_STATUS_FLAG_BUS_PASSIVE),
PUDS_STATUS_FLAG_BUS_OFF = UInt32(PCANTP_STATUS_FLAG_BUS_OFF),
PUDS_STATUS_FLAG_BUS_ANY = UInt32(PCANTP_STATUS_FLAG_BUS_ANY),
PUDS_STATUS_FLAG_NETWORK_RESULT = UInt32(PCANTP_STATUS_FLAG_NETWORK_RESULT),
PUDS_STATUS_NETWORK_TIMEOUT_A = UInt32(PCANTP_STATUS_NETWORK_TIMEOUT_A),
PUDS_STATUS_NETWORK_TIMEOUT_Bs = UInt32(PCANTP_STATUS_NETWORK_TIMEOUT_Bs),
PUDS_STATUS_NETWORK_TIMEOUT_Cr = UInt32(PCANTP_STATUS_NETWORK_TIMEOUT_Cr),
PUDS_STATUS_NETWORK_WRONG_SN = UInt32(PCANTP_STATUS_NETWORK_WRONG_SN),
PUDS_STATUS_NETWORK_INVALID_FS = UInt32(PCANTP_STATUS_NETWORK_INVALID_FS),
PUDS_STATUS_NETWORK_UNEXP_PDU = UInt32(PCANTP_STATUS_NETWORK_UNEXP_PDU),
PUDS_STATUS_NETWORK_WFT_OVRN = UInt32(PCANTP_STATUS_NETWORK_WFT_OVRN),
PUDS_STATUS_NETWORK_BUFFER_OVFLW = UInt32(PCANTP_STATUS_NETWORK_BUFFER_OVFLW),
PUDS_STATUS_NETWORK_ERROR = UInt32(PCANTP_STATUS_NETWORK_ERROR),
PUDS_STATUS_NETWORK_IGNORED = UInt32(PCANTP_STATUS_NETWORK_IGNORED),
PUDS_STATUS_CAUTION_INPUT_MODIFIED = UInt32(PCANTP_STATUS_CAUTION_INPUT_MODIFIED),
PUDS_STATUS_CAUTION_DLC_MODIFIED = UInt32(PCANTP_STATUS_CAUTION_DLC_MODIFIED),
PUDS_STATUS_CAUTION_DATA_LENGTH_MODIFIED =
    UInt32(PCANTP_STATUS_CAUTION_DATA_LENGTH_MODIFIED),
PUDS_STATUS_CAUTION_FD_FLAG_MODIFIED = UInt32(PCANTP_STATUS_CAUTION_FD_FLAG_MODIFIED),
PUDS_STATUS_CAUTION_RX_QUEUE_FULL = UInt32(PCANTP_STATUS_CAUTION_RX_QUEUE_FULL),
PUDS_STATUS_CAUTION_BUFFER_IN_USE = UInt32(PCANTP_STATUS_CAUTION_BUFFER_IN_USE),
PUDS_STATUS_FLAG_PCAN_STATUS = UInt32(PCANTP_STATUS_FLAG_PCAN_STATUS),
PUDS_STATUS_MASK_ERROR = UInt32(PCANTP_STATUS_MASK_ERROR),
PUDS_STATUS_MASK_BUS = UInt32(PCANTP_STATUS_MASK_BUS),
PUDS_STATUS_MASK_ISOTP_NET = UInt32(PCANTP_STATUS_MASK_ISOTP_NET),
PUDS_STATUS_MASK_INFO = UInt32(PCANTP_STATUS_MASK_INFO),
PUDS_STATUS_MASK_PCAN = UInt32(PCANTP_STATUS_MASK_PCAN),
PUDS_STATUS_FLAG_UDS_ERROR = $20 Shl PCANTP_STATUS_OFFSET_UDS,
PUDS_STATUS_MASK_UDS_ERROR = $3F Shl PCANTP_STATUS_OFFSET_UDS,
PUDS_STATUS_SERVICE_NO_MESSAGE = PUDS_STATUS_FLAG_UDS_ERROR Or
    (UInt32(PUDS_ERRSTATUS_SERVICE_NO_MESSAGE) shl PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_SERVICE_TIMEOUT_CONFIRMATION = PUDS_STATUS_FLAG_UDS_ERROR Or
    (UInt32(PUDS_ERRSTATUS_SERVICE_TIMEOUT_CONFIRMATION) shl PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_SERVICE_TIMEOUT_RESPONSE = PUDS_STATUS_FLAG_UDS_ERROR Or
    (UInt32(PUDS_ERRSTATUS_SERVICE_TIMEOUT_RESPONSE) shl PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_RESET = PUDS_STATUS_FLAG_UDS_ERROR Or
    (UInt32(PUDS_ERRSTATUS_RESET) shl PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_ERROR_WAIT_FOR_P3_TIMING = PUDS_STATUS_FLAG_UDS_ERROR Or
    (UInt32(PUDS_ERRSTATUS_ERROR_WAIT_FOR_P3_TIMING) shl PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_SERVICE_ALREADY_PENDING = PUDS_STATUS_FLAG_UDS_ERROR Or
    (UInt32(PUDS_ERRSTATUS_SERVICE_ALREADY_PENDING) shl PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_SERVICE_TX_ERROR = PUDS_STATUS_FLAG_UDS_ERROR Or
    (UInt32(PUDS_ERRSTATUS_SERVICE_TX_ERROR) shl PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_SERVICE_RX_ERROR = PUDS_STATUS_FLAG_UDS_ERROR Or
    (UInt32(PUDS_ERRSTATUS_SERVICE_RX_ERROR) shl PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_SERVICE_RX_OVERFLOW = PUDS_STATUS_FLAG_UDS_ERROR Or
    (UInt32(PUDS_ERRSTATUS_SERVICE_RX_OVERFLOW) shl PCANTP_STATUS_OFFSET_UDS),
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED = PUDS_STATUS_FLAG_UDS_ERROR Or
    (UInt32(PUDS_ERRSTATUS_MESSAGE_BUFFER_ALREADY_USED) shl PCANTP_STATUS_OFFSET_UDS)
);

```

## Visual Basic

```

Public Enum uds_status As UInt32
    PUDS_STATUS_OK = cantp_status.PCANTP_STATUS_OK
    PUDS_STATUS_NOT_INITIALIZED = cantp_status.PCANTP_STATUS_NOT_INITIALIZED
    PUDS_STATUS_ALREADY_INITIALIZED = cantp_status.PCANTP_STATUS_ALREADY_INITIALIZED
    PUDS_STATUS_NO_MEMORY = cantp_status.PCANTP_STATUS_NO_MEMORY
    PUDS_STATUS_OVERFLOW = cantp_status.PCANTP_STATUS_OVERFLOW

```

```

PUDS_STATUS_NO_MESSAGE = cantp_status.PCANTP_STATUS_NO_MESSAGE
PUDS_STATUS_PARAM_INVALID_TYPE = cantp_status.PCANTP_STATUS_PARAM_INVALID_TYPE
PUDS_STATUS_PARAM_INVALID_VALUE = cantp_status.PCANTP_STATUS_PARAM_INVALID_VALUE
PUDS_STATUS_MAPPING_NOT_INITIALIZED = cantp_status.PCANTP_STATUS_MAPPING_NOT_INITIALIZED
PUDS_STATUS_MAPPING_INVALID = cantp_status.PCANTP_STATUS_MAPPING_INVALID
PUDS_STATUS_MAPPING_ALREADY_INITIALIZED =
    cantp_status.PCANTP_STATUS_MAPPING_ALREADY_INITIALIZED
PUDS_STATUS_PARAM_BUFFER_TOO_SMALL = cantp_status.PCANTP_STATUS_PARAM_BUFFER_TOO_SMALL
PUDS_STATUS_QUEUE_TX_FULL = cantp_status.PCANTP_STATUS_QUEUE_TX_FULL
PUDS_STATUS_LOCK_TIMEOUT = cantp_status.PCANTP_STATUS_LOCK_TIMEOUT
PUDS_STATUS_HANDLE_INVALID = cantp_status.PCANTP_STATUS_HANDLE_INVALID
PUDS_STATUS_UNKNOWN = cantp_status.PCANTP_STATUS_UNKNOWN
PUDS_STATUS_FLAG_BUS_LIGHT = cantp_status.PCANTP_STATUS_FLAG_BUS_LIGHT
PUDS_STATUS_FLAG_BUS_HEAVY = cantp_status.PCANTP_STATUS_FLAG_BUS_HEAVY
PUDS_STATUS_FLAG_BUS_WARNING = cantp_status.PCANTP_STATUS_FLAG_BUS_WARNING
PUDS_STATUS_FLAG_BUS_PASSIVE = cantp_status.PCANTP_STATUS_FLAG_BUS_PASSIVE
PUDS_STATUS_FLAG_BUS_OFF = cantp_status.PCANTP_STATUS_FLAG_BUS_OFF
PUDS_STATUS_FLAG_BUS_ANY = cantp_status.PCANTP_STATUS_FLAG_BUS_ANY
PUDS_STATUS_FLAG_NETWORK_RESULT = cantp_status.PCANTP_STATUS_FLAG_NETWORK_RESULT
PUDS_STATUS_NETWORK_TIMEOUT_A = cantp_status.PCANTP_STATUS_NETWORK_TIMEOUT_A
PUDS_STATUS_NETWORK_TIMEOUT_Bs = cantp_status.PCANTP_STATUS_NETWORK_TIMEOUT_Bs
PUDS_STATUS_NETWORK_TIMEOUT_Cr = cantp_status.PCANTP_STATUS_NETWORK_TIMEOUT_Cr
PUDS_STATUS_NETWORK_WRONG_SN = cantp_status.PCANTP_STATUS_NETWORK_WRONG_SN
PUDS_STATUS_NETWORK_INVALID_FS = cantp_status.PCANTP_STATUS_NETWORK_INVALID_FS
PUDS_STATUS_NETWORK_UNEXP_PDU = cantp_status.PCANTP_STATUS_NETWORK_UNEXP_PDU
PUDS_STATUS_NETWORK_WFT_OVRN = cantp_status.PCANTP_STATUS_NETWORK_WFT_OVRN
PUDS_STATUS_NETWORK_BUFFER_OVFLW = cantp_status.PCANTP_STATUS_NETWORK_BUFFER_OVFLW
PUDS_STATUS_NETWORK_ERROR = cantp_status.PCANTP_STATUS_NETWORK_ERROR
PUDS_STATUS_NETWORK_IGNORED = cantp_status.PCANTP_STATUS_NETWORK_IGNORED
PUDS_STATUS_CAUTION_INPUT_MODIFIED = cantp_status.PCANTP_STATUS_CAUTION_INPUT_MODIFIED
PUDS_STATUS_CAUTION_DLC_MODIFIED = cantp_status.PCANTP_STATUS_CAUTION_DLC_MODIFIED
PUDS_STATUS_CAUTION_DATA_LENGTH_MODIFIED =
    cantp_status.PCANTP_STATUS_CAUTION_DATA_LENGTH_MODIFIED
PUDS_STATUS_CAUTION_FD_FLAG_MODIFIED = cantp_status.PCANTP_STATUS_CAUTION_FD_FLAG_MODIFIED
PUDS_STATUS_CAUTION_RX_QUEUE_FULL = cantp_status.PCANTP_STATUS_CAUTION_RX_QUEUE_FULL
PUDS_STATUS_CAUTION_BUFFER_IN_USE = cantp_status.PCANTP_STATUS_CAUTION_BUFFER_IN_USE
PUDS_STATUS_FLAG_PCAN_STATUS = cantp_status.PCANTP_STATUS_FLAG_PCAN_STATUS
PUDS_STATUS_MASK_ERROR = cantp_status.PCANTP_STATUS_MASK_ERROR
PUDS_STATUS_MASK_BUS = cantp_status.PCANTP_STATUS_MASK_BUS
PUDS_STATUS_MASK_ISOTP_NET = cantp_status.PCANTP_STATUS_MASK_ISOTP_NET
PUDS_STATUS_MASK_INFO = cantp_status.PCANTP_STATUS_MASK_INFO
PUDS_STATUS_MASK_PCAN = cantp_status.PCANTP_STATUS_MASK_PCAN
PUDS_STATUS_FLAG_UDS_ERROR = &H20 << uds_status_offset.PCANTP_STATUS_OFFSET_UDS
PUDS_STATUS_MASK_UDS_ERROR = CType(&H3F, UInt32) <<
    uds_status_offset.PCANTP_STATUS_OFFSET_UDS
PUDS_STATUS_SERVICE_NO_MESSAGE = PUDS_STATUS_FLAG_UDS_ERROR Or
    (uds_errstatus.PUDS_ERRSTATUS_SERVICE_NO_MESSAGE <<
        uds_status_offset.PCANTP_STATUS_OFFSET_UDS)
PUDS_STATUS_SERVICE_TIMEOUT_CONFIRMATION = PUDS_STATUS_FLAG_UDS_ERROR Or
    (uds_errstatus.PUDS_ERRSTATUS_SERVICE_TIMEOUT_CONFIRMATION <<
        uds_status_offset.PCANTP_STATUS_OFFSET_UDS)
PUDS_STATUS_SERVICE_TIMEOUT_RESPONSE = PUDS_STATUS_FLAG_UDS_ERROR Or
    (uds_errstatus.PUDS_ERRSTATUS_SERVICE_TIMEOUT_RESPONSE <<
        uds_status_offset.PCANTP_STATUS_OFFSET_UDS)
PUDS_STATUS_RESET = PUDS_STATUS_FLAG_UDS_ERROR Or (uds_errstatus.PUDS_ERRSTATUS_RESET <<
    uds_status_offset.PCANTP_STATUS_OFFSET_UDS)
PUDS_STATUS_ERROR_WAIT_FOR_P3_TIMING = PUDS_STATUS_FLAG_UDS_ERROR Or
    (uds_errstatus.PUDS_ERRSTATUS_ERROR_WAIT_FOR_P3_TIMING <<
        uds_status_offset.PCANTP_STATUS_OFFSET_UDS)
PUDS_STATUS_SERVICE_ALREADY_PENDING = PUDS_STATUS_FLAG_UDS_ERROR Or
    (uds_errstatus.PUDS_ERRSTATUS_SERVICE_ALREADY_PENDING <<
        uds_status_offset.PCANTP_STATUS_OFFSET_UDS)

```

```

PUDS_STATUS_SERVICE_TX_ERROR = PUDS_STATUS_FLAG_UDS_ERROR Or
    (uds_errstatus.PUDS_ERRSTATUS_SERVICE_TX_ERROR <<
    uds_status_offset.PCANTP_STATUS_OFFSET_UDS)
PUDS_STATUS_SERVICE_RX_ERROR = PUDS_STATUS_FLAG_UDS_ERROR Or
    (uds_errstatus.PUDS_ERRSTATUS_SERVICE_RX_ERROR <<
    uds_status_offset.PCANTP_STATUS_OFFSET_UDS)
PUDS_STATUS_SERVICE_RX_OVERFLOW = PUDS_STATUS_FLAG_UDS_ERROR Or
    (uds_errstatus.PUDS_ERRSTATUS_SERVICE_RX_OVERFLOW <<
    uds_status_offset.PCANTP_STATUS_OFFSET_UDS)
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED = PUDS_STATUS_FLAG_UDS_ERROR Or
    (uds_errstatus.PUDS_ERRSTATUS_MESSAGE_BUFFER_ALREADY_USED <<
    uds_status_offset.PCANTP_STATUS_OFFSET_UDS)

```

End Enum

## values

Name	Value	Description
PUDS_STATUS_OK	0x0 (0)	No error, success.
PUDS_STATUS_NOT_INITIALIZED	0x1 (1)	Not initialized.
PUDS_STATUS_ALREADY_INITIALIZED	0x2 (2)	Already initialized.
PUDS_STATUS_NO_MEMORY	0x3 (3)	Could not obtain memory.
PUDS_STATUS_OVERFLOW	0x4 (4)	Input buffer overflow.
PUDS_STATUS_NO_MESSAGE	0x7 (7)	No message available.
PUDS_STATUS_PARAM_INVALID_TYPE	0x8 (8)	Parameter has an invalid or unexpected type.
PUDS_STATUS_PARAM_INVALID_VALUE	0x9 (9)	Parameter has an invalid value.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	0xd (13)	PUDS mapping not initialized.
PUDS_STATUS_MAPPING_INVALID	0xe (14)	PUDS mapping parameters are invalid.
PUDS_STATUS_MAPPING_ALREADY_INITIALIZED	0xf (15)	PUDS mapping already defined.
PUDS_STATUS_PARAM_BUFFER_TOO_SMALL	0x10 (16)	Buffer is too small.
PUDS_STATUS_QUEUE_TX_FULL	0x11 (17)	Tx queue is full.
PUDS_STATUS_LOCK_TIMEOUT	0x12 (18)	Failed to get an access to the internal lock.
PUDS_STATUS_HANDLE_INVALID	0x13 (19)	Invalid cantp_handle.
PUDS_STATUS_UNKNOWN	0xff (255)	Unknown/generic error.
PUDS_STATUS_FLAG_BUS_LIGHT	0x100 (256)	PUDS channel is in BUS - LIGHT error state.
PUDS_STATUS_FLAG_BUS_HEAVY	0x200 (512)	PUDS channel is in BUS - HEAVY error state.
PUDS_STATUS_FLAG_BUS_WARNING	0x200 (512)	PUDS channel is in BUS - HEAVY error state.
PUDS_STATUS_FLAG_BUS_PASSIVE	0x400 (1024)	PUDS channel is in error passive state.
PUDS_STATUS_FLAG_BUS_OFF	0x800 (2048)	PUDS channel is in BUS - OFF error state.
PUDS_STATUS_FLAG_BUS_ANY	0xf00 (3840)	Mask for all bus errors.
PUDS_STATUS_FLAG_NETWORK_RESULT	0x2000 (8192)	This flag states if one of the following network errors occurred with the fetched message.
PUDS_STATUS_NETWORK_TIMEOUT_A	0x6000 (24576)	Timeout occurred between 2 frames transmission (sender and receiver side).
PUDS_STATUS_NETWORK_TIMEOUT_Bs	0xa000 (40960)	Sender side timeout while waiting for flow control frame.
PUDS_STATUS_NETWORK_TIMEOUT_Cr	0xe000 (57344)	Receiver side timeout while waiting for consecutive frame.
PUDS_STATUS_NETWORK_WRONG_SN	0x12000 (73728)	Unexpected sequence number.
PUDS_STATUS_NETWORK_INVALID_FS	0x16000 (90112)	Invalid or unknown Flow Status.
PUDS_STATUS_NETWORK_UNEXP_PDU	0x1a000 (106496)	Unexpected protocol data unit.
PUDS_STATUS_NETWORK_WFT_OVRN	0x1e000 (122880)	Reception of flow control WAIT frame that exceeds the maximum counter defined by PUDS_PARAMETER_WFT_MAX.
PUDS_STATUS_NETWORK_BUFFER_OVFLW	0x22000 (139264)	Buffer on the receiver side cannot store the data length (server side only).
PUDS_STATUS_NETWORK_ERROR	0x26000 (155648)	General error.
PUDS_STATUS_NETWORK_IGNORED	0x2a000 (172032)	Message was invalid and ignored.

Name	Value	Description
PUDS_STATUS_NETWORK_TIMEOUT_Ar	0x46000 (286720)	Receiver side timeout while transmitting.
PUDS_STATUS_NETWORK_TIMEOUT_As	0x42000 (270336)	Sender side timeout while transmitting.
PUDS_STATUS_CAUTION_INPUT_MODIFIED	0x40000 (262144)	Input was modified by the API.
PUDS_STATUS_CAUTION_DLC_MODIFIED	0x80000 (524288)	DLC value of the input was modified by the API.
PUDS_STATUS_CAUTION_DATA_LENGTH_MODIFIED	0x100000 (1048576)	Data Length value of the input was modified by the API.
PUDS_STATUS_CAUTION_FD_FLAG_MODIFIED	0x200000 (2097152)	FD flags of the input was modified by the API.
PUDS_STATUS_CAUTION_RX_QUEUE_FULL	0x400000 (4194304)	Receive queue is full.
PUDS_STATUS_CAUTION_BUFFER_IN_USE	0x800000 (8388608)	Buffer is used by another thread or API.
PUDS_STATUS_FLAG_PCAN_STATUS	0x80000000 (2147483648)	PCAN error flag, remove flag to get a usable PCAN error/status code (cf. PCANBasic API).
PUDS_STATUS_MASK_ERROR	0x3f (63)	Filter general error.
PUDS_STATUS_MASK_BUS	0x1f00 (7936)	Filter bus error.
PUDS_STATUS_MASK_ISOTP_NET	0x3e000 (253952)	Filter network error.
PUDS_STATUS_MASK_INFO	0xfc0000 (16515072)	Filter extra information.
PUDS_STATUS_MASK_PCAN	0x7FFFFFFF (2147483647)	Filter PCAN error (encapsulated PCAN-Basic status).
PUDS_STATUS_FLAG_UDS_ERROR	0x20000000 (536870912)	PUDS error flag.
PUDS_STATUS_MASK_UDS_ERROR	0xff000000 (4278190080)	Filter PUDS error.
PUDS_STATUS_SERVICE_NO_MESSAGE	0x21000000 (553648128)	UDS, no message available.
PUDS_STATUS_SERVICE_TIMEOUT_CONFIRMATION	0x22000000 (570425344)	Timeout while waiting message confirmation (loopback).
PUDS_STATUS_SERVICE_TIMEOUT_RESPONSE	0x23000000 (587202560)	Timeout while waiting for request message response.
PUDS_STATUS_RESET	0x24000000 (603979776)	UDS reset error.
PUDS_STATUS_ERROR_WAIT_FOR_P3_TIMING	0x25000000 (620756992)	UDS wait for P3 timing error.
PUDS_STATUS_SERVICE_ALREADY_PENDING	0x26000000 (637534208)	A UDS request is already pending. A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with UDS_Reset_2013 (see UDS_Reset_2013 on page 651).
PUDS_STATUS_SERVICE_TX_ERROR	0x27000000 (654311424)	An error occurred during the transmission of the UDS request message.
PUDS_STATUS_SERVICE_RX_ERROR	0x28000000 (671088640)	An error occurred during the reception of the UDS response message.
PUDS_STATUS_SERVICE_RX_OVERFLOW	0x29000000 (687865856)	Service received more messages than input buffer expected.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	0x2a000000 (704643072)	Given message buffer is already allocated, user must release buffer with UDS_MsgFree_2013 or MsgFree_2013 before reusing it.

## Remarks

The `PUDS_STATUS_FLAG_PCAN_STATUS` status is a generic error code that is used to identify PCAN-Basic errors (as PCAN-Basic API is used internally by the PCAN-UDS 2.x API). When a PCAN-Basic error occurs, the API performs a bitwise combination of the `PUDS_STATUS_MASK_PCAN` and the PCAN-Basic (`TPCANStatus`) error.

`UDS_WaitForService_2013` function (or `WaitForService_2013` method) may return exactly `PUDS_STATUS_NETWORK_ERROR`, in this specific case the error occurred in the PCAN-ISO-TP 3.x layer. The network status result of the UDS message will provide extra information (see `uds_msg` on page 21).

**See also:** `UDS_StatusIsOk_2013` on page 640, `StatusIsOk_2013` on page 203.



### 3.5.3 uds\_parameter

Represents a PUDS parameter or a PUDS value that can be read or set. With some exceptions, a channel must first be initialized before their parameters can be read or set.

#### Syntax

##### C/C++

```
typedef enum _uds_parameter {
    PUDS_PARAMETER_API_VERSION = 0x201,
    PUDS_PARAMETER_DEBUG = 0x203,
    PUDS_PARAMETER_RECEIVE_EVENT = 0x204,
    PUDS_PARAMETER_SERVER_ADDRESS = 0x207,
    PUDS_PARAMETER_SESSION_INFO = 0x209,
    PUDS_PARAMETER_TIMEOUT_REQUEST = 0x20A,
    PUDS_PARAMETER_TIMEOUT_RESPONSE = 0x20B,
    PUDS_PARAMETER_AUTOMATIC_TESTER_PRESENT = 0x20C,
    PUDS_PARAMETER_USE_NO_RESPONSE_AUTOMATIC_TESTER_PRESENT = 0x213,
    PUDS_PARAMETER_AUTO_P3_TIMING_MANAGEMENT = 0x20D,
    PUDS_PARAMETER_LISTENED_ADDRESSES = 0x210,
    PUDS_PARAMETER_ADD_LISTENED_ADDRESS = 0x211,
    PUDS_PARAMETER_REMOVE_LISTENED_ADDRESS = 0x212,
    PUDS_PARAMETER_CHANNEL_CONDITION = PCANTP_PARAMETER_CHANNEL_CONDITION,
    PUDS_PARAMETER_CAN_TX_DL = PCANTP_PARAMETER_CAN_TX_DL,
    PUDS_PARAMETER_CAN_DATA_PADDING = PCANTP_PARAMETER_CAN_DATA_PADDING,
    PUDS_PARAMETER_CAN_PADDING_VALUE = PCANTP_PARAMETER_CAN_PADDING_VALUE,
    PUDS_PARAMETER_J1939_PRIORITY = PCANTP_PARAMETER_J1939_PRIORITY,
    PUDS_PARAMETER_BLOCK_SIZE = PCANTP_PARAMETER_BLOCK_SIZE,
    PUDS_PARAMETER_SEPARATION_TIME = PCANTP_PARAMETER_SEPARATION_TIME,
    PUDS_PARAMETER_WFT_MAX = PCANTP_PARAMETER_WFT_MAX,
    PUDS_PARAMETER_ISO_TIMEOUTS = PCANTP_PARAMETER_ISO_TIMEOUTS,
    PUDS_PARAMETER_RESET_HARD = PCANTP_PARAMETER_RESET_HARD,
    PUDS_PARAMETER_HARDWARE_NAME = PCAN_HARDWARE_NAME,
    PUDS_PARAMETER_DEVICE_NUMBER = PCAN_DEVICE_NUMBER,
    PUDS_PARAMETER_CONTROLLER_NUMBER = PCAN_CONTROLLER_NUMBER,
    PUDS_PARAMETER_CHANNEL_FEATURES = PCAN_CHANNEL_FEATURES
} uds_parameter;
```

##### Pascal OO

```
uds_parameter = (
    PUDS_PARAMETER_API_VERSION = $201,
    PUDS_PARAMETER_DEBUG = $203,
    PUDS_PARAMETER_RECEIVE_EVENT = $204,
    PUDS_PARAMETER_SERVER_ADDRESS = $207,
    PUDS_PARAMETER_SESSION_INFO = $209,
    PUDS_PARAMETER_TIMEOUT_REQUEST = $20A,
    PUDS_PARAMETER_TIMEOUT_RESPONSE = $20B,
    PUDS_PARAMETER_AUTOMATIC_TESTER_PRESENT = $20C,
    PUDS_PARAMETER_USE_NO_RESPONSE_AUTOMATIC_TESTER_PRESENT = $213,
    PUDS_PARAMETER_AUTO_P3_TIMING_MANAGEMENT = $20D,
    PUDS_PARAMETER_LISTENED_ADDRESSES = $210,
    PUDS_PARAMETER_ADD_LISTENED_ADDRESS = $211,
    PUDS_PARAMETER_REMOVE_LISTENED_ADDRESS = $212,
    PUDS_PARAMETER_CHANNEL_CONDITION = UInt32(PCANTP_PARAMETER_CHANNEL_CONDITION),
    PUDS_PARAMETER_CAN_TX_DL = UInt32(PCANTP_PARAMETER_CAN_TX_DL),
    PUDS_PARAMETER_CAN_DATA_PADDING = UInt32(PCANTP_PARAMETER_CAN_DATA_PADDING),
    PUDS_PARAMETER_CAN_PADDING_VALUE = UInt32(PCANTP_PARAMETER_CAN_PADDING_VALUE),
    PUDS_PARAMETER_J1939_PRIORITY = UInt32(PCANTP_PARAMETER_J1939_PRIORITY),
    PUDS_PARAMETER_BLOCK_SIZE = UInt32(PCANTP_PARAMETER_BLOCK_SIZE),
    PUDS_PARAMETER_SEPARATION_TIME = UInt32(PCANTP_PARAMETER_SEPARATION_TIME),
```

```

PUDS_PARAMETER_WFT_MAX = UInt32(PCANTP_PARAMETER_WFT_MAX),
PUDS_PARAMETER_ISO_TIMEOUTS = UInt32(PCANTP_PARAMETER_ISO_TIMEOUTS),
PUDS_PARAMETER_RESET_HARD = UInt32(PCANTP_PARAMETER_RESET_HARD),
PUDS_PARAMETER_HARDWARE_NAME = UInt32(PCAN_HARDWARE_NAME),
PUDS_PARAMETER_DEVICE_NUMBER = UInt32(PCAN_DEVICE_NUMBER),
PUDS_PARAMETER_CONTROLLER_NUMBER = UInt32(PCAN_CONTROLLER_NUMBER),
PUDS_PARAMETER_CHANNEL_FEATURES = UInt32(PCAN_CHANNEL_FEATURES)
);

```

**C#**

```

public enum uds_parameter : UInt32
{
    PUDS_PARAMETER_API_VERSION = 0x201,
    PUDS_PARAMETER_DEBUG = 0x203,
    PUDS_PARAMETER_RECEIVE_EVENT = 0x204,
    PUDS_PARAMETER_SERVER_ADDRESS = 0x207,
    PUDS_PARAMETER_SESSION_INFO = 0x209,
    PUDS_PARAMETER_TIMEOUT_REQUEST = 0x20A,
    PUDS_PARAMETER_TIMEOUT_RESPONSE = 0x20B,
    PUDS_PARAMETER_AUTOMATIC_TESTER_PRESENT = 0x20C,
    PUDS_PARAMETER_USE_NO_RESPONSE_AUTOMATIC_TESTER_PRESENT = 0x213,
    PUDS_PARAMETER_AUTO_P3_TIMING_MANAGEMENT = 0x20D,
    PUDS_PARAMETER_LISTENED_ADDRESSES = 0x210,
    PUDS_PARAMETER_ADD_LISTENED_ADDRESS = 0x211,
    PUDS_PARAMETER_REMOVE_LISTENED_ADDRESS = 0x212,
    PUDS_PARAMETER_CHANNEL_CONDITION = cantp_parameter.PCANTP_PARAMETER_CHANNEL_CONDITION,
    PUDS_PARAMETER_CAN_TX_DL = cantp_parameter.PCANTP_PARAMETER_CAN_TX_DL,
    PUDS_PARAMETER_CAN_DATA_PADDING = cantp_parameter.PCANTP_PARAMETER_CAN_DATA_PADDING,
    PUDS_PARAMETER_CAN_PADDING_VALUE = cantp_parameter.PCANTP_PARAMETER_CAN_PADDING_VALUE,
    PUDS_PARAMETER_J1939_PRIORITY = cantp_parameter.PCANTP_PARAMETER_J1939_PRIORITY,
    PUDS_PARAMETER_BLOCK_SIZE = cantp_parameter.PCANTP_PARAMETER_BLOCK_SIZE,
    PUDS_PARAMETER_SEPARATION_TIME = cantp_parameter.PCANTP_PARAMETER_SEPARATION_TIME,
    PUDS_PARAMETER_WFT_MAX = cantp_parameter.PCANTP_PARAMETER_WFT_MAX,
    PUDS_PARAMETER_ISO_TIMEOUTS = cantp_parameter.PCANTP_PARAMETER_ISO_TIMEOUTS,
    PUDS_PARAMETER_RESET_HARD = cantp_parameter.PCANTP_PARAMETER_RESET_HARD,
    PUDS_PARAMETER_HARDWARE_NAME = TPCANParameter.PCAN_HARDWARE_NAME,
    PUDS_PARAMETER_DEVICE_NUMBER = TPCANParameter.PCAN_DEVICE_NUMBER,
    PUDS_PARAMETER_CONTROLLER_NUMBER = TPCANParameter.PCAN_CONTROLLER_NUMBER,
    PUDS_PARAMETER_CHANNEL_FEATURES = TPCANParameter.PCAN_CHANNEL_FEATURES
}

```

**C++ / CLR**

```

public enum uds_parameter : UInt32
{
    PUDS_PARAMETER_API_VERSION = 0x201,
    PUDS_PARAMETER_DEBUG = 0x203,
    PUDS_PARAMETER_RECEIVE_EVENT = 0x204,
    PUDS_PARAMETER_SERVER_ADDRESS = 0x207,
    PUDS_PARAMETER_SESSION_INFO = 0x209,
    PUDS_PARAMETER_TIMEOUT_REQUEST = 0x20A,
    PUDS_PARAMETER_TIMEOUT_RESPONSE = 0x20B,
    PUDS_PARAMETER_AUTOMATIC_TESTER_PRESENT = 0x20C,
    PUDS_PARAMETER_USE_NO_RESPONSE_AUTOMATIC_TESTER_PRESENT = 0x213,
    PUDS_PARAMETER_AUTO_P3_TIMING_MANAGEMENT = 0x20D,
    PUDS_PARAMETER_LISTENED_ADDRESSES = 0x210,
    PUDS_PARAMETER_ADD_LISTENED_ADDRESS = 0x211,
    PUDS_PARAMETER_REMOVE_LISTENED_ADDRESS = 0x212,
    PUDS_PARAMETER_CHANNEL_CONDITION = cantp_parameter::PCANTP_PARAMETER_CHANNEL_CONDITION,
    PUDS_PARAMETER_CAN_TX_DL = cantp_parameter::PCANTP_PARAMETER_CAN_TX_DL,
    PUDS_PARAMETER_CAN_DATA_PADDING = cantp_parameter::PCANTP_PARAMETER_CAN_DATA_PADDING,

```

```

PUDS_PARAMETER_CAN_PADDING_VALUE = cantp_parameter::PCANTP_PARAMETER_CAN_PADDING_VALUE,
PUDS_PARAMETER_J1939_PRIORITY = cantp_parameter::PCANTP_PARAMETER_J1939_PRIORITY,
PUDS_PARAMETER_BLOCK_SIZE = cantp_parameter::PCANTP_PARAMETER_BLOCK_SIZE,
PUDS_PARAMETER_SEPARATION_TIME = cantp_parameter::PCANTP_PARAMETER_SEPARATION_TIME,
PUDS_PARAMETER_WFT_MAX = cantp_parameter::PCANTP_PARAMETER_WFT_MAX,
PUDS_PARAMETER_ISO_TIMEOUTS = cantp_parameter::PCANTP_PARAMETER_ISO_TIMEOUTS,
PUDS_PARAMETER_RESET_HARD = cantp_parameter::PCANTP_PARAMETER_RESET_HARD,
PUDS_PARAMETER_HARDWARE_NAME = (UInt32)TPCANParameter::PCAN_HARDWARE_NAME,
PUDS_PARAMETER_DEVICE_NUMBER = (UInt32)TPCANParameter::PCAN_DEVICE_NUMBER,
PUDS_PARAMETER_CONTROLLER_NUMBER = (UInt32)TPCANParameter::PCAN_CONTROLLER_NUMBER,
PUDS_PARAMETER_CHANNEL_FEATURES = (UInt32)TPCANParameter::PCAN_CHANNEL_FEATURES
};

```

## Visual Basic

```

Public Enum uds_parameter As UInt32
    PUDS_PARAMETER_API_VERSION = &H201
    PUDS_PARAMETER_DEBUG = &H203
    PUDS_PARAMETER_RECEIVE_EVENT = &H204
    PUDS_PARAMETER_SERVER_ADDRESS = &H207
    PUDS_PARAMETER_SESSION_INFO = &H209
    PUDS_PARAMETER_TIMEOUT_REQUEST = &H20A
    PUDS_PARAMETER_TIMEOUT_RESPONSE = &H20B
    PUDS_PARAMETER_AUTOMATIC_TESTER_PRESENT = &H20C
    PUDS_PARAMETER_USE_NO_RESPONSE_AUTOMATIC_TESTER_PRESENT = &H213
    PUDS_PARAMETER_AUTO_P3_TIMING_MANAGEMENT = &H20D
    PUDS_PARAMETER_LISTENED_ADDRESSES = &H210
    PUDS_PARAMETER_ADD_LISTENED_ADDRESS = &H211
    PUDS_PARAMETER_REMOVE_LISTENED_ADDRESS = &H212
    PUDS_PARAMETER_CHANNEL_CONDITION = cantp_parameter.PCANTP_PARAMETER_CHANNEL_CONDITION
    PUDS_PARAMETER_CAN_TX_DL = cantp_parameter.PCANTP_PARAMETER_CAN_TX_DL
    PUDS_PARAMETER_CAN_DATA_PADDING = cantp_parameter.PCANTP_PARAMETER_CAN_DATA_PADDING
    PUDS_PARAMETER_CAN_PADDING_VALUE = cantp_parameter.PCANTP_PARAMETER_CAN_PADDING_VALUE
    PUDS_PARAMETER_J1939_PRIORITY = cantp_parameter.PCANTP_PARAMETER_J1939_PRIORITY
    PUDS_PARAMETER_BLOCK_SIZE = cantp_parameter.PCANTP_PARAMETER_BLOCK_SIZE
    PUDS_PARAMETER_SEPARATION_TIME = cantp_parameter.PCANTP_PARAMETER_SEPARATION_TIME
    PUDS_PARAMETER_WFT_MAX = cantp_parameter.PCANTP_PARAMETER_WFT_MAX
    PUDS_PARAMETER_ISO_TIMEOUTS = cantp_parameter.PCANTP_PARAMETER_ISO_TIMEOUTS
    PUDS_PARAMETER_RESET_HARD = cantp_parameter.PCANTP_PARAMETER_RESET_HARD
    PUDS_PARAMETER_HARDWARE_NAME = TPCANParameter.PCAN_HARDWARE_NAME
    PUDS_PARAMETER_DEVICE_NUMBER = TPCANParameter.PCAN_DEVICE_NUMBER
    PUDS_PARAMETER_CONTROLLER_NUMBER = TPCANParameter.PCAN_CONTROLLER_NUMBER
    PUDS_PARAMETER_CHANNEL_FEATURES = TPCANParameter.PCAN_CHANNEL_FEATURES
End Enum

```

## values

Name	Value	Data type	Description
PUDS_PARAMETER_API_VERSION	0x201	String	API version of the PCAN-UDS API.
PUDS_PARAMETER_DEBUG	0x203	Byte	Debug mode.
PUDS_PARAMETER_RECEIVE_EVENT	0x204	Pointer	Defines PUDS receive-event handler, require a pointer to an event HANDLE.
PUDS_PARAMETER_SERVER_ADDRESS	0x207	UInt16	Physical address of the server (ECU)
PUDS_PARAMETER_SESSION_INFO	0x209	uds_sessioninfo	UDS current server (ECU) session information (see uds_sessioninfo on page 22).

Name	Value	Data type	Description
PUDS_PARAMETER_TIMEOUT_REQUEST	0x20A	UInt32	Maximum time in milliseconds allowed by the client to transmit a request.
PUDS_PARAMETER_TIMEOUT_RESPONSE	0x20B	UInt32	Maximum time in milliseconds allowed by the client to receive a response.
PUDS_PARAMETER_AUTOMATIC_TESTER_PRESENT	0x20C	Boolean	Automatic tester present (default value: true).
PUDS_PARAMETER_USE_NO_RESPONSE_AUTOMATIC_TESTER_PRESENT	0x213	Boolean	Use no response flag for automatic tester present (default value: true)
PUDS_PARAMETER_AUTO_P3_TIMING_MANAGEMENT	0x20D	Boolean	Waits for P3 timing (default value: true).
PUDS_PARAMETER_LISTENED_ADDRESSES	0x210	Array of UInt16	Lists of physical addresses to listen to.
PUDS_PARAMETER_ADD_LISTENED_ADDRESS	0x211	UInt16	Adds a listening address to the list of physical addresses to listen to.
PUDS_PARAMETER_REMOVE_LISTENED_ADDRESS	0x212	UInt16	Removes a listening address from the list of physical addresses to listen to.
PUDS_PARAMETER_CHANNEL_CONDITION	0x102	Byte	PUDS channel condition.
PUDS_PARAMETER_CAN_TX_DL	0x106	Byte	Data stating the default DLC to use when transmitting messages with CAN FD.
PUDS_PARAMETER_CAN_DATA_PADDING	0x107	Byte	Defines if CAN frame DLC uses padding or not.
PUDS_PARAMETER_CAN_PADDING_VALUE	0x108	Byte	Value used when CAN Data padding is enabled.
PUDS_PARAMETER_J1939_PRIORITY	0x10A	Byte	Defines the default priority value for normal fixed, mixed, and enhanced addressing (default=6).
PUDS_PARAMETER_BLOCK_SIZE	0x10C	Byte	Block size (BS) parameter.
PUDS_PARAMETER_SEPARATION_TIME	0x10E	Byte	Separation Time (Stmin) parameter.
PUDS_PARAMETER_WFT_MAX	0x110	UInt32	"N_WFTmax" parameter.
PUDS_PARAMETER_ISO_TIMEOUTS	0x116	Byte	Predefined ISO values for timeouts.
PUDS_PARAMETER_RESET_HARD	0x11F	Byte	Resets the CAN controller and clears Rx/Tx queues without uninitializing mapping and defined settings.
PUDS_PARAMETER_HARDWARE_NAME	0x0E	String	PCAN hardware name parameter.
PUDS_PARAMETER_DEVICE_NUMBER	0x01	UInt32	PCAN-USB device number parameter.
PUDS_PARAMETER_CONTROLLER_NUMBER	0x10	UInt32	CAN-Controller number of a PCAN-Channel.
PUDS_PARAMETER_CHANNEL_FEATURES	0x16	UInt32	Capabilities of a PCAN device (FEATURE_***).

## Detailed Parameters Characteristics

### PUDS\_PARAMETER\_API\_VERSION

Access: **R**

**Description:** This parameter is used to get information about the PCAN-UDS API implementation version.

**Possible Values:** The value is a null-terminated string indication the version number of the API implementation. The returned text has the following form: x,x,x,x for major, minor, release and build. It represents the binary version of the API, within two 32-bit integers, defined by four 16-bit integers. The length of this text value will have a maximum length of 24 bytes, 5 bytes for represent each 16-bit value, three separator characters ( , or . ) and the null-termination.

**Default Value:** NA.








**PCAN-Device:** NA. Any PCAN device can be used, including the `PCANTP_HANDLE_NONEBUS` channel.

### PUDS\_PARAMETER\_DEBUG

Access: **R W**

**Description:** This parameter is used to control debug mode. If enabled, any received or transmitted CAN frames will be logged in PCANBasic log file (default filename is PCANBasic.log located inside the current directory).

**Possible Values:**

	Type	Constant	Value	Description
	Byte	PUDS_DEBUG_LVL_NONE	0x00	No debug messages are being generated.
	Byte	PUDS_DEBUG_LVL_ERROR	0xF1	Enable debug messages (only errors)
	Byte	PUDS_DEBUG_LVL_WARNING	0xF2	Enable debug messages (only warnings, errors)
	Byte	PUDS_DEBUG_LVL_INFORMATION	0xF3	Enable debug messages (only informations, warnings, errors)
	Byte	PUDS_DEBUG_LVL_NOTICE	0xF4	Enable debug messages (only notices, informations, warnings, errors)
	Byte	PUDS_DEBUG_LVL_DEBUG	0xF5	Enable debug messages (only debug, notices, informations, warnings, errors)
	Byte	PUDS_DEBUG_LVL_TRACE	0xF6	Enable all debug messages

**Default Value:** `PUDS_DEBUG_LVL_NONE` (no debug messages are being generated).

**PCAN-Device:** All PCAN devices (excluding `PCANTP_HANDLE_NONEBUS` channel).

### PUDS\_PARAMETER\_RECEIVE\_EVENT

Access: **R W**

**Description:** This parameter is used to let the PCAN-UDS 2.x API notify an application when UDS messages are available to be read. In this form, message processing tasks of an application can react faster and make a more efficient use of the processor time.

**Possible Values:** This value has to be a handle for an event object returned by the Windows API function `CreateEvent` or the value 0 (`IntPtr.Zero` in a managed environment). When setting this parameter, the value of 0 resets the parameter in the PCAN-UDS 2.x API. Reading a value of 0 indicates that no event handle is set. For more information about reading with events, please refer to the topic Using Events on page 777.



**Note:** .NET environment should use the prototype `SetValue_2013`, as in the following C# example:

```
System.Threading.AutoResetEvent receive_event = new System.Threading.AutoResetEvent(false);

UInt32 ibuf_event =
    Convert.ToInt32(receive_event.SafeWaitHandle.DangerousGetHandle().ToInt32());
UDSApi.SetValue_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    uds_parameter.PUDS_PARAMETER_RECEIVE_EVENT, ref ibuf_event, sizeof(UInt32));
```

**Default Value:** Disabled (0).

**PCAN-Device:** All PCAN devices (excluding `PCANTP_HANDLE_NONEBUS` channel).

**PUDS\_PARAMETER\_SERVER\_ADDRESS**

**Access:** **R W**

**Description:** This value is used to define the address of the server. Defining this parameter is required as it allows configuration of the underlying ISO-TP 3.0 API. By default the address is set to the standard address of external test equipment (0xF1, see `uds_address` on page 56). Although most UDS addresses are 1 byte data, the parameter requires a 2 bytes value in order to be compatible with ISO 15765-3:2004 addresses (see `PUDS_SERVER_ADDR_MASK_ENHANCED_ISO_15765_3`, 0x7FF).

Note that with ISO 14229-1:2013 enhanced addresses are considered deprecated, yet if you need to define an ISO 15765-3:2004 address, add the flag `PUDS_SERVER_ADDR_FLAG_ENHANCED_ISO_15765_3` (0x1000) to the address (using a bitwise OR operation, i.e.: `(PUDS_SERVER_ADDR_FLAG_ENHANCED_ISO_15765_3 | 0x123)`).

**Possible Values:** 0x00 to 0xFF, or 0x1000 to 0x17FF for enhanced ISO 14229-1:2013 addresses (see predefined `uds_address` values on page 56).

**Default Value:** `PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT` (0xF1).

**PCAN-Device:** All PCAN devices (excluding `PCANTP_HANDLE_NONEBUS` channel).

**PUDS\_PARAMETER\_SESSION\_INFO**

**Access:** **R W**

**Description:** This parameter is used to read the current diagnostic session information. The diagnostic session information is a value which is internally updated when the UDS service `UDS_SvcDiagnosticSessionControl_2013` is invoked: it keeps track of the active session and its associated timeouts. If a non-default diagnostic session is active, a keep-alive mechanism (using physically addressed TesterPresent service requests with the “suppress positive response message” flag) is automatically activated according to UDS standard (see below `PUDS_PARAMETER_AUTOMATIC_TESTER_PRESENT` to enable/disable this mechanism). This parameter can also be used to override the current session information (for example, some custom ECU may be in a non default session after reset, in this case the current session information must be overridden).

**Possible Values:** any `uds_sessioninfo` structure (see `uds_sessioninfo` on page 22).

**Default Value:** automatically updated when the response of the service `UDS_SvcDiagnosticSessionControl_2013` is processed (with the `UDS_WaitForService_2013` or `UDS_WaitForServiceFunctional_2013` functions).

**PCAN-Device:** All PCAN devices (excluding `PCANTP_HANDLE_NONEBUS` channel).

**See also:** `uds_sessioninfo` on page 22, `UDS_SvcDiagnosticSessionControl_2013` function on page 661, `SvcDiagnosticSessionControl_2013` class method on page 258.

**PUDS\_PARAMETER\_TIMEOUT\_REQUEST****Access:** **R W**

**Description:** This value defines the maximum waiting time in milliseconds to receive a confirmation of a transmission (or request loopback). It is used in PCAN-UDS 2.x API utility functions like `UDS_WaitForService_2013` or method like `WaitForService_2013`.

**Possible Values:** 0x00 (unlimited) to 0xFFFFFFFF.

**Default Value:** `PUDS_TIMEOUT_REQUEST` (10000 milliseconds).

**PCAN-Device:** All PCAN devices (excluding `PCANTP_HANDLE_NONEBUS` channel).

**PUDS\_PARAMETER\_TIMEOUT\_RESPONSE****Access:** **R W**

**Description:** This value defines the maximum waiting time in milliseconds to receive a response indication. Note that the exact timeout value is the sum of this parameter and the timeout defined in the active diagnostic session. It is used in PCAN-UDS 2.x API utility functions like `UDS_WaitForService_2013` or methods like `WaitForService_2013`.

**Possible Values:** 0x00 (unlimited) to 0xFFFFFFFF.

**Default Value:** `PUDS_TIMEOUT_RESPONSE` (10000 milliseconds).

**PCAN-Device:** All PCAN devices (excluding `PCANTP_HANDLE_NONEBUS` channel).

**PUDS\_PARAMETER\_AUTOMATIC\_TESTER\_PRESENT****Access:** **R W**

**Description:** Activates or not the automatic UDS Tester Present request that should occur when a non-default UDS session is set.

**Possible Values:** true (1) or false (0).

**Default Value:** true (activated).

**PCAN-Device:** All PCAN devices (excluding `PCANTP_HANDLE_NONEBUS` channel).

**PUDS\_PARAMETER\_USE\_NO\_RESPONSE\_AUTOMATIC\_TESTER\_PRESENT****Access:** **R W**

**Description:** Activates or not the no response flag for automatic UDS Tester Present requests.

**Possible Values:** true (1) or false (0).

**Default Value:** true (activated).

**PCAN-Device:** All PCAN devices (excluding `PCANTP_HANDLE_NONEBUS` channel).

**PUDS\_PARAMETER\_AUTO\_P3\_TIMING\_MANAGEMENT****Access:** **R W**

**Description:** Activates or not automatic P3 timing management (P3 client/server is the time to wait before sending a new UDS request to the same ECU). If activated, required waiting timing between consecutive



requests (functional or physical request without response) will be included in the call to `UDS_Write_2013` function. If not `UDS_Write_2013` will return the status `PUDS_STATUS_ERROR_WAIT_FOR_P3_TIMING`.

**Possible Values:** true (1) or false (0).

**Default Value:** true (activated).

**PCAN-Device:** All PCAN devices (excluding `PCANTP_HANDLE_NONEBUS` channel).

See also: ISO-14229-2\_2013 §8.3 Minimum time between client request messages, p.36.

#### PUDS\_PARAMETER\_LISTENED\_ADDRESSES

**Access:** 

**Description:** Gets the list of physical addresses to listen to. The length of the array must be specified in the `buffer_size` parameter of the `UDS_GetValue_2013` function or `GetValue_2013` method. If a UDS message is received and its target address does not match an item in the list of physical addresses, then this message is discarded.

**Possible Values:** 0x00 to 0xFF (see predefined `uds_address` values on page 56), or 0x1000 to 0x17FF for enhanced ISO 14229-1:2013 addresses (with `PUDS_SERVER_ADDR_FLAG_ENHANCED_ISO_15765_3` flag).

**PCAN-Device:** All PCAN devices (excluding `PCANTP_HANDLE_NONEBUS` channel).

#### PUDS\_PARAMETER\_ADD\_LISTENED\_ADDRESS

**Access:** 

**Description:** Adds a listening address to the list of physical addresses to listen to. If a UDS message is received and its target address does not match an item in the list of physical addresses, then this message is discarded. **Note:** if a call to `UDS_Write_2013` function is requested with a source address that is not in this list, it will be automatically added to this list.

**Possible Values:** 0x00 to 0xFF (see predefined `uds_address` values on page 56), or 0x1000 to 0x17FF for enhanced ISO 14229-1:2013 addresses (with `PUDS_SERVER_ADDR_FLAG_ENHANCED_ISO_15765_3` flag).

**PCAN-Device:** All PCAN devices (excluding `PCANTP_HANDLE_NONEBUS` channel).

#### PUDS\_PARAMETER\_REMOVE\_LISTENED\_ADDRESS

**Access:** 

**Description:** Removes a listened address from the list of physical addresses to listen to.

**Possible Values:** 0x00 to 0xFF (see predefined `uds_address` values on page 56), or 0x1000 to 0x17FF for enhanced ISO 14229-1:2013 addresses (with `PUDS_SERVER_ADDR_FLAG_ENHANCED_ISO_15765_3` flag).

**PCAN-Device:** All PCAN devices (excluding `PCANTP_HANDLE_NONEBUS` channel).




#### PUDS\_PARAMETER\_CHANNEL\_CONDITION

**Access:** 

**Description:** This parameter is used to check and detect available PCAN hardware on a computer, even before trying to connect any of them. This is useful when an application wants the user to select which hardware should be using in a communication session.


**Possible Values:** This parameter can have one of these values: `PUDS_CHANNEL_UNAVAILABLE`, `PUDS_CHANNEL_AVAILABLE` and `PUDS_CHANNEL_OCCUPIED`.



	Type	Constant	Value	Description
	Byte	PUDS_CHANNEL_UNAVAILABLE	0	The PUDS channel handle is illegal, or its associated hardware is not available.
	Byte	PUDS_CHANNEL_AVAILABLE	1	The PUDS channel handle is valid to connect/initialize. Furthermore, for Plug and Play hardware, this means that the hardware is plugged in.
	Byte	PUDS_CHANNEL_OCCUPIED	2	The PUDS channel handle is valid and is currently being used.

**Default Value:** NA.

**PCAN-Device:** All PCAN devices (excluding `PCANTP_HANDLE_NONEBUS` channel).

 **Note:** It is not needed to have a PUDS channel initialized before asking for its condition.

#### PUDS\_PARAMETER\_CAN\_TX\_DL

**Access:**  

**Description:** This parameter is used to define the default Data Length Code (DLC) used when transmitting ISO-TP messages CAN FD enabled: the fragmented CAN FD frames composing the full CAN ISO-TP message will have at most a length corresponding to that DLC (It depends if the data fit in a lower DLC value). Note that member `can_tx_dlc` in `uds_mapping` or `uds_msgconfig` or message's `can_info.dlc` can be used to override this parameter locally (see `uds_mapping` on page 25, `uds_msgconfig` on page 27, `cantp_can_info` on page 124).

**Possible values:** 8 (0x08) to 15 (0x0F).

**Default value:** 8 (0x08).



**PCAN-Device:** All PCAN devices (excluding `PCANTP_HANDLE_NONEBUS` channel).

#### PUDS\_PARAMETER\_CAN\_DATA\_PADDING

**Access:**  

**Description:** This parameter is used to define if the API should use CAN data optimization or CAN data padding: the first case will optimize the CAN DLC to avoid sending unnecessary data, on the other hand with CAN data padding the API will always send CAN frames with a DLC of 8 and pads the data with the padding value.

**Possible values:** `PUDS_CAN_DATA_PADDING_NONE` disables data padding (enabling CAN data optimization) and `PUDS_CAN_DATA_PADDING_ON` (enabling data padding).

	Type	Constant	Value	Description
	Byte	PUDS_CAN_DATA_PADDING_NONE	0x00	CAN frame data optimization is enabled.
	Byte	PUDS_CAN_DATA_PADDING_ON	0x01	CAN frame data optimization is disabled: CAN data length is always 8 and data is padded with zeros.

**Default value:** `PUDS_CAN_DATA_PADDING_ON` since ECUs that do not support CAN data optimization may not respond to UDS/CAN-TP messages.

**PCAN-Device:** All PCAN devices (excluding the `PCANTP_HANDLE_NONEBUS` channel).

#### PUDS\_PARAMETER\_CAN\_PADDING\_VALUE

**Access:**  

**Description:** This parameter is used to define the value (or pattern) for CAN data padding when it is enabled.

**Possible values:** Any value from 0x00 to 0xFF.

**Default value:** 0x55 (`PUDS_CAN_DATA_PADDING_VALUE`).

**PCAN-Device:** All PCAN devices (excluding `PCANTP_HANDLE_NONEBUS` channel).

**PUDS\_PARAMETER\_J1939\_PRIORITY**

**Access:** **R W**

**Description:** This parameter is used to define the default priority for messages compliant with SAE J1939 data link layer (i.e. 29-bit CAN identifier messages with normal fixed, mixed, or enhanced addressing).

**Possible Values:** Any value from 0x00 to 0x07.

**Default Value:** 0x06 (`PCANTP_J1939_PRIORITY_DEFAULT`).

**PCAN-Device:** All PCAN devices (excluding `PCANTP_HANDLE_NONEBUS` channel).

**PUDS\_PARAMETER\_BLOCK\_SIZE**

**Access:** **R W**

**Description:** This value is used to set the BlockSize (BS) parameter defined in the ISO-TP standard: it indicates to the sender the maximum number of consecutive frames that can be received without an intermediate FlowControl frame from the receiving network entity. A value of 0 indicates that no limit is set, and the sending network layer entity shall send all remaining consecutive frames.

**Possible Values:** 0x00 (unlimited) to 0xFF.

**Default Value:** 10.


**PCAN-Device:** All PCAN devices (excluding `PCANTP_HANDLE_NONEBUS` channel).

**PUDS\_PARAMETER\_SEPARATION\_TIME**

**Access:** **R W**

**Description:** This value is used to set the Separation Time (STmin) parameter defined in the ISO-TP standard: it indicates the minimum time the sender is to wait between the transmissions of two Consecutive Frames.

**Possible values:** 0x00 to 0x7F (range from 0 to 127 milliseconds) and 0xF1 to 0xF9 (range from 100 to 900 µs).

 **Note:** Values between 0xF1 to 0xF3 should define a minimum time of 100 to 300 µs, but in practice the time to transmit effectively a frame takes about 300 µs (which is to send the message to the CAN controller and to assert that the message is physically emitted on the CAN bus). Other values than the ones stated above are ISO reserved.

**Default value:** 10ms.



**PCAN-Device:** All PCAN devices (excluding `PCANTP_HANDLE_NONEBUS` channel).

**PUDS\_PARAMETER\_WFT\_MAX**

**Access:** **R W**


**Description:** This parameter is used to set the maximum number of FlowControl Wait frame transmission (N\_WFTmax) defined in the ISO-TP standard: it indicates how many FlowControl Wait frames with the wait status can be transmitted by a receiver in a row.

**Possible value:** Any positive number.

	Type	Constant	Value	Description
	Int32	PCANTP_WFT_MAX_UNLIMITED	0x00	Disables checks for ISO-TP WaitForFrames overrun when receiving a FlowControl frames (PUDS_STATUS_NETWORK_WFT_OVRN error will never occur).
	Int32	PCANTP_WFT_MAX_DEFAULT	0x10	The default value used by the API: if the number of consecutive FlowControl frame with the wait status exceeds this value, a PUDS_STATUS_NETWORK_WFT_OVRN error will occur.

**Default value:** `PCANTP_WFT_MAX_DEFAULT` (0x10).

**PCAN-Device:** NA. Any PCAN device can be used, including the `PCANTP_HANDLE_NONEBUS` channel.



 **Note:** Also, this parameter is set globally, channels will use the value sets when they are initialized, so it is possible to define different values of N\_WFTmax on separate channels. Consequently, once a channel is initialized, changing the WFTmax parameter will not affect that channel.

## PUDS\_PARAMETER\_ISO\_TIMEOUTS

**Access:**  

**Description:** Sets predefined ISO values for timeouts.

**Possible values:**

	Type	Constant	Value	Description
	Byte	PCANTP_ISO_TIMEOUTS_15765_2	0	Sets timeouts according to ISO-15765-2.
	Byte	PCANTP_ISO_TIMEOUTS_15765_4	1	Sets timeouts according to ISO-15765-4 (OBDII).

**Default value:** 0 (`PCANTP_ISO_TIMEOUTS_15765_2`).

**PCAN-Device:** All PCAN devices (excluding `PCANTP_HANDLE_NONEBUS` channel).

## PUDS\_PARAMETER\_RESET\_HARD

**Access:** 

**Description:** Resets the CAN controller and clears internal reception and transmission queues. This parameter provides a way to uninitialized then initialize the CAN channel without losing any configured mappings and PUDS/PCANTP related settings.

**Possible values:** 1.

**Default value:** NA.

**PCAN-Device:** All PCAN devices (excluding `PCANTP_HANDLE_NONEBUS` channel).

## PUDS\_PARAMETER\_HARDWARE\_NAME

**Access:** 

**Description:** This parameter is used to retrieve the name of the hardware represented by a PUDS channel. This is useful when an application wants to differentiate between several models of the same device, e.g. a PCAN-USB and a PCAN-USB Pro.

**Possible values:** The value is a null-terminated string which contains the name of the hardware specified by the given PUDS channel. The length of this text will have a maximum length of 32 bytes (null termination included).

**Default value:** N/A.

**PCAN-Device:** All PCAN devices (excluding `PCANTP_HANDLE_NONEBUS` channel).

**PUDS\_PARAMETER\_DEVICE\_NUMBER****Access:** R W

**Description:** This parameter is used on PCAN hardware to distinguish between 2 (or more) devices of the same type connected to the same computer. This value is persistent, i.e. the identifier will not be lost after disconnecting and connecting again a device.

**Possible values:** According to the firmware version, this value can be a number in the range [1..255] or [1..4294967295]. If the firmware has a resolution of one byte and the specified value is bigger, the value will be truncated.

**Default value:** If this parameter was never set before, the value is the maximum value possible for the used resolution. For 8-bits: 255 (0xFF), for 32 bits: 429496729 (0xFFFFFFFF).

**PCAN-Device:** All PCAN devices (excluding `PCANTP_HANDLE_NONEBUS` channel).

**PUDS\_PARAMETER\_CONTROLLER\_NUMBER****Access:** R

**Description:** This parameter is a zero-based index used to identify the CAN controllers built in a hardware. This parameter is useful when it is needed to communicate with a specific physical channel on a multichannel CAN Hardware, e.g. "0" or "1" on a PCAN-USB Pro device.

**Possible values:** A number in the range [0..n-1], where n is the number of physical channels on the device being used.




**Default value:** N/A.

**PCAN-Device:** All PCAN devices (excluding `PCANTP_HANDLE_NONEBUS` channel).

**PUDS\_PARAMETER\_CHANNEL\_FEATURES****Access:** R

**Description:** This value is used to read the particularities of a PUDS channel.

**Possible values:** The value can be one of the following values or a combination of them:

	Type	Constant	Value	Description
	UInt32	FEATURE_FD_CAPABLE	1	This value indicates that the hardware represented by a PUDS channel is FD capable (it supports flexible data rate).
	UInt32	FEATURE_DELAY_CAPABLE	2	This value indicates that the hardware represented by a PUDS channel allows the configuration of a delay between sending frames.
	UInt32	FEATURE_IO_CAPABLE	4	This value indicates that the hardware represented by a PUDS channel supports I/O functionality for electronic circuits (USB-Chip devices).

**Default value:** A value of 0, indicating "no special features".

**PCAN-Device:** All PCAN devices (excluding `PCANTP_HANDLE_NONEBUS` channel).

### 3.5.4 uds\_service

Represents a UDS service identifier. According to the programming language, this type can be a group of defined values or an enumeration.

#### Syntax

##### C/C++

```
#define PUDS_SI_DiagnosticSessionControl    0x10
#define PUDS_SI_ECUReset                    0x11
#define PUDS_SI_SecurityAccess              0x27
#define PUDS_SI_CommunicationControl        0x28
#define PUDS_SI_TesterPresent               0x3E
#define PUDS_SI_AccessTimingParameter       0x83
#define PUDS_SI_SecuredDataTransmission    0x84
#define PUDS_SI_ControlDTCSetting           0x85
#define PUDS_SI_ResponseOnEvent             0x86
#define PUDS_SI_LinkControl                  0x87
#define PUDS_SI_ReadDataByIdentifier        0x22
#define PUDS_SI_ReadMemoryByAddress         0x23
#define PUDS_SI_ReadScalingDataByIdentifier 0x24
#define PUDS_SI_ReadDataByPeriodicIdentifier 0x2A
#define PUDS_SI_DynamicallyDefineDataIdentifier 0x2C
#define PUDS_SI_WriteDataByIdentifier       0x2E
#define PUDS_SI_WriteMemoryByAddress        0x3D
#define PUDS_SI_ClearDiagnosticInformation   0x14
#define PUDS_SI_ReadDTCInformation          0x19
#define PUDS_SI_InputOutputControlByIdentifier 0x2F
#define PUDS_SI_RoutineControl              0x31
#define PUDS_SI_RequestDownload             0x34
#define PUDS_SI_RequestUpload               0x35
#define PUDS_SI_TransferData                0x36
#define PUDS_SI_RequestTransferExit         0x37
#define PUDS_SI_RequestFileTransfer         0x38
#define PUDS_SI_Authentication              0x29
#define PUDS_NR_SI                          0x7F
```

##### Pascal OO

```
uds_service = (
  PUDS_SERVICE_SI_DiagnosticSessionControl = $10,
  PUDS_SERVICE_SI_ECUReset = $11,
  PUDS_SERVICE_SI_SecurityAccess = $27,
  PUDS_SERVICE_SI_CommunicationControl = $28,
  PUDS_SERVICE_SI_TesterPresent = $3E,
  PUDS_SERVICE_SI_AccessTimingParameter = $83,
  PUDS_SERVICE_SI_SecuredDataTransmission = $84,
  PUDS_SERVICE_SI_ControlDTCSetting = $85,
  PUDS_SERVICE_SI_ResponseOnEvent = $86,
  PUDS_SERVICE_SI_LinkControl = $87,
  PUDS_SERVICE_SI_ReadDataByIdentifier = $22,
  PUDS_SERVICE_SI_ReadMemoryByAddress = $23,
  PUDS_SERVICE_SI_ReadScalingDataByIdentifier = $24,
  PUDS_SERVICE_SI_ReadDataByPeriodicIdentifier = $2A,
  PUDS_SERVICE_SI_DynamicallyDefineDataIdentifier = $2C,
  PUDS_SERVICE_SI_WriteDataByIdentifier = $2E,
  PUDS_SERVICE_SI_WriteMemoryByAddress = $3D,
  PUDS_SERVICE_SI_ClearDiagnosticInformation = $14,
  PUDS_SERVICE_SI_ReadDTCInformation = $19,
  PUDS_SERVICE_SI_InputOutputControlByIdentifier = $2F,
  PUDS_SERVICE_SI_RoutineControl = $31,
  PUDS_SERVICE_SI_RequestDownload = $34,
```

```

PUDS_SERVICE_SI_RequestUpload = $35,
PUDS_SERVICE_SI_TransferData = $36,
PUDS_SERVICE_SI_RequestTransferExit = $37,
PUDS_SERVICE_SI_RequestFileTransfer = $38,
PUDS_SERVICE_SI_Authentication = $29,
PUDS_SERVICE_NR_SI = $7F
);

```

**C#**

```

public enum uds_service : Byte
{
    PUDS_SERVICE_SI_DiagnosticSessionControl = 0x10,
    PUDS_SERVICE_SI_ECUReset = 0x11,
    PUDS_SERVICE_SI_SecurityAccess = 0x27,
    PUDS_SERVICE_SI_CommunicationControl = 0x28,
    PUDS_SERVICE_SI_TesterPresent = 0x3E,
    PUDS_SERVICE_SI_AccessTimingParameter = 0x83,
    PUDS_SERVICE_SI_SecuredDataTransmission = 0x84,
    PUDS_SERVICE_SI_ControlDTCSetting = 0x85,
    PUDS_SERVICE_SI_ResponseOnEvent = 0x86,
    PUDS_SERVICE_SI_LinkControl = 0x87,
    PUDS_SERVICE_SI_ReadDataByIdentifier = 0x22,
    PUDS_SERVICE_SI_ReadMemoryByAddress = 0x23,
    PUDS_SERVICE_SI_ReadScalingDataByIdentifier = 0x24,
    PUDS_SERVICE_SI_ReadDataByPeriodicIdentifier = 0x2A,
    PUDS_SERVICE_SI_DynamicallyDefineDataIdentifier = 0x2C,
    PUDS_SERVICE_SI_WriteDataByIdentifier = 0x2E,
    PUDS_SERVICE_SI_WriteMemoryByAddress = 0x3D,
    PUDS_SERVICE_SI_ClearDiagnosticInformation = 0x14,
    PUDS_SERVICE_SI_ReadDTCInformation = 0x19,
    PUDS_SERVICE_SI_InputOutputControlByIdentifier = 0x2F,
    PUDS_SERVICE_SI_RoutineControl = 0x31,
    PUDS_SERVICE_SI_RequestDownload = 0x34,
    PUDS_SERVICE_SI_RequestUpload = 0x35,
    PUDS_SERVICE_SI_TransferData = 0x36,
    PUDS_SERVICE_SI_RequestTransferExit = 0x37,
    PUDS_SERVICE_SI_RequestFileTransfer = 0x38,
    PUDS_SERVICE_SI_Authentication = 0x29,
    PUDS_SERVICE_NR_SI = 0x7F,
}

```

**C++ / CLR**

```

public enum uds_service : Byte
{
    PUDS_SERVICE_SI_DiagnosticSessionControl = 0x10,
    PUDS_SERVICE_SI_ECUReset = 0x11,
    PUDS_SERVICE_SI_SecurityAccess = 0x27,
    PUDS_SERVICE_SI_CommunicationControl = 0x28,
    PUDS_SERVICE_SI_TesterPresent = 0x3E,
    PUDS_SERVICE_SI_AccessTimingParameter = 0x83,
    PUDS_SERVICE_SI_SecuredDataTransmission = 0x84,
    PUDS_SERVICE_SI_ControlDTCSetting = 0x85,
    PUDS_SERVICE_SI_ResponseOnEvent = 0x86,
    PUDS_SERVICE_SI_LinkControl = 0x87,
    PUDS_SERVICE_SI_ReadDataByIdentifier = 0x22,
    PUDS_SERVICE_SI_ReadMemoryByAddress = 0x23,
    PUDS_SERVICE_SI_ReadScalingDataByIdentifier = 0x24,
    PUDS_SERVICE_SI_ReadDataByPeriodicIdentifier = 0x2A,
    PUDS_SERVICE_SI_DynamicallyDefineDataIdentifier = 0x2C,
    PUDS_SERVICE_SI_WriteDataByIdentifier = 0x2E,
}

```

```

PUDS_SERVICE_SI_WriteMemoryByAddress = 0x3D,
PUDS_SERVICE_SI_ClearDiagnosticInformation = 0x14,
PUDS_SERVICE_SI_ReadDTCInformation = 0x19,
PUDS_SERVICE_SI_InputOutputControlByIdentifier = 0x2F,
PUDS_SERVICE_SI_RoutineControl = 0x31,
PUDS_SERVICE_SI_RequestDownload = 0x34,
PUDS_SERVICE_SI_RequestUpload = 0x35,
PUDS_SERVICE_SI_TransferData = 0x36,
PUDS_SERVICE_SI_RequestTransferExit = 0x37,
PUDS_SERVICE_SI_RequestFileTransfer = 0x38,
PUDS_SERVICE_SI_Authentication = 0x29,
PUDS_SERVICE_NR_SI = 0x7F,
};

```

## Visual Basic

```

Public Enum uds_service As Byte
    PUDS_SERVICE_SI_DiagnosticSessionControl = &H10
    PUDS_SERVICE_SI_ECUReset = &H11
    PUDS_SERVICE_SI_SecurityAccess = &H27
    PUDS_SERVICE_SI_CommunicationControl = &H28
    PUDS_SERVICE_SI_TesterPresent = &H3E
    PUDS_SERVICE_SI_AccessTimingParameter = &H83
    PUDS_SERVICE_SI_SecuredDataTransmission = &H84
    PUDS_SERVICE_SI_ControlDTCSetting = &H85
    PUDS_SERVICE_SI_ResponseOnEvent = &H86
    PUDS_SERVICE_SI_LinkControl = &H87
    PUDS_SERVICE_SI_ReadDataByIdentifier = &H22
    PUDS_SERVICE_SI_ReadMemoryByAddress = &H23
    PUDS_SERVICE_SI_ReadScalingDataByIdentifier = &H24
    PUDS_SERVICE_SI_ReadDataByPeriodicIdentifier = &H2A
    PUDS_SERVICE_SI_DynamicallyDefineDataIdentifier = &H2C
    PUDS_SERVICE_SI_WriteDataByIdentifier = &H2E
    PUDS_SERVICE_SI_WriteMemoryByAddress = &H3D
    PUDS_SERVICE_SI_ClearDiagnosticInformation = &H14
    PUDS_SERVICE_SI_ReadDTCInformation = &H19
    PUDS_SERVICE_SI_InputOutputControlByIdentifier = &H2F
    PUDS_SERVICE_SI_RoutineControl = &H31
    PUDS_SERVICE_SI_RequestDownload = &H34
    PUDS_SERVICE_SI_RequestUpload = &H35
    PUDS_SERVICE_SI_TransferData = &H36
    PUDS_SERVICE_SI_RequestTransferExit = &H37
    PUDS_SERVICE_SI_RequestFileTransfer = &H38
    PUDS_SERVICE_SI_Authentication = &H29
    PUDS_SERVICE_NR_SI = &H7F
End Enum

```

## Values

Name	Value	Description
PUDS_SI_DiagnosticSessionControl	0x10 (16)	Identifier of the UDS Service DiagnosticSessionControl.
PUDS_SI_ECUReset	0x11 (17)	Identifier of the UDS Service ECUReset.
PUDS_SI_SecurityAccess	0x27 (39)	Identifier of the UDS Service SecurityAccess.
PUDS_SI_CommunicationControl	0x28 (40)	Identifier of the UDS Service CommunicationControl.
PUDS_SI_TesterPresent	0x3E (62)	Identifier of the UDS Service TesterPresent.
PUDS_SI_AccessTimingParameter	0x83 (131)	Identifier of the UDS Service AccessTimingParameter.
PUDS_SI_SecuredDataTransmission	0x84 (132)	Identifier of the UDS Service SecuredDataTransmission.
PUDS_SI_ControlDTCSetting	0x85 (133)	Identifier of the UDS Service ControlDTCSetting.
PUDS_SI_ResponseOnEvent	0x86 (134)	Identifier of the UDS Service ResponseOnEvent.
PUDS_SI_LinkControl	0x87 (135)	Identifier of the UDS Service LinkControl.



Name	Value	Description
PUDS_SI_ReadDataByIdentifier	0x22 (34)	Identifier of the UDS Service ReadDataByIdentifier.
PUDS_SI_ReadMemoryByAddress	0x23 (35)	Identifier of the UDS Service ReadMemoryByAddress.
PUDS_SI_ReadScalingDataByIdentifier	0x24 (36)	Identifier of the UDS Service ReadScalingDataByIdentifier.
PUDS_SI_ReadDataByPeriodicIdentifier	0x2A (42)	Identifier of the UDS Service ReadDataByPeriodicIdentifier.
PUDS_SI_DynamicallyDefineDataIdentifier	0x2C (44)	Identifier of the UDS Service DynamicallyDefineDataIdentifier.
PUDS_SI_WriteDataByIdentifier	0x2E (46)	Identifier of the UDS Service WriteDataByIdentifier.
PUDS_SI_WriteMemoryByAddress	0x3D (61)	Identifier of the UDS Service WriteMemoryByAddress.
PUDS_SI_ClearDiagnosticInformation	0x14 (20)	Identifier of the UDS Service ClearDiagnosticInformation.
PUDS_SI_ReadDTCInformation	0x19 (25)	Identifier of the UDS Service ReadDTCInformation.
PUDS_SI_InputOutputControlByIdentifier	0x2F (47)	Identifier of the UDS Service InputOutputControlByIdentifier.
PUDS_SI_RoutineControl	0x31 (49)	Identifier of the UDS Service RoutineControl.
PUDS_SI_RequestDownload	0x34 (52)	Identifier of the UDS Service RequestDownload.
PUDS_SI_RequestUpload	0x35 (53)	Identifier of the UDS Service RequestUpload.
PUDS_SI_TransferData	0x36 (54)	Identifier of the UDS Service TransferData.
PUDS_SI_RequestTransferExit	0x37 (55)	Identifier of the UDS Service RequestTransferExit.
PUDS_SI_RequestFileTransfer	0x38 (56)	Identifier of the UDS Service RequestFileTransfer.
PUDS_SI_Authentication	0x29 (41)	Identifier of the UDS Service Authentication.
PUDS_NR_SI	0x7F (127)	UDS Negative response identifier.

### 3.5.5 uds\_address

Represents the legislated addresses used with OBD (ISO-15765-4) communication. According to the programming language, this type can be a group of defined values or an enumeration.

#### Syntax

##### C/C++

```
#define PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT      0xF1
#define PUDS_ISO_15765_4_ADDR_OBD_FUNCTIONAL      0x33
#define PUDS_ISO_15765_4_ADDR_ECU_1              0x01
#define PUDS_ISO_15765_4_ADDR_ECU_2              0x02
#define PUDS_ISO_15765_4_ADDR_ECU_3              0x03
#define PUDS_ISO_15765_4_ADDR_ECU_4              0x04
#define PUDS_ISO_15765_4_ADDR_ECU_5              0x05
#define PUDS_ISO_15765_4_ADDR_ECU_6              0x06
#define PUDS_ISO_15765_4_ADDR_ECU_7              0x07
#define PUDS_ISO_15765_4_ADDR_ECU_8              0x08
```

##### Pascal OO

```
uds_address = (
  PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT = $F1,
  PUDS_ADDRESS_ISO_15765_4_ADDR_OBD_FUNCTIONAL = $33,
  PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1 = $1,
  PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_2 = $2,
  PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_3 = $3,
  PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_4 = $4,
  PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_5 = $5,
  PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_6 = $6,
  PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_7 = $7,
  PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_8 = $8
);
```



**C#**

```
public enum uds_address : UInt16
{
    PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT = 0xF1,
    PUDS_ADDRESS_ISO_15765_4_ADDR_OBD_FUNCTIONAL = 0x33,
    PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1 = 0x01,
    PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_2 = 0x02,
    PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_3 = 0x03,
    PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_4 = 0x04,
    PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_5 = 0x05,
    PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_6 = 0x06,
    PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_7 = 0x07,
    PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_8 = 0x08
}
```

**C++ / CLR**

```
public enum uds_address : UInt16
{
    PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT = 0xF1,
    PUDS_ADDRESS_ISO_15765_4_ADDR_OBD_FUNCTIONAL = 0x33,
    PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1 = 0x01,
    PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_2 = 0x02,
    PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_3 = 0x03,
    PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_4 = 0x04,
    PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_5 = 0x05,
    PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_6 = 0x06,
    PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_7 = 0x07,
    PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_8 = 0x08
};
```

**Visual Basic**

```
Public Enum uds_address As UInt16
    PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT = &HF1
    PUDS_ADDRESS_ISO_15765_4_ADDR_OBD_FUNCTIONAL = &H33
    PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1 = &H1
    PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_2 = &H2
    PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_3 = &H3
    PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_4 = &H4
    PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_5 = &H5
    PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_6 = &H6
    PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_7 = &H7
    PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_8 = &H8
End Enum
```

**Values**

Name	Value	Description
PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT	0xF1 (241)	Legislated physical address for external equipment.
PUDS_ISO_15765_4_ADDR_OBD_FUNCTIONAL	0x33 (51)	Functional address for legislated OBD system.
PUDS_ISO_15765_4_ADDR_ECU_1	0x01 (1)	Legislated-OBD ECU #1.
PUDS_ISO_15765_4_ADDR_ECU_2	0x02 (2)	Legislated-OBD ECU #2.
PUDS_ISO_15765_4_ADDR_ECU_3	0x03 (3)	Legislated-OBD ECU #3.
PUDS_ISO_15765_4_ADDR_ECU_4	0x04 (4)	Legislated-OBD ECU #4.
PUDS_ISO_15765_4_ADDR_ECU_5	0x05 (5)	Legislated-OBD ECU #5.
PUDS_ISO_15765_4_ADDR_ECU_6	0x06 (6)	Legislated-OBD ECU #6.
PUDS_ISO_15765_4_ADDR_ECU_7	0x07 (7)	Legislated-OBD ECU #7.
PUDS_ISO_15765_4_ADDR_ECU_8	0x08 (8)	Legislated-OBD ECU #8.

See also: `uds_netaddrinfo` on page 24.

### 3.5.6 uds\_can\_id

Represents the legislated CAN Identifiers used with OBD (ISO-15765-4) communication. Each of these CAN identifiers is assigned to a specific network addressing information (see `uds_mapping` on page 25 and default mappings in UDS and ISO-TP Network Addressing Information on page 770). According to the programming language, this type can be a group of defined values or an enumeration.

#### Syntax

##### C/C++

```
#define PUDS_ISO_15765_4_CAN_ID_FUNCTIONAL_REQUEST      0x7DF
#define PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1     0x7E0
#define PUDS_ISO_15765_4_CAN_ID_PHYSICAL_RESPONSE_1   0x7E8
#define PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_2     0x7E1
#define PUDS_ISO_15765_4_CAN_ID_PHYSICAL_RESPONSE_2   0x7E9
#define PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_3     0x7E2
#define PUDS_ISO_15765_4_CAN_ID_PHYSICAL_RESPONSE_3   0x7EA
#define PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_4     0x7E3
#define PUDS_ISO_15765_4_CAN_ID_PHYSICAL_RESPONSE_4   0x7EB
#define PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_5     0x7E4
#define PUDS_ISO_15765_4_CAN_ID_PHYSICAL_RESPONSE_5   0x7EC
#define PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_6     0x7E5
#define PUDS_ISO_15765_4_CAN_ID_PHYSICAL_RESPONSE_6   0x7ED
#define PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_7     0x7E6
#define PUDS_ISO_15765_4_CAN_ID_PHYSICAL_RESPONSE_7   0x7EE
#define PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_8     0x7E7
#define PUDS_ISO_15765_4_CAN_ID_PHYSICAL_RESPONSE_8   0x7EF
```

##### Pascal OO

```
uds_can_id = (
  PUDS_CAN_ID_ISO_15765_4_FUNCTIONAL_REQUEST = $7DF,
  PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1 = $7E0,
  PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_1 = $7E8,
  PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_2 = $7E1,
  PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_2 = $7E9,
  PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_3 = $7E2,
  PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_3 = $7EA,
  PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_4 = $7E3,
  PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_4 = $7EB,
  PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_5 = $7E4,
  PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_5 = $7EC,
  PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_6 = $7E5,
  PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_6 = $7ED,
  PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_7 = $7E6,
  PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_7 = $7EE,
  PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_8 = $7E7,
  PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_8 = $7EF
);
```

##### C#

```
public enum uds_can_id : UInt32
{
  PUDS_CAN_ID_ISO_15765_4_FUNCTIONAL_REQUEST = 0x7DF,
  PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1 = 0x7E0,
  PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_1 = 0x7E8,
  PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_2 = 0x7E1,
```

```

PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_2 = 0x7E9,
PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_3 = 0x7E2,
PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_3 = 0x7EA,
PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_4 = 0x7E3,
PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_4 = 0x7EB,
PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_5 = 0x7E4,
PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_5 = 0x7EC,
PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_6 = 0x7E5,
PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_6 = 0x7ED,
PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_7 = 0x7E6,
PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_7 = 0x7EE,
PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_8 = 0x7E7,
PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_8 = 0x7EF
}

```

## C++ / CLR

```

public enum uds_can_id : UInt32
{
    PUDS_CAN_ID_ISO_15765_4_FUNCTIONAL_REQUEST = 0x7DF,
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1 = 0x7E0,
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_1 = 0x7E8,
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_2 = 0x7E1,
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_2 = 0x7E9,
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_3 = 0x7E2,
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_3 = 0x7EA,
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_4 = 0x7E3,
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_4 = 0x7EB,
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_5 = 0x7E4,
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_5 = 0x7EC,
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_6 = 0x7E5,
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_6 = 0x7ED,
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_7 = 0x7E6,
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_7 = 0x7EE,
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_8 = 0x7E7,
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_8 = 0x7EF
};

```

## Visual Basic

```

Public Enum uds_can_id As UInt32
    PUDS_CAN_ID_ISO_15765_4_FUNCTIONAL_REQUEST = &H7DF
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1 = &H7E0
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_1 = &H7E8
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_2 = &H7E1
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_2 = &H7E9
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_3 = &H7E2
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_3 = &H7EA
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_4 = &H7E3
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_4 = &H7EB
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_5 = &H7E4
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_5 = &H7EC
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_6 = &H7E5
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_6 = &H7ED
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_7 = &H7E6
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_7 = &H7EE
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_8 = &H7E7
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_8 = &H7EF
End Enum

```

## values

Name	Value	Description
PUDS_ISO_15765_4_CAN_ID_FUNCTIONAL_REQUEST	0x7DF	CAN identifier for functionally addressed request messages sent by external test equipment.
PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1	0x7E0	Physical request CAN ID from external test equipment to ECU #1.
PUDS_ISO_15765_4_CAN_ID_PHYSICAL_RESPONSE_1	0x7E8	Physical response CAN ID from ECU #1 to external test equipment.
PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_2	0x7E1	Physical request CAN ID from external test equipment to ECU #2.
PUDS_ISO_15765_4_CAN_ID_PHYSICAL_RESPONSE_2	0x7E9	Physical response CAN ID from ECU #2 to external test equipment.
PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_3	0x7E2	Physical request CAN ID from external test equipment to ECU #3.
PUDS_ISO_15765_4_CAN_ID_PHYSICAL_RESPONSE_3	0x7EA	Physical response CAN ID from ECU #3 to external test equipment.
PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_4	0x7E3	Physical request CAN ID from external test equipment to ECU #4.
PUDS_ISO_15765_4_CAN_ID_PHYSICAL_RESPONSE_4	0x7EB	Physical response CAN ID from ECU #4 to external test equipment.
PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_5	0x7E4	Physical request CAN ID from external test equipment to ECU #5.
PUDS_ISO_15765_4_CAN_ID_PHYSICAL_RESPONSE_5	0x7EC	Physical response CAN ID from ECU #5 to external test equipment.
PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_6	0x7E5	Physical request CAN ID from external test equipment to ECU #6.
PUDS_ISO_15765_4_CAN_ID_PHYSICAL_RESPONSE_6	0x7ED	Physical response CAN ID from ECU #6 to external test equipment.
PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_7	0x7E6	Physical request CAN ID from external test equipment to ECU #7.
PUDS_ISO_15765_4_CAN_ID_PHYSICAL_RESPONSE_7	0x7EE	Physical response CAN ID from ECU #7 to external test equipment.
PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_8	0x7E7	Physical request CAN ID from external test equipment to ECU #8.
PUDS_ISO_15765_4_CAN_ID_PHYSICAL_RESPONSE_8	0x7EF	Physical response CAN ID from ECU #8 to external test equipment.

See also: [uds\\_netaddrinfo](#) on page 24.

### 3.5.7 uds\_status\_offset

Defines constants used by the [uds\\_status](#) enumeration. According to the programming language, this type can be a group of defined values or an enumeration.

#### Syntax

##### C/C++

```
#define PCANTP_STATUS_OFFSET_BUS 8
#define PCANTP_STATUS_OFFSET_NET (PCANTP_STATUS_OFFSET_BUS + 5)
#define PCANTP_STATUS_OFFSET_INFO (PCANTP_STATUS_OFFSET_NET + 5)
#define PCANTP_STATUS_OFFSET_UDS (PCANTP_STATUS_OFFSET_INFO + 6)
```

##### Pascal OO

```
const
  PCANTP_STATUS_OFFSET_BUS = 8;
  PCANTP_STATUS_OFFSET_NET = (PCANTP_STATUS_OFFSET_BUS + 5);
  PCANTP_STATUS_OFFSET_INFO = (PCANTP_STATUS_OFFSET_NET + 5);
  PCANTP_STATUS_OFFSET_UDS = (PCANTP_STATUS_OFFSET_INFO + 6);
```

##### C#

```
public enum uds_status_offset : byte
{
    PCANTP_STATUS_OFFSET_BUS = 8,
```

```

PCANTP_STATUS_OFFSET_NET = (PCANTP_STATUS_OFFSET_BUS + 5),
PCANTP_STATUS_OFFSET_INFO = (PCANTP_STATUS_OFFSET_NET + 5),
PCANTP_STATUS_OFFSET_UDS = (PCANTP_STATUS_OFFSET_INFO + 6)
}

```

## C++ / CLR

```

public enum uds_status_offset : Byte
{
    PCANTP_STATUS_OFFSET_BUS = 8,
    PCANTP_STATUS_OFFSET_NET = (PCANTP_STATUS_OFFSET_BUS + 5),
    PCANTP_STATUS_OFFSET_INFO = (PCANTP_STATUS_OFFSET_NET + 5),
    PCANTP_STATUS_OFFSET_UDS = (PCANTP_STATUS_OFFSET_INFO + 6)
};

```

## Visual Basic

```

Public Enum uds_status_offset As Byte
    PCANTP_STATUS_OFFSET_BUS = 8
    PCANTP_STATUS_OFFSET_NET = (PCANTP_STATUS_OFFSET_BUS + 5)
    PCANTP_STATUS_OFFSET_INFO = (PCANTP_STATUS_OFFSET_NET + 5)
    PCANTP_STATUS_OFFSET_UDS = (PCANTP_STATUS_OFFSET_INFO + 6)
End Enum

```

## Values

Name	Value	Description
PCANTP_STATUS_OFFSET_BUS	8	Bit shifting offset used for bus status code (see uds_status on page 32).
PCANTP_STATUS_OFFSET_NET	13	Bit shifting offset used for network status code (see uds_status on page 32).
PCANTP_STATUS_OFFSET_INFO	18	Bit shifting offset used for extra information status code (see uds_status on page 32).
PCANTP_STATUS_OFFSET_UDS	24	Bit shifting offset used for PUDS status code (see uds_status on page 32).

See also: [uds\\_status](#) on page 32.

## 3.5.8 uds\_msgprotocol

Represents a standardized and supported network communication protocol. It is a combination of the ISO-TP network addressing information supported in UDS.

### Syntax

#### C/C++

```

typedef enum _uds_msgprotocol {
    PUDS_MSGPROTOCOL_NONE = 0x00,
    PUDS_MSGPROTOCOL_ISO_15765_2_11B_EXTENDED = 0x07,
    PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL = 0x01,
    PUDS_MSGPROTOCOL_ISO_15765_2_11B_REMOTE = 0x02,
    PUDS_MSGPROTOCOL_ISO_15765_2_29B_EXTENDED = 0x08,
    PUDS_MSGPROTOCOL_ISO_15765_2_29B_FIXED_NORMAL = 0x03,
    PUDS_MSGPROTOCOL_ISO_15765_2_29B_NORMAL = 0x06,
    PUDS_MSGPROTOCOL_ISO_15765_2_29B_REMOTE = 0x04,
    PUDS_MSGPROTOCOL_ISO_15765_3_29B_ENHANCED = 0x05,
} uds_msgprotocol;

```

#### Pascal OO

```

uds_msgprotocol = (
    PUDS_MSGPROTOCOL_NONE = UInt32($0),
    PUDS_MSGPROTOCOL_ISO_15765_2_11B_EXTENDED = UInt32($07),

```

```

PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL = UInt32($01),
PUDS_MSGPROTOCOL_ISO_15765_2_11B_REMOTE = UInt32($02),
PUDS_MSGPROTOCOL_ISO_15765_2_29B_EXTENDED = UInt32($08),
PUDS_MSGPROTOCOL_ISO_15765_2_29B_FIXED_NORMAL = UInt32($03),
PUDS_MSGPROTOCOL_ISO_15765_2_29B_NORMAL = UInt32($06),
PUDS_MSGPROTOCOL_ISO_15765_2_29B_REMOTE = UInt32($04),
PUDS_MSGPROTOCOL_ISO_15765_3_29B_ENHANCED = UInt32($05));

```

**C#**

```

public enum uds_msgprotocol : UInt32
{
    PUDS_MSGPROTOCOL_NONE = 0x00,
    PUDS_MSGPROTOCOL_ISO_15765_2_11B_EXTENDED = 0x07,
    PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL = 0x01,
    PUDS_MSGPROTOCOL_ISO_15765_2_11B_REMOTE = 0x02,
    PUDS_MSGPROTOCOL_ISO_15765_2_29B_EXTENDED = 0x08,
    PUDS_MSGPROTOCOL_ISO_15765_2_29B_FIXED_NORMAL = 0x03,
    PUDS_MSGPROTOCOL_ISO_15765_2_29B_NORMAL = 0x06,
    PUDS_MSGPROTOCOL_ISO_15765_2_29B_REMOTE = 0x04,
    PUDS_MSGPROTOCOL_ISO_15765_3_29B_ENHANCED = 0x05
}

```

**C++ / CLR**

```

public enum uds_msgprotocol : UInt32
{
    PUDS_MSGPROTOCOL_NONE = 0x00,
    PUDS_MSGPROTOCOL_ISO_15765_2_11B_EXTENDED = 0x07,
    PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL = 0x01,
    PUDS_MSGPROTOCOL_ISO_15765_2_11B_REMOTE = 0x02,
    PUDS_MSGPROTOCOL_ISO_15765_2_29B_EXTENDED = 0x08,
    PUDS_MSGPROTOCOL_ISO_15765_2_29B_FIXED_NORMAL = 0x03,
    PUDS_MSGPROTOCOL_ISO_15765_2_29B_NORMAL = 0x06,
    PUDS_MSGPROTOCOL_ISO_15765_2_29B_REMOTE = 0x04,
    PUDS_MSGPROTOCOL_ISO_15765_3_29B_ENHANCED = 0x05
};

```

**Visual Basic**

```

Public Enum uds_msgprotocol As UInt32
    PUDS_MSGPROTOCOL_NONE = &H0
    PUDS_MSGPROTOCOL_ISO_15765_2_11B_EXTENDED = &H7
    PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL = &H1
    PUDS_MSGPROTOCOL_ISO_15765_2_11B_REMOTE = &H2
    PUDS_MSGPROTOCOL_ISO_15765_2_29B_EXTENDED = &H8
    PUDS_MSGPROTOCOL_ISO_15765_2_29B_FIXED_NORMAL = &H3
    PUDS_MSGPROTOCOL_ISO_15765_2_29B_NORMAL = &H6
    PUDS_MSGPROTOCOL_ISO_15765_2_29B_REMOTE = &H4
    PUDS_MSGPROTOCOL_ISO_15765_3_29B_ENHANCED = &H5
End Enum

```

**Values**

Name	Value	Description
PUDS_MSGPROTOCOL_NONE	0	Network layer configuration for Unacknowledged Unsegmented Data Transfer (UUDT).
PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL	1	Network layer configuration for the PCAN-ISO-TP 3.x API: 11 BIT CAN identifier, NORMAL addressing, and diagnostic message type (mapping required).

Name	Value	Description
PUDS_MSGPROTOCOL_ISO_15765_2_11B_EXTENDED	7	Network layer configuration for the PCAN-ISO-TP 3.x API: 11 BIT CAN identifier, EXTENDED addressing, and diagnostic message type. Note that specific CAN identifier mappings must be configured via the PCAN-ISO-TP 3.x API to transmit and receive such messages.
PUDS_MSGPROTOCOL_ISO_15765_2_11B_REMOTE	2	Network layer configuration for the PCAN-ISO-TP 3.x API: 11 BIT CAN identifier, MIXED addressing, and remote diagnostic message type (mapping required).
PUDS_MSGPROTOCOL_ISO_15765_2_29B_FIXED_NORMAL	3	Network layer configuration for the PCAN-ISO-TP 3.x API: 29 BIT CAN identifier, FIXED NORMAL addressing, and diagnostic message type.
PUDS_MSGPROTOCOL_ISO_15765_2_29B_EXTENDED	8	Network layer configuration for the PCAN-ISO-TP 3.x API: 29 BIT CAN identifier, EXTENDED addressing, and diagnostic message. Note that specific CAN identifier mappings must be configured via the PCAN-ISO-TP 3.x API to transmit and receive such messages.
PUDS_MSGPROTOCOL_ISO_15765_2_29B_NORMAL	6	Network layer configuration for the PCAN-ISO-TP 3.x API: 29 BIT CAN identifier, NORMAL addressing, and diagnostic message type. Note that specific CAN identifier mappings must be configured via the PCAN-ISO-TP 3.x API to transmit and receive such messages.
PUDS_MSGPROTOCOL_ISO_15765_2_29B_REMOTE	4	Network layer configuration for the PCAN-ISO-TP 3.x API: 29 BIT CAN identifier, MIXED addressing, and remote diagnostic message type.
PUDS_MSGPROTOCOL_ISO_15765_3_29B_ENHANCED	5	Network layer configuration for the PCAN-ISO-TP 3.x API: Enhanced diagnostics 29-bit CAN identifiers. Note with ISO-15765:2016, this addressing is considered deprecated and disabled by default. See PCAN-ISO-TP documentation on parameter: PCANTP_PARAMETER_SUPPORT_29B_ENHANCED.

**See also:** [uds\\_netaddrinfo](#) on page 24 and [uds\\_mapping](#) on page 25.

### 3.5.9 uds\_msgtype

Represents type and flags for a [uds\\_msg](#).

#### Syntax

##### C/C++

```
typedef enum _uds_msgtype {
    PUDS_MSGTYPE_USDT = 0,
    PUDS_MSGTYPE_UUDT = 1,
    PUDS_MSGTYPE_FLAG_NO_POSITIVE_RESPONSE = 2,
    PUDS_MSGTYPE_FLAG_LOOPBACK = 4,
    PUDS_MSGTYPE_MASK_TYPE = 0x01,
} uds_msgtype;
```

##### Pascal OO

```
uds_msgtype = (
    PUDS_MSGTYPE_USDT = 0,
    PUDS_MSGTYPE_UUDT = 1,
    PUDS_MSGTYPE_FLAG_NO_POSITIVE_RESPONSE = 2,
    PUDS_MSGTYPE_FLAG_LOOPBACK = 4,
    PUDS_MSGTYPE_MASK_TYPE = $1
);
```

**C#**

```
[Flags]
public enum uds_msgtype : UInt32
{
    PUDS_MSGTYPE_USDT = 0,
    PUDS_MSGTYPE_UUDT = 1,
    PUDS_MSGTYPE_FLAG_NO_POSITIVE_RESPONSE = 2,
    PUDS_MSGTYPE_FLAG_LOOPBACK = 4,
    PUDS_MSGTYPE_MASK_TYPE = 0x01,
}
```

**C++ / CLR**

```
public enum uds_msgtype : UInt32
{
    PUDS_MSGTYPE_USDT = 0,
    PUDS_MSGTYPE_UUDT = 1,
    PUDS_MSGTYPE_FLAG_NO_POSITIVE_RESPONSE = 2,
    PUDS_MSGTYPE_FLAG_LOOPBACK = 4,
    PUDS_MSGTYPE_MASK_TYPE = 0x01,
};
```

**Visual Basic**

```
<Flags()>
Public Enum uds_msgtype As UInt32
    PUDS_MSGTYPE_USDT = 0
    PUDS_MSGTYPE_UUDT = 1
    PUDS_MSGTYPE_FLAG_NO_POSITIVE_RESPONSE = 2
    PUDS_MSGTYPE_FLAG_LOOPBACK = 4
    PUDS_MSGTYPE_MASK_TYPE = &H1
End Enum
```

**Values**

Name	Value	Description
PUDS_MSGTYPE_USDT	0	Unacknowledged Segmented Data Transfer (ISO-TP message).
PUDS_MSGTYPE_UUDT	1	Unacknowledged Unsegmented Data Transfer (physical message will use a single CAN/CAN FD frame without ISO-TP protocol control information).
PUDS_MSGTYPE_FLAG_NO_POSITIVE_RESPONSE	2	ECU(s) shall not reply to the request on a positive response.
PUDS_MSGTYPE_FLAG_LOOPBACK	4	Message is a loopback.
PUDS_MSGTYPE_MASK_TYPE	1	Mask to get the type (USDT or UUDT).

**See also:** [uds\\_msgconfig](#) on page 25, [uds\\_msg](#) on page 21.

**3.5.10 uds\_nrc**

Represents UDS negative response codes (see ISO 14229-1:2013 §A.1 Negative response codes p.325).

**Syntax****C/C++**

```
typedef enum _uds_nrc
{
    PUDS_NRC_PR = 0x00,
    PUDS_NRC_GR = 0x10,
    PUDS_NRC_SNS = 0x11,
```



```
PUDS_NRC_SFNS = 0x12,  
PUDS_NRC_IMLOIF = 0x13,  
PUDS_NRC_RTL = 0x14,  
PUDS_NRC_BRR = 0x21,  
PUDS_NRC_CNC = 0x22,  
PUDS_NRC_RSE = 0x24,  
PUDS_NRC_NRFSC = 0x25,  
PUDS_NRC_FPEORA = 0x26,  
PUDS_NRC_ROOR = 0x31,  
PUDS_NRC_SAD = 0x33,  
PUDS_NRC_AR = 0x34,  
PUDS_NRC_IK = 0x35,  
PUDS_NRC_ENOA = 0x36,  
PUDS_NRC_RTDNE = 0x37,  
PUDS_NRC_SDTR = 0x38,  
PUDS_NRC_SDTNA = 0x39,  
PUDS_NRC_SDTF = 0x3A,  
PUDS_NRC_CVFITP = 0x50,  
PUDS_NRC_CVFISIG = 0x51,  
PUDS_NRC_CVFICOT = 0x52,  
PUDS_NRC_CVFIT = 0x53,  
PUDS_NRC_CVFIF = 0x54,  
PUDS_NRC_CVFIC = 0x55,  
PUDS_NRC_CVFISCP = 0x56,  
PUDS_NRC_CVFICERT = 0x57,  
PUDS_NRC_OVF = 0x58,  
PUDS_NRC_CCF = 0x59,  
PUDS_NRC_SARF = 0x5A,  
PUDS_NRC_SKCDF = 0x5B,  
PUDS_NRC_CDUF = 0x5C,  
PUDS_NRC_DAF = 0x5D,  
PUDS_NRC_UDNA = 0x70,  
PUDS_NRC_TDS = 0x71,  
PUDS_NRC_GPF = 0x72,  
PUDS_NRC_WBSC = 0x73,  
PUDS_NRC_RCRRP = 0x78,  
PUDS_NRC_SFNSIAS = 0x7E,  
PUDS_NRC_SNSIAS = 0x7F,  
PUDS_NRC_RPMTH = 0x81,  
PUDS_NRC_RPMTL = 0x82,  
PUDS_NRC_EIR = 0x83,  
PUDS_NRC_EINR = 0x84,  
PUDS_NRC_ERTTL = 0x85,  
PUDS_NRC_TEMPTH = 0x86,  
PUDS_NRC_TEMPTL = 0x87,  
PUDS_NRC_VSTH = 0x88,  
PUDS_NRC_VSTL = 0x89,  
PUDS_NRC_TPTH = 0x8A,  
PUDS_NRC_TPTL = 0x8B,  
PUDS_NRC_TRNIN = 0x8C,  
PUDS_NRC_TRNIG = 0x8D,  
PUDS_NRC_BSNC = 0x8F,  
PUDS_NRC_SLNIP = 0x90,  
PUDS_NRC_TCCL = 0x91,  
PUDS_NRC_VTH = 0x92,  
PUDS_NRC_VTL = 0x93,  
PUDS_NRC_RTNA = 0x94  
} uds_nrc;
```

## Pascal OO

```
uds_nrc = (  
    PUDS_NRC_PR = $00,  
    PUDS_NRC_GR = $10,  
    PUDS_NRC_SNS = $11,  
    PUDS_NRC_SFNS = $12,  
    PUDS_NRC_IMLOIF = $13,  
    PUDS_NRC_RTL = $14,  
    PUDS_NRC_BRR = $21,  
    PUDS_NRC_CNC = $22,  
    PUDS_NRC_RSE = $24,  
    PUDS_NRC_NRFSC = $25,  
    PUDS_NRC_FPEORA = $26,  
    PUDS_NRC_ROOR = $31,  
    PUDS_NRC_SAD = $33,  
    PUDS_NRC_AR = $34,  
    PUDS_NRC_IK = $35,  
    PUDS_NRC_ENOA = $36,  
    PUDS_NRC_RTDNE = $37,  
    PUDS_NRC_SDTR = $38,  
    PUDS_NRC_SDTNA = $39,  
    PUDS_NRC_SDTF = $3A,  
    PUDS_NRC_CVFITP = $50,  
    PUDS_NRC_CVFISIG = $51,  
    PUDS_NRC_CVFICOT = $52,  
    PUDS_NRC_CVFIT = $53,  
    PUDS_NRC_CVFIF = $54,  
    PUDS_NRC_CVFIC = $55,  
    PUDS_NRC_CVFISCP = $56,  
    PUDS_NRC_CVFICERT = $57,  
    PUDS_NRC_OVF = $58,  
    PUDS_NRC_CCF = $59,  
    PUDS_NRC_SARF = $5A,  
    PUDS_NRC_SKCDF = $5B,  
    PUDS_NRC_CDUF = $5C,  
    PUDS_NRC_DAF = $5D,  
    PUDS_NRC_UDNA = $70,  
    PUDS_NRC_TDS = $71,  
    PUDS_NRC_GPF = $72,  
    PUDS_NRC_WBSC = $73,  
    PUDS_NRC_RCRRP = $78,  
    PUDS_NRC_SFNSIAS = $7E,  
    PUDS_NRC_SNSIAS = $7F,  
    PUDS_NRC_RPMTH = $81,  
    PUDS_NRC_RPMTL = $82,  
    PUDS_NRC_EIR = $83,  
    PUDS_NRC_EINR = $84,  
    PUDS_NRC_ERTTL = $85,  
    PUDS_NRC_TEMPTH = $86,  
    PUDS_NRC_TEMPTL = $87,  
    PUDS_NRC_VSTH = $88,  
    PUDS_NRC_VSTL = $89,  
    PUDS_NRC_TPTH = $8A,  
    PUDS_NRC_TPTL = $8B,  
    PUDS_NRC_TRNIN = $8C,  
    PUDS_NRC_TRNIG = $8D,  
    PUDS_NRC_BSNC = $8F,  
    PUDS_NRC_SLNIP = $90,  
    PUDS_NRC_TCCL = $91,
```

```
PUDS_NRC_VTH = $92,
PUDS_NRC_VTL = $93,
PUDS_NRC_RTNA = $94);
```

**C#**

```
public enum uds_nrc : Byte
{
    PUDS_NRC_PR = 0x00,
    PUDS_NRC_GR = 0x10,
    PUDS_NRC_SNS = 0x11,
    PUDS_NRC_SFNS = 0x12,
    PUDS_NRC_IMLOIF = 0x13,
    PUDS_NRC_RTL = 0x14,
    PUDS_NRC_BRR = 0x21,
    PUDS_NRC_CNC = 0x22,
    PUDS_NRC_RSE = 0x24,
    PUDS_NRC_NRFSC = 0x25,
    PUDS_NRC_FPEORA = 0x26,
    PUDS_NRC_ROOR = 0x31,
    PUDS_NRC_SAD = 0x33,
    PUDS_NRC_AR = 0x34,
    PUDS_NRC_IK = 0x35,
    PUDS_NRC_ENOA = 0x36,
    PUDS_NRC_RTDNE = 0x37,
    PUDS_NRC_SDTR = 0x38,
    PUDS_NRC_SDTNA = 0x39,
    PUDS_NRC_SDTF = 0x3A,
    PUDS_NRC_CVFITP = 0x50,
    PUDS_NRC_CVFISIG = 0x51,
    PUDS_NRC_CVFICOT = 0x52,
    PUDS_NRC_CVFIT = 0x53,
    PUDS_NRC_CVFIF = 0x54,
    PUDS_NRC_CVFIC = 0x55,
    PUDS_NRC_CVFISCP = 0x56,
    PUDS_NRC_CVFICERT = 0x57,
    PUDS_NRC_OVF = 0x58,
    PUDS_NRC_CCF = 0x59,
    PUDS_NRC_SARF = 0x5A,
    PUDS_NRC_SKCDF = 0x5B,
    PUDS_NRC_CDUF = 0x5C,
    PUDS_NRC_DAF = 0x5D,
    PUDS_NRC_UDNA = 0x70,
    PUDS_NRC_TDS = 0x71,
    PUDS_NRC_GPF = 0x72,
    PUDS_NRC_WBSC = 0x73,
    PUDS_NRC_RCRRP = 0x78,
    PUDS_NRC_SFNSIAS = 0x7E,
    PUDS_NRC_SNSIAS = 0x7F,
    PUDS_NRC_RPMTH = 0x81,
    PUDS_NRC_RPMTL = 0x82,
    PUDS_NRC_EIR = 0x83,
    PUDS_NRC_EINR = 0x84,
    PUDS_NRC_ERTTL = 0x85,
    PUDS_NRC_TEMPTH = 0x86,
    PUDS_NRC_TEMPTL = 0x87,
    PUDS_NRC_VSTH = 0x88,
    PUDS_NRC_VSTL = 0x89,
    PUDS_NRC_TPTH = 0x8A,
    PUDS_NRC_TPTL = 0x8B,
    PUDS_NRC_TRNIN = 0x8C,
    PUDS_NRC_TRNIG = 0x8D,
```

```

PUDS_NRC_BSNC = 0x8F,
PUDS_NRC_SLNIP = 0x90,
PUDS_NRC_TCCL = 0x91,
PUDS_NRC_VTH = 0x92,
PUDS_NRC_VTL = 0x93,
PUDS_NRC_RTNA = 0x94
}

```

## C++ / CLR

```

public enum uds_nrc : Byte
{
    PUDS_NRC_PR = 0x00,
    PUDS_NRC_GR = 0x10,
    PUDS_NRC_SNS = 0x11,
    PUDS_NRC_SFNS = 0x12,
    PUDS_NRC_IMLOIF = 0x13,
    PUDS_NRC_RTL = 0x14,
    PUDS_NRC_BRR = 0x21,
    PUDS_NRC_CNC = 0x22,
    PUDS_NRC_RSE = 0x24,
    PUDS_NRC_NRFSC = 0x25,
    PUDS_NRC_FPEORA = 0x26,
    PUDS_NRC_ROOR = 0x31,
    PUDS_NRC_SAD = 0x33,
    PUDS_NRC_AR = 0x34,
    PUDS_NRC_IK = 0x35,
    PUDS_NRC_ENOA = 0x36,
    PUDS_NRC_RTDNE = 0x37,
    PUDS_NRC_SDTR = 0x38,
    PUDS_NRC_SDTNA = 0x39,
    PUDS_NRC_SDTF = 0x3A,
    PUDS_NRC_CVFITP = 0x50,
    PUDS_NRC_CVFISIG = 0x51,
    PUDS_NRC_CVFICOT = 0x52,
    PUDS_NRC_CVFIT = 0x53,
    PUDS_NRC_CVFIF = 0x54,
    PUDS_NRC_CVFIC = 0x55,
    PUDS_NRC_CVFISCP = 0x56,
    PUDS_NRC_CVFICERT = 0x57,
    PUDS_NRC_OVF = 0x58,
    PUDS_NRC_CCF = 0x59,
    PUDS_NRC_SARF = 0x5A,
    PUDS_NRC_SKCDF = 0x5B,
    PUDS_NRC_CDUF = 0x5C,
    PUDS_NRC_DAF = 0x5D,
    PUDS_NRC_UDNA = 0x70,
    PUDS_NRC_TDS = 0x71,
    PUDS_NRC_GPF = 0x72,
    PUDS_NRC_WBSC = 0x73,
    PUDS_NRC_RCRRP = 0x78,
    PUDS_NRC_SFNSIAS = 0x7E,
    PUDS_NRC_SNSIAS = 0x7F,
    PUDS_NRC_RPMTH = 0x81,
    PUDS_NRC_RPMTL = 0x82,
    PUDS_NRC_EIR = 0x83,
    PUDS_NRC_EINR = 0x84,
    PUDS_NRC_ERTTL = 0x85,
    PUDS_NRC_TEMPTH = 0x86,
    PUDS_NRC_TEMPTL = 0x87,
    PUDS_NRC_VSTH = 0x88,
    PUDS_NRC_VSTL = 0x89,
}

```

```

PUDS_NRC_TPTH = 0x8A,
PUDS_NRC_TPTL = 0x8B,
PUDS_NRC_TRNIN = 0x8C,
PUDS_NRC_TRNIG = 0x8D,
PUDS_NRC_BSNC = 0x8F,
PUDS_NRC_SLNIP = 0x90,
PUDS_NRC_TCCL = 0x91,
PUDS_NRC_VTH = 0x92,
PUDS_NRC_VTL = 0x93,
PUDS_NRC_RTNA = 0x94
};

```

## Visual Basic

```

Public Enum uds_nrc As Byte
    PUDS_NRC_PR = &H00
    PUDS_NRC_GR = &H10
    PUDS_NRC_SNS = &H11
    PUDS_NRC_SFNS = &H12
    PUDS_NRC_IMLOIF = &H13
    PUDS_NRC_RTL = &H14
    PUDS_NRC_BRR = &H21
    PUDS_NRC_CNC = &H22
    PUDS_NRC_RSE = &H24
    PUDS_NRC_NRFSC = &H25
    PUDS_NRC_FPEORA = &H26
    PUDS_NRC_ROOR = &H31
    PUDS_NRC_SAD = &H33
    PUDS_NRC_AR = &H34
    PUDS_NRC_IK = &H35
    PUDS_NRC_ENOA = &H36
    PUDS_NRC_RTDNE = &H37
    PUDS_NRC_SDTR = &H38
    PUDS_NRC_SDTNA = &H39
    PUDS_NRC_SDTF = &H3A
    PUDS_NRC_CVFITP = &H50
    PUDS_NRC_CVFISIG = &H51
    PUDS_NRC_CVFICOT = &H52
    PUDS_NRC_CVFIT = &H53
    PUDS_NRC_CVFIF = &H54
    PUDS_NRC_CVFIC = &H55
    PUDS_NRC_CVFISCP = &H56
    PUDS_NRC_CVFICERT = &H57
    PUDS_NRC_OVF = &H58
    PUDS_NRC_CCF = &H59
    PUDS_NRC_SARF = &H5A
    PUDS_NRC_SKCDF = &H5B
    PUDS_NRC_CDUF = &H5C
    PUDS_NRC_DAF = &H5D
    PUDS_NRC_UDNA = &H70
    PUDS_NRC_TDS = &H71
    PUDS_NRC_GPF = &H72
    PUDS_NRC_WBSC = &H73
    PUDS_NRC_RCRRP = &H78
    PUDS_NRC_SFNSIAS = &H7E
    PUDS_NRC_SNSIAS = &H7F
    PUDS_NRC_RPMTH = &H81
    PUDS_NRC_RPMTL = &H82
    PUDS_NRC_EIR = &H83
    PUDS_NRC_EINR = &H84
    PUDS_NRC_ERTTL = &H85
    PUDS_NRC_TEMPTH = &H86

```

```

PUDS_NRC_TEMPTL = &H87
PUDS_NRC_VSTH = &H88
PUDS_NRC_VSTL = &H89
PUDS_NRC_TPTH = &H8A
PUDS_NRC_TPTL = &H8B
PUDS_NRC_TRNIN = &H8C
PUDS_NRC_TRNIG = &H8D
PUDS_NRC_BSNC = &H8F
PUDS_NRC_SLNIP = &H90
PUDS_NRC_TCCL = &H91
PUDS_NRC_VTH = &H92
PUDS_NRC_VTL = &H93
PUDS_NRC_RTNA = &H94

```

End Enum

## values

Name	Value	Description
PUDS_NRC_PR	0x00	Positive Response
PUDS_NRC_GR	0x10	General Reject
PUDS_NRC_SNS	0x11	Service Not Supported
PUDS_NRC_SFNS	0x12	Sub Function Not Supported
PUDS_NRC_IMLOIF	0x13	Incorrect Message Length Or Invalid Format
PUDS_NRC_RTL	0x14	Response Too Long
PUDS_NRC_BRR	0x21	Busy Repeat Request
PUDS_NRC_CNC	0x22	Conditions Not Correct
PUDS_NRC_RSE	0x24	Request Sequence Error
PUDS_NRC_NRFSC	0x25	No Response From Subnet Component
PUDS_NRC_FPEORA	0x26	Failure Prevents Execution Of Requested Action
PUDS_NRC_ROOR	0x31	Request Out Of Range
PUDS_NRC_SAD	0x33	Security Access Denied
PUDS_NRC_AR	0x34	Authentication Required
PUDS_NRC_IK	0x35	Invalid Key
PUDS_NRC_ENOA	0x36	Exceeded Number Of Attempts
PUDS_NRC_RTDNE	0x37	Required Time Delay Not Expired
PUDS_NRC_SDTR	0x38	Secure Data Transmission Required
PUDS_NRC_SDTNA	0x39	Secure Data Transmission Not Allowed
PUDS_NRC_SDTF	0x3A	Secure Data Verification Failed
PUDS_NRC_CVFITP	0x50	Certificate Verification Failed Invalid Time Period
PUDS_NRC_CVFISIG	0x51	Certificate Verification Failed Invalid SIGNature
PUDS_NRC_CVFICOT	0x52	Certificate Verification Failed Invalid Chain of Trust
PUDS_NRC_CVFIT	0x53	Certificate Verification Failed Invalid Type
PUDS_NRC_CVFIF	0x54	Certificate Verification Failed Invalid Format
PUDS_NRC_CVFIC	0x55	Certificate Verification Failed Invalid Content
PUDS_NRC_CVFISCP	0x56	Certificate Verification Failed Invalid ScoPe
PUDS_NRC_CVFICERT	0x57	Certificate Verification Failed Invalid CERTificate(revoked)
PUDS_NRC_OVF	0x58	Ownership Verification Failed
PUDS_NRC_CCF	0x59	Challenge Calculation Failed
PUDS_NRC_SARF	0x5A	Setting Access Rights Failed
PUDS_NRC_SKCDF	0x5B	Session Key Creation / Derivation Failed
PUDS_NRC_CDUF	0x5C	Configuration Data Usage Failed
PUDS_NRC_DAF	0x5D	DeAuthentication Failed
PUDS_NRC_UDNA	0x70	Upload Download Not Accepted
PUDS_NRC_TDS	0x71	Transfer Data Suspended
PUDS_NRC_GPF	0x72	General Programming Failure
PUDS_NRC_WBSC	0x73	Wrong Block Sequence Counter

Name	Value	Description
PUDS_NRC_RCRRP	0x78	Request Correctly Received – Response Pending
PUDS_NRC_SFNSIAS	0x7E	Sub Function Not Supported In Active Session
PUDS_NRC_SNSIAS	0x7F	Service Not Supported In Active Session
PUDS_NRC_RPMTH	0x81	RPM Too High
PUDS_NRC_RPMTL	0x82	RPM Too Low
PUDS_NRC_EIR	0x83	Engine Is Running
PUDS_NRC_EINR	0x84	Engine Is Not Running
PUDS_NRC_ERTTL	0x85	Engine Run Time Too Low
PUDS_NRC_TEMPTH	0x86	TEMPerature Too High
PUDS_NRC_TEMPTL	0x87	TEMPerature Too Low
PUDS_NRC_VSTH	0x88	Vehicle Speed Too High
PUDS_NRC_VSTL	0x89	Vehicle Speed Too Low
PUDS_NRC_TPTH	0x8A	Throttle / Pedal Too High
PUDS_NRC_TPTL	0x8B	Throttle / Pedal Too Low
PUDS_NRC_TRNIN	0x8C	Transmission Range Not In Neutral
PUDS_NRC_TRNIG	0x8D	Transmission Range Not In Gear
PUDS_NRC_BSNC	0x8F	Brake Switch(es) Not Closed(brake pedal not pressed or not applied)
PUDS_NRC_SLNIP	0x90	Shifter Lever Not In Park
PUDS_NRC_TCCL	0x91	Torque Converter Clutch Locked
PUDS_NRC_VTH	0x92	Voltage Too High
PUDS_NRC_VTL	0x93	Voltage Too Low
PUDS_NRC_RTNA	0x94	Resource Temporarily Not Available

See also: `uds_msgaccess` on page 28, `uds_msg` on page 21.

### 3.5.11 uds\_svc\_param\_dsc

Represents the subfunction parameter for UDS service DiagnosticSessionControl. According to the programming language, this type can be a group of defined values or an enumeration.

#### Syntax

##### C/C++

```
#define PUDS_SVC_PARAM_DSC_DS      0x01
#define PUDS_SVC_PARAM_DSC_ECUPS   0x02
#define PUDS_SVC_PARAM_DSC_ECUEDS  0x03
#define PUDS_SVC_PARAM_DSC_SSDS    0x04
```

##### Pascal OO

```
uds_svc_param_dsc = (
    PUDS_SVC_PARAM_DSC_DS = $1,
    PUDS_SVC_PARAM_DSC_ECUPS = $2,
    PUDS_SVC_PARAM_DSC_ECUEDS = $3,
    PUDS_SVC_PARAM_DSC_SSDS = $4
);
```

**C#**

```
public enum uds_svc_param_dsc : Byte
{
    PUDS_SVC_PARAM_DSC_DS = 0x01,
    PUDS_SVC_PARAM_DSC_ECUPS = 0x02,
    PUDS_SVC_PARAM_DSC_ECUEDS = 0x03,
    PUDS_SVC_PARAM_DSC_SSDS = 0x04
}
```

**C++ / CLR**

```
enum struct uds_svc_param_dsc : Byte
{
    PUDS_SVC_PARAM_DSC_DS = 0x01,
    PUDS_SVC_PARAM_DSC_ECUPS = 0x02,
    PUDS_SVC_PARAM_DSC_ECUEDS = 0x03,
    PUDS_SVC_PARAM_DSC_SSDS = 0x04
};
```

**Visual Basic**

```
Public Enum uds_svc_param_dsc As Byte
    PUDS_SVC_PARAM_DSC_DS = &H1
    PUDS_SVC_PARAM_DSC_ECUPS = &H2
    PUDS_SVC_PARAM_DSC_ECUEDS = &H3
    PUDS_SVC_PARAM_DSC_SSDS = &H4
End Enum
```

**Values**

Name	Value	Description
PUDS_SVC_PARAM_DSC_DS	1	Default Session.
PUDS_SVC_PARAM_DSC_ECUPS	2	ECU Programming Session.
PUDS_SVC_PARAM_DSC_ECUEDS	3	ECU Extended Diagnostic Session.
PUDS_SVC_PARAM_DSC_SSDS	4	Safety System Diagnostic Session.

**See also:** [UDS\\_SvcDiagnosticSessionControl\\_2013](#) on page 661 (**class-method:** [SvcDiagnosticSessionControl\\_2013](#) on page 258).

**3.5.12 uds\_svc\_param\_er**

Represents the subfunction parameter for UDS service ECUReset. According to the programming language, this type can be a group of defined values or an enumeration.

**Syntax****C/C++**

```
#define PUDS_SVC_PARAM_ER_HR 0x01
#define PUDS_SVC_PARAM_ER_KOFFONR 0x02
#define PUDS_SVC_PARAM_ER_SR 0x03
#define PUDS_SVC_PARAM_ER_ERPSD 0x04
#define PUDS_SVC_PARAM_ER_DRPSD 0x05
```



## Pascal OO

```
uds_svc_param_er = (
  PUDS_SVC_PARAM_ER_HR = $1,
  PUDS_SVC_PARAM_ER_KOFFONR = $2,
  PUDS_SVC_PARAM_ER_SR = $3,
  PUDS_SVC_PARAM_ER_ERPSD = $4,
  PUDS_SVC_PARAM_ER_DRPSD = $5
);
```

## C#

```
public enum uds_svc_param_er : Byte
{
  PUDS_SVC_PARAM_ER_HR = 0x01,
  PUDS_SVC_PARAM_ER_KOFFONR = 0x02,
  PUDS_SVC_PARAM_ER_SR = 0x03,
  PUDS_SVC_PARAM_ER_ERPSD = 0x04,
  PUDS_SVC_PARAM_ER_DRPSD = 0x05,
}
```

## C++ / CLR

```
enum struct uds_svc_param_er : Byte
{
  PUDS_SVC_PARAM_ER_HR = 0x01,
  PUDS_SVC_PARAM_ER_KOFFONR = 0x02,
  PUDS_SVC_PARAM_ER_SR = 0x03,
  PUDS_SVC_PARAM_ER_ERPSD = 0x04,
  PUDS_SVC_PARAM_ER_DRPSD = 0x05,
};
```

## Visual Basic

```
Public Enum uds_svc_param_er As Byte
  PUDS_SVC_PARAM_ER_HR = &H1
  PUDS_SVC_PARAM_ER_KOFFONR = &H2
  PUDS_SVC_PARAM_ER_SR = &H3
  PUDS_SVC_PARAM_ER_ERPSD = &H4
  PUDS_SVC_PARAM_ER_DRPSD = &H5
End Enum
```

## Values

Name	Value	Description
PUDS_SVC_PARAM_ER_HR	1	Hard Reset.
PUDS_SVC_PARAM_ER_KOFFONR	2	Key Off on Reset.
PUDS_SVC_PARAM_ER_SR	3	Soft Reset.
PUDS_SVC_PARAM_ER_ERPSD	4	Enable Rapid Power Shutdown.
PUDS_SVC_PARAM_ER_DRPSD	5	Disable Rapid Power Shutdown.

**See also:** [UDS\\_SvcECUReset\\_2013](#) on page 663 (**class-method:** [SvcECUReset\\_2013](#) on page 262).

### 3.5.13 uds\_svc\_param\_cc

Represents the subfunction parameter for UDS service CommunicationControl. According to the programming language, this type can be a group of defined values or an enumeration.

#### Syntax

##### C/C++

```
#define PUDS_SVC_PARAM_CC_ERXTX          0x00
#define PUDS_SVC_PARAM_CC_ERXDTX        0x01
#define PUDS_SVC_PARAM_CC_DRXETX        0x02
#define PUDS_SVC_PARAM_CC_DRXTX         0x03
#define PUDS_SVC_PARAM_CC_ERXDTXWEAI    0x04
#define PUDS_SVC_PARAM_CC_ERXTXWEAI     0x05
```

##### Pascal OO

```
uds_svc_param_cc = (
  PUDS_SVC_PARAM_CC_ERXTX = $0,
  PUDS_SVC_PARAM_CC_ERXDTX = $1,
  PUDS_SVC_PARAM_CC_DRXETX = $2,
  PUDS_SVC_PARAM_CC_DRXTX = $3,
  PUDS_SVC_PARAM_CC_ERXDTXWEAI = $4,
  PUDS_SVC_PARAM_CC_ERXTXWEAI = $5
);
```

##### C#

```
public enum uds_svc_param_cc : Byte
{
  PUDS_SVC_PARAM_CC_ERXTX = 0x00,
  PUDS_SVC_PARAM_CC_ERXDTX = 0x01,
  PUDS_SVC_PARAM_CC_DRXETX = 0x02,
  PUDS_SVC_PARAM_CC_DRXTX = 0x03,
  PUDS_SVC_PARAM_CC_ERXDTXWEAI = 0x04,
  PUDS_SVC_PARAM_CC_ERXTXWEAI = 0x05
}
```

##### C++ / CLR

```
enum struct uds_svc_param_cc : Byte
{
  PUDS_SVC_PARAM_CC_ERXTX = 0x00,
  PUDS_SVC_PARAM_CC_ERXDTX = 0x01,
  PUDS_SVC_PARAM_CC_DRXETX = 0x02,
  PUDS_SVC_PARAM_CC_DRXTX = 0x03,
  PUDS_SVC_PARAM_CC_ERXDTXWEAI = 0x04,
  PUDS_SVC_PARAM_CC_ERXTXWEAI = 0x05
};
```

##### Visual Basic

```
Public Enum uds_svc_param_cc As Byte
  PUDS_SVC_PARAM_CC_ERXTX = &H0
  PUDS_SVC_PARAM_CC_ERXDTX = &H1
  PUDS_SVC_PARAM_CC_DRXETX = &H2
  PUDS_SVC_PARAM_CC_DRXTX = &H3
  PUDS_SVC_PARAM_CC_ERXDTXWEAI = &H4
  PUDS_SVC_PARAM_CC_ERXTXWEAI = &H5
End Enum
```

## Values

Name	Value	Description
PUDS_SVC_PARAM_CC_ERXTX	0	Enable Rx and Tx.
PUDS_SVC_PARAM_CC_ERXDTX	1	Enable Rx and Disable Tx.
PUDS_SVC_PARAM_CC_DRXETX	2	Disable Rx and Enable Tx.
PUDS_SVC_PARAM_CC_DRXTX	3	Disable Rx and Tx.
PUDS_SVC_PARAM_CC_ERXDTXWEAI	4	Enable Rx And Disable Tx With Enhanced Address Information.
PUDS_SVC_PARAM_CC_ERXTXWEAI	5	Enable Rx And Tx With Enhanced Address Information.

**See also:** [UDS\\_SvcCommunicationControl\\_2013](#) on page 666 (**class-method:** [SvcCommunicationControl\\_2013](#) on page 276).

### 3.5.14 uds\_svc\_param\_tp

Represents the subfunction parameter for UDS service TesterPresent. According to the programming language, this type can be a group of defined values or an enumeration.

## Syntax

### C/C++

```
#define PUDS_SVC_PARAM_TP_ZSUBF 0x00
```

### Pascal OO

```
uds_svc_param_tp = (  
    PUDS_SVC_PARAM_TP_ZSUBF = $0  
);
```

### C#

```
public enum uds_svc_param_tp : Byte  
{  
    PUDS_SVC_PARAM_TP_ZSUBF = 0x00  
}
```

### C++ / CLR

```
enum struct uds_svc_param_tp : Byte  
{  
    PUDS_SVC_PARAM_TP_ZSUBF = 0x00  
};
```

### Visual Basic

```
Public Enum uds_svc_param_tp As Byte  
    PUDS_SVC_PARAM_TP_ZSUBF = &H0  
End Enum
```

## Values

Name	Value	Description
PUDS_SVC_PARAM_TP_ZSUBF	0	Zero subfunction.

**See also:** [UDS\\_SvcTesterPresent\\_2013](#) on page 668 (**class-method:** [SvcTesterPresent\\_2013](#) on page 285).

### 3.5.15 uds\_svc\_param\_cdtcs

Represents the subfunction parameter for UDS service ControlDTCSetting. According to the programming language, this type can be a group of defined values or an enumeration.

#### Syntax

##### C/C++

```
#define PUDS_SVC_PARAM_CDTCS_ON      0x01
#define PUDS_SVC_PARAM_CDTCS_OFF    0x02
```

##### Pascal OO

```
uds_svc_param_cdtcs = (
    PUDS_SVC_PARAM_CDTCS_ON = $1,
    PUDS_SVC_PARAM_CDTCS_OFF = $2
);
```

##### C#

```
public enum uds_svc_param_cdtcs : Byte
{
    PUDS_SVC_PARAM_CDTCS_ON = 0x01,
    PUDS_SVC_PARAM_CDTCS_OFF = 0x02
}
```

##### C++ / CLR

```
enum struct uds_svc_param_cdtcs : Byte
{
    PUDS_SVC_PARAM_CDTCS_ON = 0x01,
    PUDS_SVC_PARAM_CDTCS_OFF = 0x02
};
```

##### Visual Basic

```
Public Enum uds_svc_param_cdtcs As Byte
    PUDS_SVC_PARAM_CDTCS_ON = &H1
    PUDS_SVC_PARAM_CDTCS_OFF = &H2
End Enum
```

#### values

Name	Value	Description
PUDS_SVC_PARAM_CDTCS_ON	1	The server(s)/ECU(s) shall resume the setting of diagnostic trouble codes.
PUDS_SVC_PARAM_CDTCS_OFF	2	The server(s)/ECU(s) shall stop the setting of diagnostic trouble codes.

**See also:** [UDS\\_SvcControlDTCSetting\\_2013](#) on page 675 (**class-method:** [SvcControlDTCSetting\\_2013](#) on page 305).

### 3.5.16 uds\_svc\_param\_roe

Represents the subfunction parameter for UDS service ResponseOnEvent. According to the programming language, this type can be a group of defined values or an enumeration.

#### Syntax

##### C/C++

```
#define PUDS_SVC_PARAM_ROE_STPROE      0x00
#define PUDS_SVC_PARAM_ROE_ONDTCS     0x01
#define PUDS_SVC_PARAM_ROE_OTI       0x02
#define PUDS_SVC_PARAM_ROE_OCODID    0x03
#define PUDS_SVC_PARAM_ROE_RAE       0x04
#define PUDS_SVC_PARAM_ROE_STRTROE   0x05
#define PUDS_SVC_PARAM_ROE_CLRROE    0x06
#define PUDS_SVC_PARAM_ROE_OCOV      0x07
#define PUDS_SVC_PARAM_ROE_RMRDOSC   0x08
#define PUDS_SVC_PARAM_ROE_RDRIODSC  0x09
```

##### Pascal OO

```
uds_svc_param_roe = (
  PUDS_SVC_PARAM_ROE_STPROE = $0,
  PUDS_SVC_PARAM_ROE_ONDTCS = $1,
  PUDS_SVC_PARAM_ROE_OTI = $2,
  PUDS_SVC_PARAM_ROE_OCODID = $3,
  PUDS_SVC_PARAM_ROE_RAE = $4,
  PUDS_SVC_PARAM_ROE_STRTROE = $5,
  PUDS_SVC_PARAM_ROE_CLRROE = $6,
  PUDS_SVC_PARAM_ROE_OCOV = $7,
  PUDS_SVC_PARAM_ROE_RMRDOSC = $8,
  PUDS_SVC_PARAM_ROE_RDRIODSC = $9
);
```

##### C#

```
public enum uds_svc_param_roe : Byte
{
  PUDS_SVC_PARAM_ROE_STPROE = 0x00,
  PUDS_SVC_PARAM_ROE_ONDTCS = 0x01,
  PUDS_SVC_PARAM_ROE_OTI = 0x02,
  PUDS_SVC_PARAM_ROE_OCODID = 0x03,
  PUDS_SVC_PARAM_ROE_RAE = 0x04,
  PUDS_SVC_PARAM_ROE_STRTROE = 0x05,
  PUDS_SVC_PARAM_ROE_CLRROE = 0x06,
  PUDS_SVC_PARAM_ROE_OCOV = 0x07,
  PUDS_SVC_PARAM_ROE_RMRDOSC = 0x08,
  PUDS_SVC_PARAM_ROE_RDRIODSC = 0x09
}
```

##### C++ / CLR

```
enum struct uds_svc_param_roe : Byte
{
  PUDS_SVC_PARAM_ROE_STPROE = 0x00,
  PUDS_SVC_PARAM_ROE_ONDTCS = 0x01,
  PUDS_SVC_PARAM_ROE_OTI = 0x02,
  PUDS_SVC_PARAM_ROE_OCODID = 0x03,
  PUDS_SVC_PARAM_ROE_RAE = 0x04,
  PUDS_SVC_PARAM_ROE_STRTROE = 0x05,
  PUDS_SVC_PARAM_ROE_CLRROE = 0x06,
  PUDS_SVC_PARAM_ROE_OCOV = 0x07,
```

```

PUDS_SVC_PARAM_ROE_RMRDOSC = 0x08,
PUDS_SVC_PARAM_ROE_RDRIODSC = 0x09
};

```

### Visual Basic

```

Public Enum uds_svc_param_roe As Byte
    PUDS_SVC_PARAM_ROE_STPROE = &H0
    PUDS_SVC_PARAM_ROE_ONDTCS = &H1
    PUDS_SVC_PARAM_ROE_OTI = &H2
    PUDS_SVC_PARAM_ROE_OCODID = &H3
    PUDS_SVC_PARAM_ROE_RAE = &H4
    PUDS_SVC_PARAM_ROE_STRTROE = &H5
    PUDS_SVC_PARAM_ROE_CLRROE = &H6
    PUDS_SVC_PARAM_ROE_OCOV = &H7
    PUDS_SVC_PARAM_ROE_RMRDOSC = &H8
    PUDS_SVC_PARAM_ROE_RDRIODSC = &H9
End Enum

```

### values

Name	Value	Description
PUDS_SVC_PARAM_ROE_STPROE	0	Stop Response On Event.
PUDS_SVC_PARAM_ROE_ONDTCS	1	On DTC Status Change.
PUDS_SVC_PARAM_ROE_OTI	2	On Timer Interrupt.
PUDS_SVC_PARAM_ROE_OCODID	3	On Change Of Data Identifier.
PUDS_SVC_PARAM_ROE_RAE	4	Report Activated Events.
PUDS_SVC_PARAM_ROE_STRTROE	5	Start Response On Event.
PUDS_SVC_PARAM_ROE_CLRROE	6	Clear Response On Event.
PUDS_SVC_PARAM_ROE_OCOV	7	On Comparison Of Values.
PUDS_SVC_PARAM_ROE_RMRDOSC	8	Report Most Recent Dtc On Status Change (ISO 14229-1:2020)
PUDS_SVC_PARAM_ROE_RDRIODSC	9	Report Dtc Record Information On Dtc Status Change (ISO 14229-1:2020)

See also: [UDS\\_SvcResponseOnEvent\\_2013](#) on page 677 (class-method: [SvcResponseOnEvent\\_2013](#) on page 314).

### 3.5.17 uds\_svc\_param\_roe\_recommended\_service\_id

Represents the recommended service to use with the UDS service ResponseOnEvent. According to the programming language, this type can be a group of defined values or an enumeration.

#### Syntax

##### C/C++

```

#define PUDS_SVC_PARAM_ROE_STRT_SI_RDBI      PUDS_SI_ReadDataByIdentifier
#define PUDS_SVC_PARAM_ROE_STRT_SI_RDTCI     PUDS_SI_ReadDTCInformation
#define PUDS_SVC_PARAM_ROE_STRT_SI_RC        PUDS_SI_RoutineControl
#define PUDS_SVC_PARAM_ROE_STRT_SI_IOCBI     PUDS_SI_InputOutputControlByIdentifier

```

##### Pascal OO

```

uds_svc_param_roe_recommended_service_id = (
    PUDS_SVC_PARAM_ROE_STRT_SI_RDBI = Byte(PUDS_SERVICE_SI_ReadDataByIdentifier),
    PUDS_SVC_PARAM_ROE_STRT_SI_RDTCI = Byte(PUDS_SERVICE_SI_ReadDTCInformation),
    PUDS_SVC_PARAM_ROE_STRT_SI_RC = Byte(PUDS_SERVICE_SI_RoutineControl),
    PUDS_SVC_PARAM_ROE_STRT_SI_IOCBI = Byte(PUDS_SERVICE_SI_InputOutputControlByIdentifier)
);

```

**C#**

```
enum uds_svc_param_roe_recommended_service_id : Byte
{
    PUDS_SVC_PARAM_ROE_STRT_SI_RDBI = uds_service.PUDS_SERVICE_SI_ReadDataByIdentifier,
    PUDS_SVC_PARAM_ROE_STRT_SI_RDTCI = uds_service.PUDS_SERVICE_SI_ReadDTCInformation,
    PUDS_SVC_PARAM_ROE_STRT_SI_RC = uds_service.PUDS_SERVICE_SI_RoutineControl,
    PUDS_SVC_PARAM_ROE_STRT_SI_IOCBI = uds_service.PUDS_SERVICE_SI_InputOutputControlByIdentifier
}
```

**C++ / CLR**

```
enum struct uds_svc_param_roe_recommended_service_id : Byte
{
    PUDS_SVC_PARAM_ROE_STRT_SI_RDBI = uds_service::PUDS_SERVICE_SI_ReadDataByIdentifier,
    PUDS_SVC_PARAM_ROE_STRT_SI_RDTCI = uds_service::PUDS_SERVICE_SI_ReadDTCInformation,
    PUDS_SVC_PARAM_ROE_STRT_SI_RC = uds_service::PUDS_SERVICE_SI_RoutineControl,
    PUDS_SVC_PARAM_ROE_STRT_SI_IOCBI = uds_service::PUDS_SERVICE_SI_InputOutputControlByIdentifier
};
```

**Visual Basic**

```
Enum uds_svc_param_roe_recommended_service_id As Byte
    PUDS_SVC_PARAM_ROE_STRT_SI_RDBI = uds_service.PUDS_SERVICE_SI_ReadDataByIdentifier
    PUDS_SVC_PARAM_ROE_STRT_SI_RDTCI = uds_service.PUDS_SERVICE_SI_ReadDTCInformation
    PUDS_SVC_PARAM_ROE_STRT_SI_RC = uds_service.PUDS_SERVICE_SI_RoutineControl
    PUDS_SVC_PARAM_ROE_STRT_SI_IOCBI = uds_service.PUDS_SERVICE_SI_InputOutputControlByIdentifier
End Enum
```

**values**

Name	Value	Description
PUDS_SVC_PARAM_ROE_STRT_SI_RDBI	PUDS_SI_ReadDataByIdentifier	UDS service ReadDataByIdentifier.
PUDS_SVC_PARAM_ROE_STRT_SI_RDTCI	PUDS_SI_ReadDTCInformation	UDS service ReadDTCInformation.
PUDS_SVC_PARAM_ROE_STRT_SI_RC	PUDS_SI_RoutineControl	UDS service RoutineControl.
PUDS_SVC_PARAM_ROE_STRT_SI_IOCBI	PUDS_SI_InputOutputControlByIdentifier	UDS service InputOutputControlByIdentifier.

**See also:** `UDS_SvcResponseOnEvent_2013` on page 677 (**class-method:** `SvcResponseOnEvent_2013` on page 314), `uds_service` on page 53.

**3.5.18 uds\_svc\_param\_lc**

Represents the subfunction parameter for UDS service LinkControl. According to the programming language, this type can be a group of defined values or an enumeration.

**Syntax****C/C++**

```
#define PUDS_SVC_PARAM_LC_VBTWFBR 0x01
#define PUDS_SVC_PARAM_LC_VBTWSBR 0x02
#define PUDS_SVC_PARAM_LC_TB 0x03
```

**Pascal OO**

```
uds_svc_param_lc = (
    PUDS_SVC_PARAM_LC_VBTWFBR = $1,
    PUDS_SVC_PARAM_LC_VBTWSBR = $2,
    PUDS_SVC_PARAM_LC_TB = $3
);
```

**C#**

```
public enum uds_svc_param_lc : Byte
{
    PUDS_SVC_PARAM_LC_VBTWFBR = 0x01,
    PUDS_SVC_PARAM_LC_VBTWSBR = 0x02,
    PUDS_SVC_PARAM_LC_TB = 0x03
}
```

**C++ / CLR**

```
enum struct uds_svc_param_lc : Byte
{
    PUDS_SVC_PARAM_LC_VBTWFBR = 0x01,
    PUDS_SVC_PARAM_LC_VBTWSBR = 0x02,
    PUDS_SVC_PARAM_LC_TB = 0x03
};
```

**Visual Basic**

```
Public Enum uds_svc_param_lc As Byte
    PUDS_SVC_PARAM_LC_VBTWFBR = &H1
    PUDS_SVC_PARAM_LC_VBTWSBR = &H2
    PUDS_SVC_PARAM_LC_TB = &H3
End Enum
```

**Values**

Name	Value	Description
PUDS_SVC_PARAM_LC_VBTWFBR	1	Verify Baud rate Transition With Fixed Baud rate.
PUDS_SVC_PARAM_LC_VBTWSBR	2	Verify Baud rate Transition With Specific Baud rate.
PUDS_SVC_PARAM_LC_TB	3	Transition Baud rate.

**See also:** [UDS\\_SvcLinkControl\\_2013](#) on page 679 (**class-method:** [SvcLinkControl\\_2013](#) on page 328).

**3.5.19 uds\_svc\_param\_lc\_baudrate\_identfier**

Represents the standard baud rate identifiers to use with the UDS service LinkControl. According to the programming language, this type can be a group of defined values or an enumeration.

**Syntax****C/C++**

```
#define PUDS_SVC_PARAM_LC_BAUDRATE_PC_9600 0x01
#define PUDS_SVC_PARAM_LC_BAUDRATE_PC_19200 0x02
#define PUDS_SVC_PARAM_LC_BAUDRATE_PC_38400 0x03
#define PUDS_SVC_PARAM_LC_BAUDRATE_PC_57600 0x04
#define PUDS_SVC_PARAM_LC_BAUDRATE_PC_115200 0x05
#define PUDS_SVC_PARAM_LC_BAUDRATE_CAN_125K 0x10
#define PUDS_SVC_PARAM_LC_BAUDRATE_CAN_250K 0x11
#define PUDS_SVC_PARAM_LC_BAUDRATE_CAN_500K 0x12
#define PUDS_SVC_PARAM_LC_BAUDRATE_CAN_1M 0x13
#define PUDS_SVC_PARAM_LC_BAUDRATE_PROGSU 0x20
```

**Pascal OO**

```
uds_svc_param_lc_baudrate_identfier = (
    PUDS_SVC_PARAM_LC_BAUDRATE_PC_9600 = $1,
    PUDS_SVC_PARAM_LC_BAUDRATE_PC_19200 = $2,
```



```

PUDS_SVC_PARAM_LC_BAUDRATE_PC_38400 = $3,
PUDS_SVC_PARAM_LC_BAUDRATE_PC_57600 = $4,
PUDS_SVC_PARAM_LC_BAUDRATE_PC_115200 = $5,
PUDS_SVC_PARAM_LC_BAUDRATE_CAN_125K = $10,
PUDS_SVC_PARAM_LC_BAUDRATE_CAN_250K = $11,
PUDS_SVC_PARAM_LC_BAUDRATE_CAN_500K = $12,
PUDS_SVC_PARAM_LC_BAUDRATE_CAN_1M = $13,
PUDS_SVC_PARAM_LC_BAUDRATE_PROGSU = $20
);

```

**C#**

```

public enum uds_svc_param_lc_baudrate_identifier : Byte
{
    PUDS_SVC_PARAM_LC_BAUDRATE_PC_9600 = 0x01,
    PUDS_SVC_PARAM_LC_BAUDRATE_PC_19200 = 0x02,
    PUDS_SVC_PARAM_LC_BAUDRATE_PC_38400 = 0x03,
    PUDS_SVC_PARAM_LC_BAUDRATE_PC_57600 = 0x04,
    PUDS_SVC_PARAM_LC_BAUDRATE_PC_115200 = 0x05,
    PUDS_SVC_PARAM_LC_BAUDRATE_CAN_125K = 0x10,
    PUDS_SVC_PARAM_LC_BAUDRATE_CAN_250K = 0x11,
    PUDS_SVC_PARAM_LC_BAUDRATE_CAN_500K = 0x12,
    PUDS_SVC_PARAM_LC_BAUDRATE_CAN_1M = 0x13,
    PUDS_SVC_PARAM_LC_BAUDRATE_PROGSU = 0x20
}

```

**C++ / CLR**

```

enum struct uds_svc_param_lc_baudrate_identifier : Byte
{
    PUDS_SVC_PARAM_LC_BAUDRATE_PC_9600 = 0x01,
    PUDS_SVC_PARAM_LC_BAUDRATE_PC_19200 = 0x02,
    PUDS_SVC_PARAM_LC_BAUDRATE_PC_38400 = 0x03,
    PUDS_SVC_PARAM_LC_BAUDRATE_PC_57600 = 0x04,
    PUDS_SVC_PARAM_LC_BAUDRATE_PC_115200 = 0x05,
    PUDS_SVC_PARAM_LC_BAUDRATE_CAN_125K = 0x10,
    PUDS_SVC_PARAM_LC_BAUDRATE_CAN_250K = 0x11,
    PUDS_SVC_PARAM_LC_BAUDRATE_CAN_500K = 0x12,
    PUDS_SVC_PARAM_LC_BAUDRATE_CAN_1M = 0x13,
    PUDS_SVC_PARAM_LC_BAUDRATE_PROGSU = 0x20
};

```

**Visual Basic**

```

Public Enum uds_svc_param_lc_baudrate_identifier As Byte
    PUDS_SVC_PARAM_LC_BAUDRATE_PC_9600 = &H1
    PUDS_SVC_PARAM_LC_BAUDRATE_PC_19200 = &H2
    PUDS_SVC_PARAM_LC_BAUDRATE_PC_38400 = &H3
    PUDS_SVC_PARAM_LC_BAUDRATE_PC_57600 = &H4
    PUDS_SVC_PARAM_LC_BAUDRATE_PC_115200 = &H5
    PUDS_SVC_PARAM_LC_BAUDRATE_CAN_125K = &H10
    PUDS_SVC_PARAM_LC_BAUDRATE_CAN_250K = &H11
    PUDS_SVC_PARAM_LC_BAUDRATE_CAN_500K = &H12
    PUDS_SVC_PARAM_LC_BAUDRATE_CAN_1M = &H13
    PUDS_SVC_PARAM_LC_BAUDRATE_PROGSU = &H20
End Enum

```

**Values**

Name	Value	Description
PUDS_SVC_PARAM_LC_BAUDRATE_PC_9600	0x1 (1)	Standard PC baud rate of 9.6 Kbaud.
PUDS_SVC_PARAM_LC_BAUDRATE_PC_19200	0x2 (2)	Standard PC baud rate of 19.2 Kbaud.

Name	Value	Description
PUDS_SVC_PARAM_LC_BAUDRATE_PC_38400	0x3 (3)	Standard PC baud rate of 38.4 KBaud.
PUDS_SVC_PARAM_LC_BAUDRATE_PC_57600	0x4 (4)	Standard PC baud rate of 57.6 KBaud.
PUDS_SVC_PARAM_LC_BAUDRATE_PC_115200	0x5 (5)	Standard PC baud rate of 115.2 KBaud.
PUDS_SVC_PARAM_LC_BAUDRATE_CAN_125K	0x10 (16)	Standard CAN baud rate of 125 KBaud.
PUDS_SVC_PARAM_LC_BAUDRATE_CAN_250K	0x11 (17)	Standard CAN baud rate of 250 KBaud.
PUDS_SVC_PARAM_LC_BAUDRATE_CAN_500K	0x12 (18)	Standard CAN baud rate of 500 KBaud.
PUDS_SVC_PARAM_LC_BAUDRATE_CAN_1M	0x13 (19)	Standard CAN baud rate of 1 MBaud.
PUDS_SVC_PARAM_LC_BAUDRATE_PROGSU	0x20 (32)	Programming setup

See also: `UDS_SvcLinkControl_2013` on page 679 (class-method: `SvcLinkControl_2013` on page 328).

### 3.5.20 uds\_svc\_param\_di

Represents the Data Identifiers defined in UDS standard ISO-14229-1. According to the programming language, this type can be a group of defined values or an enumeration.

#### Syntax

##### C/C++

```
#define PUDS_SVC_PARAM_DI_BSIDIID 0xF180
#define PUDS_SVC_PARAM_DI_ASIDIID 0xF181
#define PUDS_SVC_PARAM_DI_ADIDIID 0xF182
#define PUDS_SVC_PARAM_DI_BSFPDIID 0xF183
#define PUDS_SVC_PARAM_DI_ASFPDIID 0xF184
#define PUDS_SVC_PARAM_DI_ADFPDIID 0xF185
#define PUDS_SVC_PARAM_DI_ADSDIID 0xF186
#define PUDS_SVC_PARAM_DI_VMSPNDIID 0xF187
#define PUDS_SVC_PARAM_DI_VMECUSNDIID 0xF188
#define PUDS_SVC_PARAM_DI_VMECUSVNDIID 0xF189
#define PUDS_SVC_PARAM_DI_SSIDIID 0xF18A
#define PUDS_SVC_PARAM_DI_ECUMDDIID 0xF18B
#define PUDS_SVC_PARAM_DI_ECUSNDIID 0xF18C
#define PUDS_SVC_PARAM_DI_SFUDIID 0xF18D
#define PUDS_SVC_PARAM_DI_VMKAPNDIID 0xF18E
#define PUDS_SVC_PARAM_DI_VINDIID 0xF190
#define PUDS_SVC_PARAM_DI_VMECUHNDIID 0xF191
#define PUDS_SVC_PARAM_DI_SSECUHWNDIID 0xF192
#define PUDS_SVC_PARAM_DI_SSECUHWVNDIID 0xF193
#define PUDS_SVC_PARAM_DI_SSECUSWNDIID 0xF194
#define PUDS_SVC_PARAM_DI_SSECUSWVNDIID 0xF195
#define PUDS_SVC_PARAM_DI_EROTANDIID 0xF196
#define PUDS_SVC_PARAM_DI_SNOETDIID 0xF197
#define PUDS_SVC_PARAM_DI_RSCOTSNDIID 0xF198
#define PUDS_SVC_PARAM_DI_PDDIID 0xF199
#define PUDS_SVC_PARAM_DI_CRSCOCESNDIID 0xF19A
#define PUDS_SVC_PARAM_DI_CDDIID 0xF19B
#define PUDS_SVC_PARAM_DI_CESWNDIID 0xF19C
#define PUDS_SVC_PARAM_DI_EIDIID 0xF19D
#define PUDS_SVC_PARAM_DI_ODXFDIID 0xF19E
#define PUDS_SVC_PARAM_DI_EDIID 0xF19F
```

##### Pascal OO

```
uds_svc_param_di = (
    PUDS_SVC_PARAM_DI_BSIDIID = $F180,
    PUDS_SVC_PARAM_DI_ASIDIID = $F181,
    PUDS_SVC_PARAM_DI_ADIDIID = $F182,
    PUDS_SVC_PARAM_DI_BSFPDIID = $F183,
```

```

PUDS_SVC_PARAM_DI_ASFPDID = $F184,
PUDS_SVC_PARAM_DI_ADFPDID = $F185,
PUDS_SVC_PARAM_DI_ADSDID = $F186,
PUDS_SVC_PARAM_DI_VMSPNDID = $F187,
PUDS_SVC_PARAM_DI_VMECUSNDID = $F188,
PUDS_SVC_PARAM_DI_VMECUSVNDID = $F189,
PUDS_SVC_PARAM_DI_SSIDDID = $F18A,
PUDS_SVC_PARAM_DI_ECUMDDID = $F18B,
PUDS_SVC_PARAM_DI_ECUSNDID = $F18C,
PUDS_SVC_PARAM_DI_SFUDID = $F18D,
PUDS_SVC_PARAM_DI_VMKAPNDID = $F18E,
PUDS_SVC_PARAM_DI_VINDID = $F190,
PUDS_SVC_PARAM_DI_VMECUHNDID = $F191,
PUDS_SVC_PARAM_DI_SSECUHWNDID = $F192,
PUDS_SVC_PARAM_DI_SSECUHWVNDID = $F193,
PUDS_SVC_PARAM_DI_SSECUSWNDID = $F194,
PUDS_SVC_PARAM_DI_SSECUSWVNDID = $F195,
PUDS_SVC_PARAM_DI_EROTANDID = $F196,
PUDS_SVC_PARAM_DI_SNOETDID = $F197,
PUDS_SVC_PARAM_DI_RSCOTSNDID = $F198,
PUDS_SVC_PARAM_DI_PDDID = $F199,
PUDS_SVC_PARAM_DI_CRSCOCESNDID = $F19A,
PUDS_SVC_PARAM_DI_CDDID = $F19B,
PUDS_SVC_PARAM_DI_CESWNDID = $F19C,
PUDS_SVC_PARAM_DI_EIDDID = $F19D,
PUDS_SVC_PARAM_DI_ODXFDID = $F19E,
PUDS_SVC_PARAM_DI_EDID = $F19F

```

```
);
```

## C#

```

public enum uds_svc_param_di : UInt16
{
    PUDS_SVC_PARAM_DI_BSIDDID = 0xF180,
    PUDS_SVC_PARAM_DI_ASIDDID = 0xF181,
    PUDS_SVC_PARAM_DI_ADIDDID = 0xF182,
    PUDS_SVC_PARAM_DI_BSPFDID = 0xF183,
    PUDS_SVC_PARAM_DI_ASFPDID = 0xF184,
    PUDS_SVC_PARAM_DI_ADFPDID = 0xF185,
    PUDS_SVC_PARAM_DI_ADSDID = 0xF186,
    PUDS_SVC_PARAM_DI_VMSPNDID = 0xF187,
    PUDS_SVC_PARAM_DI_VMECUSNDID = 0xF188,
    PUDS_SVC_PARAM_DI_VMECUSVNDID = 0xF189,
    PUDS_SVC_PARAM_DI_SSIDDID = 0xF18A,
    PUDS_SVC_PARAM_DI_ECUMDDID = 0xF18B,
    PUDS_SVC_PARAM_DI_ECUSNDID = 0xF18C,
    PUDS_SVC_PARAM_DI_SFUDID = 0xF18D,
    PUDS_SVC_PARAM_DI_VMKAPNDID = 0xF18E,
    PUDS_SVC_PARAM_DI_VINDID = 0xF190,
    PUDS_SVC_PARAM_DI_VMECUHNDID = 0xF191,
    PUDS_SVC_PARAM_DI_SSECUHWNDID = 0xF192,
    PUDS_SVC_PARAM_DI_SSECUHWVNDID = 0xF193,
    PUDS_SVC_PARAM_DI_SSECUSWNDID = 0xF194,
    PUDS_SVC_PARAM_DI_SSECUSWVNDID = 0xF195,
    PUDS_SVC_PARAM_DI_EROTANDID = 0xF196,
    PUDS_SVC_PARAM_DI_SNOETDID = 0xF197,
    PUDS_SVC_PARAM_DI_RSCOTSNDID = 0xF198,
    PUDS_SVC_PARAM_DI_PDDID = 0xF199,
    PUDS_SVC_PARAM_DI_CRSCOCESNDID = 0xF19A,
    PUDS_SVC_PARAM_DI_CDDID = 0xF19B,
    PUDS_SVC_PARAM_DI_CESWNDID = 0xF19C,
    PUDS_SVC_PARAM_DI_EIDDID = 0xF19D,

```

```

PUDS_SVC_PARAM_DI_ODXFDID = 0xF19E,
PUDS_SVC_PARAM_DI_EDID = 0xF19F
}

```

## C++ / CLR

```

enum struct uds_svc_param_di : Uint16
{
    PUDS_SVC_PARAM_DI_BSIDDID = 0xF180,
    PUDS_SVC_PARAM_DI_ASIDDID = 0xF181,
    PUDS_SVC_PARAM_DI_ADIDDID = 0xF182,
    PUDS_SVC_PARAM_DI_BSFDPID = 0xF183,
    PUDS_SVC_PARAM_DI_ASFPDID = 0xF184,
    PUDS_SVC_PARAM_DI_ADFPDID = 0xF185,
    PUDS_SVC_PARAM_DI_ADSDID = 0xF186,
    PUDS_SVC_PARAM_DI_VMSPNDID = 0xF187,
    PUDS_SVC_PARAM_DI_VMECUSNDID = 0xF188,
    PUDS_SVC_PARAM_DI_VMECUSVNDID = 0xF189,
    PUDS_SVC_PARAM_DI_SSIDDID = 0xF18A,
    PUDS_SVC_PARAM_DI_ECUMDDID = 0xF18B,
    PUDS_SVC_PARAM_DI_ECUSNDID = 0xF18C,
    PUDS_SVC_PARAM_DI_SFUDID = 0xF18D,
    PUDS_SVC_PARAM_DI_VMKAPNDID = 0xF18E,
    PUDS_SVC_PARAM_DI_VINDID = 0xF190,
    PUDS_SVC_PARAM_DI_VMECUHNDID = 0xF191,
    PUDS_SVC_PARAM_DI_SSECUHWNDID = 0xF192,
    PUDS_SVC_PARAM_DI_SSECUHWVNDID = 0xF193,
    PUDS_SVC_PARAM_DI_SSECUSWNDID = 0xF194,
    PUDS_SVC_PARAM_DI_SSECUSWVNDID = 0xF195,
    PUDS_SVC_PARAM_DI_EROTANDID = 0xF196,
    PUDS_SVC_PARAM_DI_SNOETDID = 0xF197,
    PUDS_SVC_PARAM_DI_RSCOTSNDID = 0xF198,
    PUDS_SVC_PARAM_DI_PDDID = 0xF199,
    PUDS_SVC_PARAM_DI_CRSCOCESNDID = 0xF19A,
    PUDS_SVC_PARAM_DI_CDDID = 0xF19B,
    PUDS_SVC_PARAM_DI_CESWNDID = 0xF19C,
    PUDS_SVC_PARAM_DI_EIDDID = 0xF19D,
    PUDS_SVC_PARAM_DI_ODXFDID = 0xF19E,
    PUDS_SVC_PARAM_DI_EDID = 0xF19F
};

```

## Visual Basic

```

Public Enum uds_svc_param_di As Uint16
    PUDS_SVC_PARAM_DI_BSIDDID = &HF180
    PUDS_SVC_PARAM_DI_ASIDDID = &HF181
    PUDS_SVC_PARAM_DI_ADIDDID = &HF182
    PUDS_SVC_PARAM_DI_BSFDPID = &HF183
    PUDS_SVC_PARAM_DI_ASFPDID = &HF184
    PUDS_SVC_PARAM_DI_ADFPDID = &HF185
    PUDS_SVC_PARAM_DI_ADSDID = &HF186
    PUDS_SVC_PARAM_DI_VMSPNDID = &HF187
    PUDS_SVC_PARAM_DI_VMECUSNDID = &HF188
    PUDS_SVC_PARAM_DI_VMECUSVNDID = &HF189
    PUDS_SVC_PARAM_DI_SSIDDID = &HF18A
    PUDS_SVC_PARAM_DI_ECUMDDID = &HF18B
    PUDS_SVC_PARAM_DI_ECUSNDID = &HF18C
    PUDS_SVC_PARAM_DI_SFUDID = &HF18D
    PUDS_SVC_PARAM_DI_VMKAPNDID = &HF18E
    PUDS_SVC_PARAM_DI_VINDID = &HF190
    PUDS_SVC_PARAM_DI_VMECUHNDID = &HF191
    PUDS_SVC_PARAM_DI_SSECUHWNDID = &HF192

```

```

PUDS_SVC_PARAM_DI_SSECUHWVNDID = &HF193
PUDS_SVC_PARAM_DI_SSECUSWNDID = &HF194
PUDS_SVC_PARAM_DI_SSECUSWVNDID = &HF195
PUDS_SVC_PARAM_DI_EROTANDID = &HF196
PUDS_SVC_PARAM_DI_SNOETDID = &HF197
PUDS_SVC_PARAM_DI_RSCOTSNDID = &HF198
PUDS_SVC_PARAM_DI_PDDID = &HF199
PUDS_SVC_PARAM_DI_CRSCOCESNDID = &HF19A
PUDS_SVC_PARAM_DI_CDDID = &HF19B
PUDS_SVC_PARAM_DI_CESWNDID = &HF19C
PUDS_SVC_PARAM_DI_EIDDDID = &HF19D
PUDS_SVC_PARAM_DI_ODXFDID = &HF19E
PUDS_SVC_PARAM_DI_EDID = &HF19F

```

End Enum

## values

Name	Value	Description
PUDS_SVC_PARAM_DI_BSIDID	0xF180	Boot Software Identification Data Identifier.
PUDS_SVC_PARAM_DI_ASIDID	0xF181	Application Software Identification Data Identifier.
PUDS_SVC_PARAM_DI_ADIDID	0xF182	Application Data Identification Data Identifier.
PUDS_SVC_PARAM_DI_BSFPDID	0xF183	Boot Software Identification Data Identifier.
PUDS_SVC_PARAM_DI_ASFPDID	0xF184	Application Software Fingerprint Data Identifier.
PUDS_SVC_PARAM_DI_ADFPDID	0xF185	Application Data Fingerprint Data Identifier.
PUDS_SVC_PARAM_DI_ADSDID	0xF186	Active Diagnostic Session Data Identifier.
PUDS_SVC_PARAM_DI_VMSPNDID	0xF187	Vehicle Manufacturer Spare Part Number Data Identifier.
PUDS_SVC_PARAM_DI_VMECUSNDID	0xF188	Vehicle Manufacturer ECU Software Number Data Identifier.
PUDS_SVC_PARAM_DI_VMECUSVNDID	0xF189	Vehicle Manufacturer ECU Software Version Number Data Identifier.
PUDS_SVC_PARAM_DI_SSIDDDID	0xF18A	System Supplier Identifier Data Identifier.
PUDS_SVC_PARAM_DI_ECUMDDID	0xF18B	ECU Manufacturing Date Data Identifier.
PUDS_SVC_PARAM_DI_ECUSNDID	0xF18C	ECU Serial Number Data Identifier.
PUDS_SVC_PARAM_DI_SFUDID	0xF18D	Supported Functional Units Data Identifier.
PUDS_SVC_PARAM_DI_VMKAPNDID	0xF18E	Vehicle Manufacturer Kit Assembly Part Number Data Identifier.
PUDS_SVC_PARAM_DI_VINDID	0xF190	VIN Data Identifier.
PUDS_SVC_PARAM_DI_VMECUHNDID	0xF191	Vehicle Manufacturer ECU Hardware Number Data Identifier.
PUDS_SVC_PARAM_DI_SSECUHWNDID	0xF192	System Supplier ECU Hardware Number Data Identifier.
PUDS_SVC_PARAM_DI_SSECUHWVNDID	0xF193	System Supplier ECU Hardware Version Number Data Identifier.
PUDS_SVC_PARAM_DI_SSECUSWNDID	0xF194	System Supplier ECU Software Number Data Identifier.
PUDS_SVC_PARAM_DI_SSECUSWVNDID	0xF195	System Supplier ECU Software Version Number Data Identifier.
PUDS_SVC_PARAM_DI_EROTANDID	0xF196	Exhaust Regulation Or Type Approval Number Data Identifier.
PUDS_SVC_PARAM_DI_SNOETDID	0xF197	System Name Or Engine Type Data Identifier.
PUDS_SVC_PARAM_DI_RSCOTSNDID	0xF198	Repair Shop Code Or Tester Serial Number Data Identifier.
PUDS_SVC_PARAM_DI_PDDID	0xF199	Programming Date Data Identifier.
PUDS_SVC_PARAM_DI_CRSCOCESNDID	0xF19A	Calibration Repair Shop Code Or Calibration Equipment Serial Number Data Identifier.
PUDS_SVC_PARAM_DI_CDDID	0xF19B	Calibration Date Data Identifier.
PUDS_SVC_PARAM_DI_CESWNDID	0xF19C	Calibration Equipment Software Number Data Identifier.
PUDS_SVC_PARAM_DI_EIDDDID	0xF19D	ECU Installation Date Data Identifier.
PUDS_SVC_PARAM_DI_ODXFDID	0xF19E	ODX File Data Identifier.
PUDS_SVC_PARAM_DI_EDID	0xF19F	Entity Data Identifier.

See also: [UDS\\_SvcReadDataByIdentifier\\_2013](#) on page 681 (class-method: [SvcReadDataByIdentifier\\_2013](#) on page 337).

### 3.5.21 uds\_svc\_param\_rdbpi

Represents the subfunction parameter for UDS service ReadDataByPeriodicIdentifier. According to the programming language, this type can be a group of defined values or an enumeration.

#### Syntax

##### C/C++

```
#define PUDS_SVC_PARAM_RDBPI_SASR    0x01
#define PUDS_SVC_PARAM_RDBPI_SAMR    0x02
#define PUDS_SVC_PARAM_RDBPI_SAFR    0x03
#define PUDS_SVC_PARAM_RDBPI_SS      0x04
```

##### Pascal OO

```
uds_svc_param_rdbpi = (
    PUDS_SVC_PARAM_RDBPI_SASR = $1,
    PUDS_SVC_PARAM_RDBPI_SAMR = $2,
    PUDS_SVC_PARAM_RDBPI_SAFR = $3,
    PUDS_SVC_PARAM_RDBPI_SS = $4
);
```

##### C#

```
public enum uds_svc_param_rdbpi : Byte
{
    PUDS_SVC_PARAM_RDBPI_SASR = 0x01,
    PUDS_SVC_PARAM_RDBPI_SAMR = 0x02,
    PUDS_SVC_PARAM_RDBPI_SAFR = 0x03,
    PUDS_SVC_PARAM_RDBPI_SS = 0x04
}
```

##### C++ / CLR

```
enum struct uds_svc_param_rdbpi : Byte
{
    PUDS_SVC_PARAM_RDBPI_SASR = 0x01,
    PUDS_SVC_PARAM_RDBPI_SAMR = 0x02,
    PUDS_SVC_PARAM_RDBPI_SAFR = 0x03,
    PUDS_SVC_PARAM_RDBPI_SS = 0x04
};
```

##### Visual Basic

```
Public Enum uds_svc_param_rdbpi As Byte
    PUDS_SVC_PARAM_RDBPI_SASR = &H1
    PUDS_SVC_PARAM_RDBPI_SAMR = &H2
    PUDS_SVC_PARAM_RDBPI_SAFR = &H3
    PUDS_SVC_PARAM_RDBPI_SS = &H4
End Enum
```

#### Values

Name	Value	Description
PUDS_SVC_PARAM_RDBPI_SASR	1	Send At Slow Rate.
PUDS_SVC_PARAM_RDBPI_SAMR	2	Send At Medium Rate.
PUDS_SVC_PARAM_RDBPI_SAFR	3	Send At Fast Rate.
PUDS_SVC_PARAM_RDBPI_SS	4	Stop Sending.

**See also:** [UDS\\_SvcReadDataByIdentifier\\_2013](#) on page 681 (**class-method:** [SvcReadDataByIdentifier\\_2013](#) on page 337).

### 3.5.22 uds\_svc\_param\_dddI

Represents the subfunction parameter for UDS service DynamicallyDefineDataIdentifier. According to the programming language, this type can be a group of defined values or an enumeration.

#### Syntax

##### C/C++

```
#define PUDS_SVC_PARAM_DDDI_DBID      0x01
#define PUDS_SVC_PARAM_DDDI_DBMA      0x02
#define PUDS_SVC_PARAM_DDDI_CDDDI     0x03
```

##### Pascal OO

```
uds_svc_param_dddI = (
    PUDS_SVC_PARAM_DDDI_DBID = $1,
    PUDS_SVC_PARAM_DDDI_DBMA = $2,
    PUDS_SVC_PARAM_DDDI_CDDDI = $3
);
```

##### C#

```
public enum uds_svc_param_dddI : Byte
{
    PUDS_SVC_PARAM_DDDI_DBID = 0x01,
    PUDS_SVC_PARAM_DDDI_DBMA = 0x02,
    PUDS_SVC_PARAM_DDDI_CDDDI = 0x03
}
```

##### C++ / CLR

```
enum struct uds_svc_param_dddI : Byte
{
    PUDS_SVC_PARAM_DDDI_DBID = 0x01,
    PUDS_SVC_PARAM_DDDI_DBMA = 0x02,
    PUDS_SVC_PARAM_DDDI_CDDDI = 0x03
};
```

##### Visual Basic

```
Public Enum uds_svc_param_dddI As Byte
    PUDS_SVC_PARAM_DDDI_DBID = &H1
    PUDS_SVC_PARAM_DDDI_DBMA = &H2
    PUDS_SVC_PARAM_DDDI_CDDDI = &H3
End Enum
```

#### Values

Name	Value	Description
PUDS_SVC_PARAM_DDDI_DBID	1	Define By Identifier.
PUDS_SVC_PARAM_DDDI_DBMA	2	Define By Memory Address.
PUDS_SVC_PARAM_DDDI_CDDDI	3	Clear Dynamically Defined Data Identifier.

**See also:** [UDS\\_SvcDynamicallyDefineDataIdentifierDBID\\_2013](#) on page 688 (**class-method:**

[SvcDynamicallyDefineDataIdentifierDBID\\_2013](#) on page 356, [UDS\\_SvcDynamicallyDefineDataIdentifierDBMA\\_2013](#) on page 690, [SvcDynamicallyDefineDataIdentifierDBMA\\_2013](#) on page 362, [UDS\\_SvcDynamicallyDefineDataIdentifierCDDDI\\_2013](#) on page 693, [SvcDynamicallyDefineDataIdentifierCDDDI\\_2013](#) on page 368).



### 3.5.23 uds\_svc\_param\_rdtci

Represents the subfunction parameter for UDS service ReadDTCInformation. According to the programming language, this type can be a group of defined values or an enumeration.

#### Syntax

##### C/C++

```
#define PUDS_SVC_PARAM_RDTCI_RNODTCBSM      0x01
#define PUDS_SVC_PARAM_RDTCI_RDTCBSM       0x02
#define PUDS_SVC_PARAM_RDTCI_RDTCSSI       0x03
#define PUDS_SVC_PARAM_RDTCI_RDTCSSBDTC    0x04
#define PUDS_SVC_PARAM_RDTCI_RDTCSSBRN     0x05
#define PUDS_SVC_PARAM_RDTCI_RDTCEDRBDN    0x06
#define PUDS_SVC_PARAM_RDTCI_RNODTCBSMR    0x07
#define PUDS_SVC_PARAM_RDTCI_RDTCBSMR      0x08
#define PUDS_SVC_PARAM_RDTCI_RSIODTC       0x09
#define PUDS_SVC_PARAM_RDTCI_RSUPDTC       0x0A
#define PUDS_SVC_PARAM_RDTCI_RFTFDTC       0x0B
#define PUDS_SVC_PARAM_RDTCI_RFCDTC        0x0C
#define PUDS_SVC_PARAM_RDTCI_RMRTFDTC      0x0D
#define PUDS_SVC_PARAM_RDTCI_RMRCDTC       0x0E
#define PUDS_SVC_PARAM_RDTCI_RMMDTCBSM     0x0F
#define PUDS_SVC_PARAM_RDTCI_RMMDEDRBDN    0x10
#define PUDS_SVC_PARAM_RDTCI_RNOMMDTCBSM   0x11
#define PUDS_SVC_PARAM_RDTCI_RNOOBDDTCBSM  0x12
#define PUDS_SVC_PARAM_RDTCI_ROBDDTCBSM    0x13
#define PUDS_SVC_PARAM_RDTCI_RDTCEDBR      0x16
#define PUDS_SVC_PARAM_RDTCI_RUDMDTCBSM    0x17
#define PUDS_SVC_PARAM_RDTCI_RUDMDTCSSBDTC 0x18
#define PUDS_SVC_PARAM_RDTCI_RUDMDTCEDRBDN 0x19
#define PUDS_SVC_PARAM_RDTCI_RDTCEDI       0x1A
#define PUDS_SVC_PARAM_RDTCI_RWWHOBDDTCBMR 0x42
#define PUDS_SVC_PARAM_RDTCI_RWWHOBDDTCWPS 0x55
#define PUDS_SVC_PARAM_RDTCI_RDTCBRGI      0x56
#define PUDS_SVC_PARAM_RDTCI_RDTCFDC       0x14
#define PUDS_SVC_PARAM_RDTCI_RDTCWPS       0x15
```

##### Pascal OO

```
uds_svc_param_rdtci = (
    PUDS_SVC_PARAM_RDTCI_RNODTCBSM = $1,
    PUDS_SVC_PARAM_RDTCI_RDTCBSM = $2,
    PUDS_SVC_PARAM_RDTCI_RDTCSSI = $3,
    PUDS_SVC_PARAM_RDTCI_RDTCSSBDTC = $4,
    PUDS_SVC_PARAM_RDTCI_RDTCSSBRN = $5,
    PUDS_SVC_PARAM_RDTCI_RDTCEDRBDN = $6,
    PUDS_SVC_PARAM_RDTCI_RNODTCBSMR = $7,
    PUDS_SVC_PARAM_RDTCI_RDTCBSMR = $8,
    PUDS_SVC_PARAM_RDTCI_RSIODTC = $9,
    PUDS_SVC_PARAM_RDTCI_RSUPDTC = $A,
    PUDS_SVC_PARAM_RDTCI_RFTFDTC = $B,
    PUDS_SVC_PARAM_RDTCI_RFCDTC = $C,
    PUDS_SVC_PARAM_RDTCI_RMRTFDTC = $D,
    PUDS_SVC_PARAM_RDTCI_RMRCDTC = $E,
    PUDS_SVC_PARAM_RDTCI_RMMDTCBSM = $F,
    PUDS_SVC_PARAM_RDTCI_RMMDEDRBDN = $10,
    PUDS_SVC_PARAM_RDTCI_RNOMMDTCBSM = $11,
    PUDS_SVC_PARAM_RDTCI_RNOOBDDTCBSM = $12,
    PUDS_SVC_PARAM_RDTCI_ROBDDTCBSM = $13,
    PUDS_SVC_PARAM_RDTCI_RDTCEDBR = $16,
    PUDS_SVC_PARAM_RDTCI_RUDMDTCBSM = $17,
```



```

PUDS_SVC_PARAM_RDTCI_RUDMDTCSSBDTC = $18,
PUDS_SVC_PARAM_RDTCI_RUDMDTCEDRBDN = $19,
PUDS_SVC_PARAM_RDTCI_RDTCEDI = $1A,
PUDS_SVC_PARAM_RDTCI_RWWHOBDDTCBMR = $42,
PUDS_SVC_PARAM_RDTCI_RWWHOBDDTCWPS = $55,
PUDS_SVC_PARAM_RDTCI_RDTCBRGI = $56,
PUDS_SVC_PARAM_RDTCI_RDTCFDC = $14,
PUDS_SVC_PARAM_RDTCI_RDTCWPS = $15
);

```

**C#**

```

public enum uds_svc_param_rdtci : Byte
{
    PUDS_SVC_PARAM_RDTCI_RNODTCBSM = 0x01,
    PUDS_SVC_PARAM_RDTCI_RDTCBSM = 0x02,
    PUDS_SVC_PARAM_RDTCI_RDTCSSI = 0x03,
    PUDS_SVC_PARAM_RDTCI_RDTCSSBDTC = 0x04,
    PUDS_SVC_PARAM_RDTCI_RDTCSSBRN = 0x05,
    PUDS_SVC_PARAM_RDTCI_RDTCEDRBDN = 0x06,
    PUDS_SVC_PARAM_RDTCI_RNODTCBSMR = 0x07,
    PUDS_SVC_PARAM_RDTCI_RDTCBSMR = 0x08,
    PUDS_SVC_PARAM_RDTCI_RSIODTC = 0x09,
    PUDS_SVC_PARAM_RDTCI_RSUPDTC = 0x0A,
    PUDS_SVC_PARAM_RDTCI_RFTFDTC = 0x0B,
    PUDS_SVC_PARAM_RDTCI_RFCDDTC = 0x0C,
    PUDS_SVC_PARAM_RDTCI_RMRTFDTC = 0x0D,
    PUDS_SVC_PARAM_RDTCI_RMRCDDTC = 0x0E,
    PUDS_SVC_PARAM_RDTCI_RMMDDTCBSM = 0x0F,
    PUDS_SVC_PARAM_RDTCI_RMMDEDRBDN = 0x10,
    PUDS_SVC_PARAM_RDTCI_RNOMMDTCBSM = 0x11,
    PUDS_SVC_PARAM_RDTCI_RNOOBDDTCBSM = 0x12,
    PUDS_SVC_PARAM_RDTCI_ROBDDTCBSM = 0x13,
    PUDS_SVC_PARAM_RDTCI_RDTCEDBR = 0x16,
    PUDS_SVC_PARAM_RDTCI_RUDMDTCBSM = 0x17,
    PUDS_SVC_PARAM_RDTCI_RUDMDTCSSBDTC = 0x18,
    PUDS_SVC_PARAM_RDTCI_RUDMDTCEDRBDN = 0x19,
    PUDS_SVC_PARAM_RDTCI_RDTCEDI = 0x1A,
    PUDS_SVC_PARAM_RDTCI_RWWHOBDDTCBMR = 0x42,
    PUDS_SVC_PARAM_RDTCI_RWWHOBDDTCWPS = 0x55,
    PUDS_SVC_PARAM_RDTCI_RDTCBRGI = 0x56,
    PUDS_SVC_PARAM_RDTCI_RDTCFDC = 0x14,
    PUDS_SVC_PARAM_RDTCI_RDTCWPS = 0x15
}

```

**C++ / CLR**

```

enum struct uds_svc_param_rdtci : Byte
{
    PUDS_SVC_PARAM_RDTCI_RNODTCBSM = 0x01,
    PUDS_SVC_PARAM_RDTCI_RDTCBSM = 0x02,
    PUDS_SVC_PARAM_RDTCI_RDTCSSI = 0x03,
    PUDS_SVC_PARAM_RDTCI_RDTCSSBDTC = 0x04,
    PUDS_SVC_PARAM_RDTCI_RDTCSSBRN = 0x05,
    PUDS_SVC_PARAM_RDTCI_RDTCEDRBDN = 0x06,
    PUDS_SVC_PARAM_RDTCI_RNODTCBSMR = 0x07,
    PUDS_SVC_PARAM_RDTCI_RDTCBSMR = 0x08,
    PUDS_SVC_PARAM_RDTCI_RSIODTC = 0x09,
    PUDS_SVC_PARAM_RDTCI_RSUPDTC = 0x0A,
    PUDS_SVC_PARAM_RDTCI_RFTFDTC = 0x0B,
    PUDS_SVC_PARAM_RDTCI_RFCDDTC = 0x0C,
    PUDS_SVC_PARAM_RDTCI_RMRTFDTC = 0x0D,

```

```

PUDS_SVC_PARAM_RDTCI_RMRCBTC = 0x0E,
PUDS_SVC_PARAM_RDTCI_RMMDTCSM = 0x0F,
PUDS_SVC_PARAM_RDTCI_RMMDEDRBDN = 0x10,
PUDS_SVC_PARAM_RDTCI_RNOMMDTCBSM = 0x11,
PUDS_SVC_PARAM_RDTCI_RNOOBDDTCBSM = 0x12,
PUDS_SVC_PARAM_RDTCI_ROBDDTCBSM = 0x13,
PUDS_SVC_PARAM_RDTCI_RDTCEDBR = 0x16,
PUDS_SVC_PARAM_RDTCI_RUDMDTCBSM = 0x17,
PUDS_SVC_PARAM_RDTCI_RUDMDTCSSBDTC = 0x18,
PUDS_SVC_PARAM_RDTCI_RUDMDTCEDRBDN = 0x19,
PUDS_SVC_PARAM_RDTCI_RDTCEDI = 0x1A,
PUDS_SVC_PARAM_RDTCI_RWWHOBDDTCBMR = 0x42,
PUDS_SVC_PARAM_RDTCI_RWWHOBDDTCWPS = 0x55,
PUDS_SVC_PARAM_RDTCI_RDTCBRGI = 0x56,
PUDS_SVC_PARAM_RDTCI_RDTCFDC = 0x14,
PUDS_SVC_PARAM_RDTCI_RDTCWPS = 0x15

```

```
};
```

## Visual Basic

```
Public Enum uds_svc_param_rdtci As Byte
```

```

    PUDS_SVC_PARAM_RDTCI_RNODTCBSM = &H1
    PUDS_SVC_PARAM_RDTCI_RDTCBSM = &H2
    PUDS_SVC_PARAM_RDTCI_RDTCSSI = &H3
    PUDS_SVC_PARAM_RDTCI_RDTCSSBDTC = &H4
    PUDS_SVC_PARAM_RDTCI_RDTCSSBRN = &H5
    PUDS_SVC_PARAM_RDTCI_RDTCEDRBDN = &H6
    PUDS_SVC_PARAM_RDTCI_RNODTCBSMR = &H7
    PUDS_SVC_PARAM_RDTCI_RDTCBSMR = &H8
    PUDS_SVC_PARAM_RDTCI_RSIODTC = &H9
    PUDS_SVC_PARAM_RDTCI_RSUPDTC = &HA
    PUDS_SVC_PARAM_RDTCI_RFTFDTC = &HB
    PUDS_SVC_PARAM_RDTCI_RFCDDTC = &HC
    PUDS_SVC_PARAM_RDTCI_RMRTFDTC = &HD
    PUDS_SVC_PARAM_RDTCI_RMRCBTC = &HE
    PUDS_SVC_PARAM_RDTCI_RMMDTCSM = &HF
    PUDS_SVC_PARAM_RDTCI_RMMDEDRBDN = &H10
    PUDS_SVC_PARAM_RDTCI_RNOMMDTCBSM = &H11
    PUDS_SVC_PARAM_RDTCI_RNOOBDDTCBSM = &H12
    PUDS_SVC_PARAM_RDTCI_ROBDDTCBSM = &H13
    PUDS_SVC_PARAM_RDTCI_RDTCEDBR = &H16
    PUDS_SVC_PARAM_RDTCI_RUDMDTCBSM = &H17
    PUDS_SVC_PARAM_RDTCI_RUDMDTCSSBDTC = &H18
    PUDS_SVC_PARAM_RDTCI_RUDMDTCEDRBDN = &H19
    PUDS_SVC_PARAM_RDTCI_RDTCEDI = &H1A
    PUDS_SVC_PARAM_RDTCI_RWWHOBDDTCBMR = &H42
    PUDS_SVC_PARAM_RDTCI_RWWHOBDDTCWPS = &H55
    PUDS_SVC_PARAM_RDTCI_RDTCBRGI = &H56
    PUDS_SVC_PARAM_RDTCI_RDTCFDC = &H14
    PUDS_SVC_PARAM_RDTCI_RDTCWPS = &H15

```

```
End Enum
```

## Values

Name	Value	Description
PUDS_SVC_PARAM_RDTCI_RNODTCBSM	0x01 (1)	Report Number Of DTC By Status Mask.
PUDS_SVC_PARAM_RDTCI_RDTCBSM	0x02 (2)	Report DTC By Status Mask.
PUDS_SVC_PARAM_RDTCI_RDTCSSI	0x03 (3)	Report DTC Snapshot Identification.
PUDS_SVC_PARAM_RDTCI_RDTCSSBDTC	0x04 (4)	Report DTC Snapshot Record By DTC Number.
PUDS_SVC_PARAM_RDTCI_RDTCSSBRN	0x05 (5)	Report DTC Snapshot Record By Record Number.
PUDS_SVC_PARAM_RDTCI_RDTCEDRBDN	0x06 (6)	Report DTC Extended Data Record By DTC Number.

Name	Value	Description
PUDS_SVC_PARAM_RDTCI_RNODTCBSMR	0x07 (7)	Report Number Of DTC By Severity Mask Record.
PUDS_SVC_PARAM_RDTCI_RDTCSMR	0x08 (8)	Report DTC By Severity Mask Record.
PUDS_SVC_PARAM_RDTCI_RSIODTC	0x09 (9)	Report Severity Information Of DTC.
PUDS_SVC_PARAM_RDTCI_RSUPDTC	0x0A (10)	Report Supported DTC.
PUDS_SVC_PARAM_RDTCI_RFTFDTC	0x0B (11)	Report First Test Failed DTC.
PUDS_SVC_PARAM_RDTCI_RFCDDTC	0x0C (12)	Report First Confirmed DTC.
PUDS_SVC_PARAM_RDTCI_RMRTFDTC	0x0D (13)	Report Most Recent Test Failed DTC.
PUDS_SVC_PARAM_RDTCI_RMRCDDTC	0x0E (14)	Report Most Recent Confirmed DTC.
PUDS_SVC_PARAM_RDTCI_RMMDTCBSM	0x0F (15)	Report Mirror Memory DTC By Status Mask.
PUDS_SVC_PARAM_RDTCI_RMMDEDRBDN	0x10 (16)	Report Mirror Memory DTC Extended Data Record By DTC Number.
PUDS_SVC_PARAM_RDTCI_RNOMMDTCBSM,	0x11 (16)	Report Number Of Mirror MemoryDTC By Status Mask.
PUDS_SVC_PARAM_RDTCI_RNOOBDDTCBSM	0x12 (17)	Report Number Of Emissions Related OBD DTC By Status Mask.
PUDS_SVC_PARAM_RDTCI_ROBDDTCBSM	0x13 (18)	Report Emissions Related OBD DTC By Status Mask.
PUDS_SVC_PARAM_RDTCI_RDTCEDBR	0x16 (22)	Report DTC Ext Data Record By Record Number.
PUDS_SVC_PARAM_RDTCI_RUDMDTCBSM	0x17 (23)	Report User Def Memory DTC By Status Mask.
PUDS_SVC_PARAM_RDTCI_RUDMDTCSSBDTC	0x18 (24)	Report User Def Memory DTC Snapshot Record By DTC Number.
PUDS_SVC_PARAM_RDTCI_RUDMDTCEDRBDN	0x19 (25)	Report User Def Memory DTC Ext Data Record By DTC Number.
PUDS_SVC_PARAM_RDTCI_RDTCEDI	0x1A (26)	Report DTC Extended Data Record Identification (ISO_14229-1 2020)
PUDS_SVC_PARAM_RDTCI_RWWHOBDTDCBMR	0x42 (66)	Report WWHOBD DTC By Mask Record.
PUDS_SVC_PARAM_RDTCI_RWWHOBDTDCWPS	0x55 (85)	Report WWHOBD DTC With Permanent Status.
PUDS_SVC_PARAM_RDTCI_RDTCBRGI	0x56 (86)	Report DTC Information By DTC Readiness Group Identifier (ISO_14229-1 2020)
PUDS_SVC_PARAM_RDTCI_RDTCFDC	0x14 (20)	Not in ISO-15765-3: report DTC Fault Detection Counter.
PUDS_SVC_PARAM_RDTCI_RDTCWPS	0x15 (21)	Not in ISO-15765-3: report DTC With Permanent Status.

See also: [UDS\\_SvcReadDTCInformation\\_2013](#) on page 704 (**class-method:** [SvcReadDTCInformation\\_2013](#) on page 396).

### 3.5.24 uds\_svc\_param\_rdtci\_dtcsvm

Represents the DTC severity mask's flags (DTCSVM) used with the UDS service SvcReadDTCInformation. According to the programming language, this type can be a group of defined values or an enumeration.

#### Syntax

##### C/C++

```
#define PUDS_SVC_PARAM_RDTCI_DTCSVM_NSA 0x00
#define PUDS_SVC_PARAM_RDTCI_DTCSVM_MO 0x20
#define PUDS_SVC_PARAM_RDTCI_DTCSVM_CHKANH 0x40
#define PUDS_SVC_PARAM_RDTCI_DTCSVM_CHKI 0x80
```

##### Pascal OO

```
uds_svc_param_rdtci_dtcsvm = (
    PUDS_SVC_PARAM_RDTCI_DTCSVM_NSA = $0,
    PUDS_SVC_PARAM_RDTCI_DTCSVM_MO = $20,
    PUDS_SVC_PARAM_RDTCI_DTCSVM_CHKANH = $40,
    PUDS_SVC_PARAM_RDTCI_DTCSVM_CHKI = $80
);
```

##### C#

```
[Flags]
public enum uds_svc_param_rdtci_dtcsvm : Byte
{
    PUDS_SVC_PARAM_RDTCI_DTCSVM_NSA = 0x00,
```

```

PUDS_SVC_PARAM_RDTCI_DTCSVM_MO = 0x20,
PUDS_SVC_PARAM_RDTCI_DTCSVM_CHKANH = 0x40,
PUDS_SVC_PARAM_RDTCI_DTCSVM_CHKHI = 0x80
}

```

## C++ / CLR

```

enum struct uds_svc_param_rdtci_dtcsvm : Byte
{
    PUDS_SVC_PARAM_RDTCI_DTCSVM_NSA = 0x00,
    PUDS_SVC_PARAM_RDTCI_DTCSVM_MO = 0x20,
    PUDS_SVC_PARAM_RDTCI_DTCSVM_CHKANH = 0x40,
    PUDS_SVC_PARAM_RDTCI_DTCSVM_CHKHI = 0x80
};

```

## Visual Basic

```

<Flags(>
Public Enum uds_svc_param_rdtci_dtcsvm As Byte
    PUDS_SVC_PARAM_RDTCI_DTCSVM_NSA = &H0
    PUDS_SVC_PARAM_RDTCI_DTCSVM_MO = &H20
    PUDS_SVC_PARAM_RDTCI_DTCSVM_CHKANH = &H40
    PUDS_SVC_PARAM_RDTCI_DTCSVM_CHKHI = &H80
End Enum

```

## Values

Name	Value	Description
PUDS_SVC_PARAM_RDTCI_DTCSVM_NSA	0x00 (0)	DTC severity bit definitions: No Severity Available.
PUDS_SVC_PARAM_RDTCI_DTCSVM_MO	0x20 (32)	DTC severity bit definitions: Maintenance Only.
PUDS_SVC_PARAM_RDTCI_DTCSVM_CHKANH	0x40 (64)	DTC severity bit definitions: CHecK At Next Halt.
PUDS_SVC_PARAM_RDTCI_DTCSVM_CHKHI	0x80 (128)	DTC severity bit definitions: CheckK Immediately.

**See also:** [UDS\\_SvcReadDTCInformation\\_2013](#) on page 704 (**class-method:** [SvcReadDTCInformation\\_2013](#) on page 396).

### 3.5.25 uds\_svc\_param\_iocbi

Represents the InputOutputControl parameter for UDS service InputOutputControlByIdentifier. According to the programming language, this type can be a group of defined values or an enumeration.

## Syntax

### C/C++

```

#define PUDS_SVC_PARAM_IOCBI_RTECU 0x00
#define PUDS_SVC_PARAM_IOCBI_RTD 0x01
#define PUDS_SVC_PARAM_IOCBI_FCS 0x02
#define PUDS_SVC_PARAM_IOCBI_STA 0x03

```

### Pascal OO

```

uds_svc_param_iocbi = (
    PUDS_SVC_PARAM_IOCBI_RTECU = $0,
    PUDS_SVC_PARAM_IOCBI_RTD = $1,
    PUDS_SVC_PARAM_IOCBI_FCS = $2,
    PUDS_SVC_PARAM_IOCBI_STA = $3
);

```

### C#

```
public enum uds_svc_param_iocbi : Byte
{
    PUDS_SVC_PARAM_IOCBI_RCTECU = 0x00,
    PUDS_SVC_PARAM_IOCBI_RTD = 0x01,
    PUDS_SVC_PARAM_IOCBI_FCS = 0x02,
    PUDS_SVC_PARAM_IOCBI_STA = 0x03
}
```

### C++ / CLR

```
enum struct uds_svc_param_iocbi : Byte
{
    PUDS_SVC_PARAM_IOCBI_RCTECU = 0x00,
    PUDS_SVC_PARAM_IOCBI_RTD = 0x01,
    PUDS_SVC_PARAM_IOCBI_FCS = 0x02,
    PUDS_SVC_PARAM_IOCBI_STA = 0x03
};
```

### Visual Basic

```
Public Enum uds_svc_param_iocbi As Byte
    PUDS_SVC_PARAM_IOCBI_RCTECU = &H0
    PUDS_SVC_PARAM_IOCBI_RTD = &H1
    PUDS_SVC_PARAM_IOCBI_FCS = &H2
    PUDS_SVC_PARAM_IOCBI_STA = &H3
End Enum
```

### Values

Name	Value	Description
PUDS_SVC_PARAM_IOCBI_RCTECU	0	Return Control To ECU.
PUDS_SVC_PARAM_IOCBI_RTD	1	Reset To Default.
PUDS_SVC_PARAM_IOCBI_FCS	2	Freeze Current State.
PUDS_SVC_PARAM_IOCBI_STA	3	Short Term Adjustment.

See also: [UDS\\_SvcInputOutputControlByIdentifier\\_2013](#) on page 731  
(**class-method:** [SvcInputOutputControlByIdentifier\\_2013](#) on page 462).

## 3.5.26 uds\_svc\_param\_rc

Represents the subfunction parameter for UDS service RoutineControl. According to the programming language, this type can be a group of defined values or an enumeration.

### Syntax

#### C/C++

```
#define PUDS_SVC_PARAM_RC_STR 0x01
#define PUDS_SVC_PARAM_RC_STPR 0x02
#define PUDS_SVC_PARAM_RC_RRR 0x03
```

#### Pascal OO

```
uds_svc_param_rc = (
    PUDS_SVC_PARAM_RC_STR = $1,
    PUDS_SVC_PARAM_RC_STPR = $2,
    PUDS_SVC_PARAM_RC_RRR = $3
);
```

#### C#

```
public enum uds_svc_param_rc : Byte
{
    PUDS_SVC_PARAM_RC_STR = 0x01,
    PUDS_SVC_PARAM_RC_STPR = 0x02,
    PUDS_SVC_PARAM_RC_RRR = 0x03
}
```

### C++ / CLR

```
enum struct uds_svc_param_rc : Byte
{
    PUDS_SVC_PARAM_RC_STR = 0x01,
    PUDS_SVC_PARAM_RC_STPR = 0x02,
    PUDS_SVC_PARAM_RC_RRR = 0x03
};
```

### Visual Basic

```
Public Enum uds_svc_param_rc As Byte
    PUDS_SVC_PARAM_RC_STR = &H1
    PUDS_SVC_PARAM_RC_STPR = &H2
    PUDS_SVC_PARAM_RC_RRR = &H3
End Enum
```

## Values

Name	Value	Description
PUDS_SVC_PARAM_RC_STR	1	Start Routine.
PUDS_SVC_PARAM_RC_STPR	2	Stop Routine.
PUDS_SVC_PARAM_RC_RRR	3	Request Routine Results.

**See also:** [UDS\\_SvcRoutineControl\\_2013](#) on page 733 (**class-method:** [SvcRoutineControl\\_2013](#) on page 473).

### 3.5.27 uds\_svc\_param\_rc\_rid

Represents the routine identifier used with the UDS service RoutineControl. According to the programming language, this type can be a group of defined values or an enumeration.

## Syntax

### C/C++

```
#define PUDS_SVC_PARAM_RC_RID_DLRI_ 0xE200
#define PUDS_SVC_PARAM_RC_RID_EM_ 0xFF00
#define PUDS_SVC_PARAM_RC_RID_CPD_ 0xFF01
#define PUDS_SVC_PARAM_RC_RID_EEMDTC_ 0xFF02
```

### Pascal OO

```
uds_svc_param_rc_rid = (
    PUDS_SVC_PARAM_RC_RID_DLRI_ = $E200,
    PUDS_SVC_PARAM_RC_RID_EM_ = $FF00,
    PUDS_SVC_PARAM_RC_RID_CPD_ = $FF01,
    PUDS_SVC_PARAM_RC_RID_EEMDTC_ = $FF02
);
```

### C#

```
public enum uds_svc_param_rc_rid : UInt16
{
```

```

PUDS_SVC_PARAM_RC_RID_DLRI_ = 0xE200,
PUDS_SVC_PARAM_RC_RID_EM_   = 0xFF00,
PUDS_SVC_PARAM_RC_RID_CPD_  = 0xFF01,
PUDS_SVC_PARAM_RC_RID_EMMDTC_ = 0xFF02
}

```

**C++ / CLR**

```

enum struct uds_svc_param_rc_rid : Uint16
{
    PUDS_SVC_PARAM_RC_RID_DLRI_ = 0xE200,
    PUDS_SVC_PARAM_RC_RID_EM_   = 0xFF00,
    PUDS_SVC_PARAM_RC_RID_CPD_  = 0xFF01,
    PUDS_SVC_PARAM_RC_RID_EMMDTC_ = 0xFF02
};

```

**Visual Basic**

```

Public Enum uds_svc_param_rc_rid As Uint16
    PUDS_SVC_PARAM_RC_RID_DLRI_ = &HE200
    PUDS_SVC_PARAM_RC_RID_EM_   = &HFF00
    PUDS_SVC_PARAM_RC_RID_CPD_  = &HFF01
    PUDS_SVC_PARAM_RC_RID_EMMDTC_ = &HFF02
End Enum

```

**Values**

Name	Value	Description
PUDS_SVC_PARAM_RC_RID_DLRI_	0xE200 (57856)	Deploy Loop Routine ID.
PUDS_SVC_PARAM_RC_RID_EM_	0xFF00 (65280)	Erase Memory.
PUDS_SVC_PARAM_RC_RID_CPD_	0xFF01 (65281)	Check Programming Dependencies.
PUDS_SVC_PARAM_RC_RID_EMMDTC_	0xFF02 (65282)	Erase Mirror Memory DTCs.

**See also:** [UDS\\_SvcRoutineControl\\_2013](#) on page 733 (**class-method:** [SvcRoutineControl\\_2013](#) on page 473).

**3.5.28 uds\_svc\_param\_atp**

Represents the subfunction parameter for the UDS service AccessTimingParameter. It defines the access type. According to the programming language, this type can be a group of defined values or an enumeration.

**Syntax****C/C++**

```

#define PUDS_SVC_PARAM_ATP_TRETPS      0x01
#define PUDS_SVC_PARAM_ATP_STPTDV      0x02
#define PUDS_SVC_PARAM_ATP_RCATP       0x03
#define PUDS_SVC_PARAM_ATP_STPTGV      0x04

```

**Pascal OO**

```

uds_svc_param_atp = (
    PUDS_SVC_PARAM_ATP_TRETPS = $1,
    PUDS_SVC_PARAM_ATP_STPTDV = $2,
    PUDS_SVC_PARAM_ATP_RCATP  = $3,
    PUDS_SVC_PARAM_ATP_STPTGV = $4
);

```

**C#**

```
public enum uds_svc_param_atp : Byte
{
    PUDS_SVC_PARAM_ATP_TRETPS = 0x01,
    PUDS_SVC_PARAM_ATP_STPTDV = 0x02,
    PUDS_SVC_PARAM_ATP_RCATP = 0x03,
    PUDS_SVC_PARAM_ATP_STPTGV = 0x04
}
```

### C++ / CLR

```
enum struct uds_svc_param_atp : Byte
{
    PUDS_SVC_PARAM_ATP_TRETPS = 0x01,
    PUDS_SVC_PARAM_ATP_STPTDV = 0x02,
    PUDS_SVC_PARAM_ATP_RCATP = 0x03,
    PUDS_SVC_PARAM_ATP_STPTGV = 0x04
};
```

### Visual Basic

```
Public Enum uds_svc_param_atp As Byte
    PUDS_SVC_PARAM_ATP_TRETPS = &H1
    PUDS_SVC_PARAM_ATP_STPTDV = &H2
    PUDS_SVC_PARAM_ATP_RCATP = &H3
    PUDS_SVC_PARAM_ATP_STPTGV = &H4
End Enum
```

## Values

Name	Value	Description
PUDS_SVC_PARAM_ATP_TRETPS	0x01	Read Extended Timing Parameter Set.
PUDS_SVC_PARAM_ATP_STPTDV	0x02	Set Timing Parameters to Default Values.
PUDS_SVC_PARAM_ATP_RCATP	0x03	Read Currently Active Timing Parameters.
PUDS_SVC_PARAM_ATP_STPTGV	0x04	Set Timing Parameters to Given Values.

**See also:** [UDS\\_SvcAccessTimingParameter\\_2013](#) on page 744 (**class-method:** [SvcAccessTimingParameter\\_2013](#) on page 512).

### 3.5.29 uds\_svc\_param\_rft\_moop

Represents the mode of operation parameter for the UDS service RequestFileTransfer. According to the programming language, this type can be a group of defined values or an enumeration.

## Syntax

### C/C++

```
#define PUDS_SVC_PARAM_RFT_MOOP_ADDFILE 0x1
#define PUDS_SVC_PARAM_RFT_MOOP_DELFIL 0x2
#define PUDS_SVC_PARAM_RFT_MOOP_REPLFILE 0x3
#define PUDS_SVC_PARAM_RFT_MOOP_RDFILE 0x4
#define PUDS_SVC_PARAM_RFT_MOOP_RDDIR 0x5
#define PUDS_SVC_PARAM_RFT_MOOP_RSFILE 0x6
```

### Pascal OO

```
uds_svc_param_rft_moop = (
    PUDS_SVC_PARAM_RFT_MOOP_ADDFILE = $1,
    PUDS_SVC_PARAM_RFT_MOOP_DELFIL = $2,
    PUDS_SVC_PARAM_RFT_MOOP_REPLFILE = $3,
```



```

PUDS_SVC_PARAM_RFT_MOOP_RDFILE = $4,
PUDS_SVC_PARAM_RFT_MOOP_RDDIR = $5,
PUDS_SVC_PARAM_RFT_MOOP_RSFILE = $6
);

```

**C#**

```

public enum uds_svc_param_rft_moop : Byte
{
    PUDS_SVC_PARAM_RFT_MOOP_ADDFILE = 0x1,
    PUDS_SVC_PARAM_RFT_MOOP_DELFILE = 0x2,
    PUDS_SVC_PARAM_RFT_MOOP_REPLFILE = 0x3,
    PUDS_SVC_PARAM_RFT_MOOP_RDFILE = 0x4,
    PUDS_SVC_PARAM_RFT_MOOP_RDDIR = 0x5,
    PUDS_SVC_PARAM_RFT_MOOP_RSFILE = 0x6
}

```

**C++ / CLR**

```

enum struct uds_svc_param_rft_moop : Byte
{
    PUDS_SVC_PARAM_RFT_MOOP_ADDFILE = 0x1,
    PUDS_SVC_PARAM_RFT_MOOP_DELFILE = 0x2,
    PUDS_SVC_PARAM_RFT_MOOP_REPLFILE = 0x3,
    PUDS_SVC_PARAM_RFT_MOOP_RDFILE = 0x4,
    PUDS_SVC_PARAM_RFT_MOOP_RDDIR = 0x5,
    PUDS_SVC_PARAM_RFT_MOOP_RSFILE = 0x6
};

```

**Visual Basic**

```

Public Enum uds_svc_param_rft_moop As Byte
    PUDS_SVC_PARAM_RFT_MOOP_ADDFILE = &H1
    PUDS_SVC_PARAM_RFT_MOOP_DELFILE = &H2
    PUDS_SVC_PARAM_RFT_MOOP_REPLFILE = &H3
    PUDS_SVC_PARAM_RFT_MOOP_RDFILE = &H4
    PUDS_SVC_PARAM_RFT_MOOP_RDDIR = &H5
    PUDS_SVC_PARAM_RFT_MOOP_RSFILE = &H6
End Enum

```

**Values**

Name	Value	Description
PUDS_SVC_PARAM_RFT_MOOP_ADDFILE	0x1	Add file.
PUDS_SVC_PARAM_RFT_MOOP_DELFILE	0x2	Delete file.
PUDS_SVC_PARAM_RFT_MOOP_REPLFILE	0x3	Replace file.
PUDS_SVC_PARAM_RFT_MOOP_RDFILE	0x4	Read file.
PUDS_SVC_PARAM_RFT_MOOP_RDDIR	0x5	Read directory.
PUDS_SVC_PARAM_RFT_MOOP_RSFILE	0x6	Resume file (ISO-14229-1:2020).

**See also:** [UDS\\_SvcRequestFileTransfer\\_2013](#) on page 745 (**class-method:** [SvcRequestFileTransfer\\_2013](#) on page 517).

### 3.5.30 uds\_svc\_authentication\_subfunction

Represents the subfunction parameter for UDS service Authentication (see ISO 14229-1:2020 §10.6.5.2 Table 74 Request message SubFunction parameter definition p.76).

#### Syntax

##### C/C++

```
typedef enum _uds_svc_authentication_subfunction
{
    PUDS_SVC_PARAM_AT_DA = 0x00,
    PUDS_SVC_PARAM_AT_VCU = 0x01,
    PUDS_SVC_PARAM_AT_VCB = 0x02,
    PUDS_SVC_PARAM_AT_POWN = 0x03,
    PUDS_SVC_PARAM_AT_TC = 0x04,
    PUDS_SVC_PARAM_AT_RCFA = 0x05,
    PUDS_SVC_PARAM_AT_VPOWNU = 0x06,
    PUDS_SVC_PARAM_AT_VPOWNB = 0x07,
    PUDS_SVC_PARAM_AT_AC = 0x08
} uds_svc_authentication_subfunction;
```

##### Pascal OO

```
uds_svc_authentication_subfunction = (
    PUDS_SVC_PARAM_AT_DA = $00,
    PUDS_SVC_PARAM_AT_VCU = $01,
    PUDS_SVC_PARAM_AT_VCB = $02,
    PUDS_SVC_PARAM_AT_POWN = $03,
    PUDS_SVC_PARAM_AT_TC = $04,
    PUDS_SVC_PARAM_AT_RCFA = $05,
    PUDS_SVC_PARAM_AT_VPOWNU = $06,
    PUDS_SVC_PARAM_AT_VPOWNB = $07,
    PUDS_SVC_PARAM_AT_AC = $08);
```

##### C#

```
public enum uds_svc_authentication_subfunction : Byte
{
    PUDS_SVC_PARAM_AT_DA = 0x00,
    PUDS_SVC_PARAM_AT_VCU = 0x01,
    PUDS_SVC_PARAM_AT_VCB = 0x02,
    PUDS_SVC_PARAM_AT_POWN = 0x03,
    PUDS_SVC_PARAM_AT_TC = 0x04,
    PUDS_SVC_PARAM_AT_RCFA = 0x05,
    PUDS_SVC_PARAM_AT_VPOWNU = 0x06,
    PUDS_SVC_PARAM_AT_VPOWNB = 0x07,
    PUDS_SVC_PARAM_AT_AC = 0x08
}
```

##### C++ / CLR

```
enum struct uds_svc_authentication_subfunction : Byte
{
    PUDS_SVC_PARAM_AT_DA = 0x00,
    PUDS_SVC_PARAM_AT_VCU = 0x01,
    PUDS_SVC_PARAM_AT_VCB = 0x02,
    PUDS_SVC_PARAM_AT_POWN = 0x03,
    PUDS_SVC_PARAM_AT_TC = 0x04,
    PUDS_SVC_PARAM_AT_RCFA = 0x05,
    PUDS_SVC_PARAM_AT_VPOWNU = 0x06,
    PUDS_SVC_PARAM_AT_VPOWNB = 0x07,
    PUDS_SVC_PARAM_AT_AC = 0x08
}
```

};

## Visual Basic

```
Public Enum uds_svc_authentication_subfunction As Byte
    PUDS_SVC_PARAM_AT_DA = &H0
    PUDS_SVC_PARAM_AT_VCU = &H1
    PUDS_SVC_PARAM_AT_VCB = &H2
    PUDS_SVC_PARAM_AT_POWN = &H3
    PUDS_SVC_PARAM_AT_TC = &H4
    PUDS_SVC_PARAM_AT_RCFA = &H5
    PUDS_SVC_PARAM_AT_VPOWNU = &H6
    PUDS_SVC_PARAM_AT_VPOWNB = &H7
    PUDS_SVC_PARAM_AT_AC = &H8
End Enum
```

## Values

Name	Value	Description
PUDS_SVC_PARAM_AT_DA	0x00	DeAuthenticate subfunction.
PUDS_SVC_PARAM_AT_VCU	0x01	VerifyCertificateUnidirectional subfunction.
PUDS_SVC_PARAM_AT_VCB	0x02	VerifyCertificateBidirectional subfunction.
PUDS_SVC_PARAM_AT_POWN	0x03	ProofOfOwnership subfunction.
PUDS_SVC_PARAM_AT_TC	0x04	TransmitCertificate subfunction.
PUDS_SVC_PARAM_AT_RCFA	0x05	RequestChallengeForAuthentication subfunction.
PUDS_SVC_PARAM_AT_VPOWNU	0x06	VerifyProofOfOwnershipUnidirectional subfunction.
PUDS_SVC_PARAM_AT_VPOWNB	0x07	VerifyProofOfOwnershipBidirectional subfunction.
PUDS_SVC_PARAM_AT_AC	0x08	AuthenticationConfiguration subfunction.

### 3.5.31 uds\_svc\_authentication\_return\_parameter

Represents the return parameter for UDS service Authentication (see ISO 14229-1:2020 §B.5 AuthenticationReturnParameter definitions p.403).

## Syntax

### C/C++

```
typedef enum _uds_svc_authentication_return_parameter
{
    PUDS_SVC_PARAM_AT_RV_RA = 0x00,
    PUDS_SVC_PARAM_AT_RV_GR = 0x01,
    PUDS_SVC_PARAM_AT_RV_ACAPCE = 0x02,
    PUDS_SVC_PARAM_AT_RV_ACACRAC = 0x03,
    PUDS_SVC_PARAM_AT_RV_ACACRSC = 0x04,
    PUDS_SVC_PARAM_AT_RV_DAS = 0x10,
    PUDS_SVC_PARAM_AT_RV_CVOVN = 0x11,
    PUDS_SVC_PARAM_AT_RV_OVAC = 0x12,
    PUDS_SVC_PARAM_AT_RV_CV = 0x13
} uds_svc_authentication_return_parameter;
```

### Pascal OO

```
uds_svc_authentication_return_parameter = (
    PUDS_SVC_PARAM_AT_RV_RA = $00,
    PUDS_SVC_PARAM_AT_RV_GR = $01,
    PUDS_SVC_PARAM_AT_RV_ACAPCE = $02,
    PUDS_SVC_PARAM_AT_RV_ACACRAC = $03,
    PUDS_SVC_PARAM_AT_RV_ACACRSC = $04,
    PUDS_SVC_PARAM_AT_RV_DAS = $10,
```

```
PUDS_SVC_PARAM_AT_RV_CVOVN = $11,
PUDS_SVC_PARAM_AT_RV_OVAC = $12,
PUDS_SVC_PARAM_AT_RV_CV = $13);
```

**C#**

```
public enum uds_svc_authentication_return_parameter : Byte
{
    PUDS_SVC_PARAM_AT_RV_RA = 0x00,
    PUDS_SVC_PARAM_AT_RV_GR = 0x01,
    PUDS_SVC_PARAM_AT_RV_ACAPCE = 0x02,
    PUDS_SVC_PARAM_AT_RV_ACACRAC = 0x03,
    PUDS_SVC_PARAM_AT_RV_ACACRSC = 0x04,
    PUDS_SVC_PARAM_AT_RV_DAS = 0x10,
    PUDS_SVC_PARAM_AT_RV_CVOVN = 0x11,
    PUDS_SVC_PARAM_AT_RV_OVAC = 0x12,
    PUDS_SVC_PARAM_AT_RV_CV = 0x13
}
```

**C++ / CLR**

```
enum struct uds_svc_authentication_return_parameter : Byte
{
    PUDS_SVC_PARAM_AT_RV_RA = 0x00,
    PUDS_SVC_PARAM_AT_RV_GR = 0x01,
    PUDS_SVC_PARAM_AT_RV_ACAPCE = 0x02,
    PUDS_SVC_PARAM_AT_RV_ACACRAC = 0x03,
    PUDS_SVC_PARAM_AT_RV_ACACRSC = 0x04,
    PUDS_SVC_PARAM_AT_RV_DAS = 0x10,
    PUDS_SVC_PARAM_AT_RV_CVOVN = 0x11,
    PUDS_SVC_PARAM_AT_RV_OVAC = 0x12,
    PUDS_SVC_PARAM_AT_RV_CV = 0x13
};
```

**Visual Basic**

```
Public Enum uds_svc_authentication_return_parameter As Byte
    PUDS_SVC_PARAM_AT_RV_RA = &H00
    PUDS_SVC_PARAM_AT_RV_GR = &H01
    PUDS_SVC_PARAM_AT_RV_ACAPCE = &H02
    PUDS_SVC_PARAM_AT_RV_ACACRAC = &H03
    PUDS_SVC_PARAM_AT_RV_ACACRSC = &H04
    PUDS_SVC_PARAM_AT_RV_DAS = &H10
    PUDS_SVC_PARAM_AT_RV_CVOVN = &H11
    PUDS_SVC_PARAM_AT_RV_OVAC = &H12
    PUDS_SVC_PARAM_AT_RV_CV = &H13
End Enum
```



**Values**

Name	Value	Description
PUDS_SVC_PARAM_AT_RV_RA	0x00	Request Accepted.
PUDS_SVC_PARAM_AT_RV_GR	0x01	General Reject.
PUDS_SVC_PARAM_AT_RV_ACAPCE	0x02	Authentication Configuration APCE.
PUDS_SVC_PARAM_AT_RV_ACACRAC	0x03	Authentication Configuration ACR with Asymmetric Cryptography.
PUDS_SVC_PARAM_AT_RV_ACACRSC	0x04	Authentication Configuration ACR with Symmetric Cryptography.
PUDS_SVC_PARAM_AT_RV_DAS	0x10	DeAuthentication Successful.
PUDS_SVC_PARAM_AT_RV_CVOVN	0x11	Certificate Verified, Ownership Verification Necessary.
PUDS_SVC_PARAM_AT_RV_OVAC	0x12	Ownership Verified, Authentication Complete.
PUDS_SVC_PARAM_AT_RV_CV	0x13	Certificate Verified.


















## 3.6 PCAN-ISO-TP 3.x Dependencies

PCAN-UDS 2.x API is built on the PCAN-ISO-TP 3.x API, so it has some dependencies. These dependencies are described in this chapter.

### Aliases

	Alias	Description
	cantp_bitrate	Represents a PCAN FD bit rate string.
	cantp_timestamp	Defines the timestamp of a message.

### Enumerations

	Name	Description
	cantp_handle	Represents a PCANTP channel or a PUDS channel.
	cantp_hwtype	Represents the type of PCAN hardware to be initialized.
	cantp_isotp_addressing	Represents the type of message addressing of a PCANTP message.
	cantp_baudrate	Represents a PCAN Baud rate register value for the PCANTP channel.
	cantp_msg	Defines a PCANTP message.
	cantp_can_msgtype	Represents the flags of a CAN or CAN FD message.
	cantp_msgtype	Represents the type of a PCANTP message.
	cantp_can_info	Represents common CAN information.
	cantp_msgdata	Represents the content of a generic PCANTP message.
	cantp_msgdata_can	Represents the content of a standard CAN message.
	cantp_msgdata_canfd	Represents the content of a CAN FD message.
	cantp_msgdata_isotp	Represents the content of an ISO TP message.
	cantp_msgflag	Represents the flags common to all types of cantp_msg.
	cantp_netstatus	Represents the network result of the communication of an PCANTP message.
	cantp_netaddrinfo	Represents the network address information of an PCANTP message.
	cantp_isotp_msgtype	Represents the addressing format of an PCANTP message.
	cantp_isotp_format	Represents the addressing format of an PCANTP message.

### 3.6.1 cantp\_bitrate

Represents a bit rate string with flexible data rate (FD) for PCANTP or PUDS channels.

#### Syntax

##### C/C++

```
#define cantp_bitrate char*
```

##### Pascal OO

```
cantp_bitrate = PAnsiChar;
```

##### C#

```
using cantp_bitrate = String;
```

##### C++ / CLR

```
using cantp_bitrate = String^;
```

## Visual Basic

```
Imports cantp_bitrate = System.String
```

## Remarks

### .NET Framework programming languages:

An alias is used to represent a flexible data rate under Microsoft .NET to originate a homogeneity between all programming languages listed above.

Aliases are defined in the `Peak.Can.IsoTp` Namespace for C# and VB .NET. However, including a namespace does not include the defined aliases.

If it is wished to work with aliases, those must be copied to the working file, right after the inclusion of the `Peak.Can.IsoTp` Namespace. Otherwise, just use the native type, which in this case is a string.

### C#

```
using System;
using Peak.Can.IsoTp;
using cantp_bitrate = System.String; // Alias' declaration for System.String
```

## Visual Basic

```
Imports System
Imports Peak.Can.IsoTp
Imports cantp_bitrate = System.String ' Alias declaration for System.String
```

## FD Bit Rate Parameter Definitions

Defines the different configuration parameters used to create a flexible data rate string for FD capable PCAN channel initialization. These values are used as parameter with `UDS_InitializeFD_2013` (class method version: `InitializeFD_2013`).

### Clock frequency parameters:

Type	Constant	Value	Description
String	PCANTP_BR_CLOCK	"f_clock"	Clock frequency in Hertz (80000000, 60000000, 40000000, 30000000, 24000000, 20000000)
String	PCANTP_BR_CLOCK_MHZ	"f_clock_mhz"	Clock frequency in Megahertz (80, 60, 40, 30, 24, 20)

### Nominal bit rate parameters:

Type	Constant	Value	Description
String	PCANTP_BR_NOM_BRP	"nom_brp"	Clock prescaler for nominal time quantum (1..1024).
String	PCANTP_BR_NOM_TSEG1	"nom_tseg1"	TSEG1 segment for nominal bit rate in time quanta (1..256).
String	PCANTP_BR_NOM_TSEG2	"nom_tseg2"	TSEG2 segment for nominal bit rate in time quanta (1..128).
String	PCANTP_BR_NOM_SJW	"nom_sjw"	Synchronization Jump Width for nominal bit rate in time quanta (1..128).

### Data bit rate parameters:

Type	Constant	Value	Description
String	PCANTP_BR_DATA_BRP	"data_brp"	Clock prescaler for fast data time quantum (1..1024).
String	PCANTP_BR_DATA_TSEG1	"data_tseg1"	TSEG1 segment for fast data bit rate in time quanta (1..32).
String	PCANTP_BR_DATA_TSEG2	"data_tseg2"	TSEG2 segment for fast data bit rate in time quanta (1..16).
String	PCANTP_BR_DATA_SJW	"data_sjw"	Synchronization Jump Width for fast data bit rate in time quanta (1..16).

## Remarks

These definitions are constant values in an object-oriented environment (Delphi, .NET Framework) and declared as defines in C/C++ (plain API, see Functions on page 621).

Following points are to be respected to construct a valid FD bit rate string:

- └ The string must contain only one of the two possible clock frequency parameters, depending on the unit used (Hz, or MHz).
- └ The frequency to use must be one of the 6 listed within the clock frequency parameters.
- └ The value for each parameter must be separated with a '='. **Example:** "data\_brp=1"
- └ Each pair of parameter/value must be separated with a ','. Blank spaces are allowed but are not necessary. Example: "f\_clock\_mhz=24, nom\_brp=1,"
- └ Both bit rates, or only the nominal one, must be defined within the string (`PCANTP_BR_DATA_*` and `PCANTP_BR_NOM_*`, or only `PCANTP_BR_NOM_*`).

### Example with nominal bit rate only:

A valid string representing 1 Mbit/sec for both, nominal and data bit rates:

"f\_clock\_mhz=20, nom\_brp=5, nom\_tseg1=2, nom\_tseg2=1, nom\_sjw=1"

### Example with nominal and data bit rate:

A valid string representing 1 Mbit/sec for nominal bit rate, and 2 Mbit/sec for data bit rate:

"f\_clock\_mhz=20, nom\_brp=5, nom\_tseg1=2, nom\_tseg2=1, nom\_sjw=1, data\_brp=2, data\_tseg1=3, data\_tseg2=1, data\_sjw=1"

### Parameter value ranges:

Parameter	Value Range
f_clock	[80000000, 60000000, 40000000, 30000000, 24000000, 20000000]
f_clock_mhz	[80, 60, 40, 30, 24, 20]
nom_brp	1 .. 1024
nom_tseg1	1 .. 256
nom_tseg2	1 .. 128
nom_sjw	1 .. 128
data_brp	1 .. 1024
data_tseg1	1 .. 32
data_tseg2	1 .. 16
data_sjw	1 .. 16

**See Also:** `UDS_InitializeFD_2013` on page 626, **class method version:** `InitializeFD_2013` on page 148.

### 3.6.2 cantp\_timestamp

Represents a timestamp in PCAN-ISO-TP 3.x API and PCAN-UDS 2.x API.

#### Syntax

##### C/C++

```
#define cantp_timestamp uint64_t
```

##### Pascal OO

```
cantp_timestamp = uint64;
```

##### C#

```
using cantp_timestamp = UInt64;
```

##### C++ / CLR

```
using cantp_timestamp = UInt64;
```

##### Visual Basic

```
Imports cantp_timestamp = System.UInt64
```

#### Remarks

##### .NET Framework programming languages:

An alias is used to represent a flexible data rate under Microsoft .NET to originate a homogeneity between all programming languages listed above.

Aliases are defined in the `Peak.Can.IsoTp` Namespace for C# and VB .NET. However, including a namespace does not include the defined aliases.

If it is wished to work with aliases, those must be copied to the working file, right after the inclusion of the `Peak.Can.IsoTp` Namespace. Otherwise, just use the native type.

##### C#

```
using System;  
using Peak.Can.IsoTp;  
using cantp_timestamp = System.UInt64;
```

##### Visual Basic

```
Imports System  
Imports Peak.Can.IsoTp  
Imports cantp_timestamp = System.UInt64
```



### 3.6.3 cantp\_handle

Represents currently defined and supported PCANTP handle (a.k.a. channels). These identifiers are also used to identify PUDS channels.

#### Syntax

##### C/C++

```
#define PCAN_NONEBUS          0x00U
#define PCAN_ISABUS1          0x21U
#define PCAN_ISABUS2          0x22U
#define PCAN_ISABUS3          0x23U
#define PCAN_ISABUS4          0x24U
#define PCAN_ISABUS5          0x25U
#define PCAN_ISABUS6          0x26U
#define PCAN_ISABUS7          0x27U
#define PCAN_ISABUS8          0x28U
#define PCAN_DNGBUS1          0x31U
#define PCAN_PCIBUS1          0x41U
#define PCAN_PCIBUS2          0x42U
#define PCAN_PCIBUS3          0x43U
#define PCAN_PCIBUS4          0x44U
#define PCAN_PCIBUS5          0x45U
#define PCAN_PCIBUS6          0x46U
#define PCAN_PCIBUS7          0x47U
#define PCAN_PCIBUS8          0x48U
#define PCAN_PCIBUS9          0x409U
#define PCAN_PCIBUS10         0x40AU
#define PCAN_PCIBUS11         0x40BU
#define PCAN_PCIBUS12         0x40CU
#define PCAN_PCIBUS13         0x40DU
#define PCAN_PCIBUS14         0x40EU
#define PCAN_PCIBUS15         0x40FU
#define PCAN_PCIBUS16         0x410U
#define PCAN_USBBUS1          0x51U
#define PCAN_USBBUS2          0x52U
#define PCAN_USBBUS3          0x53U
#define PCAN_USBBUS4          0x54U
#define PCAN_USBBUS5          0x55U
#define PCAN_USBBUS6          0x56U
#define PCAN_USBBUS7          0x57U
#define PCAN_USBBUS8          0x58U
#define PCAN_USBBUS9          0x509U
#define PCAN_USBBUS10         0x50AU
#define PCAN_USBBUS11         0x50BU
#define PCAN_USBBUS12         0x50CU
#define PCAN_USBBUS13         0x50DU
#define PCAN_USBBUS14         0x50EU
#define PCAN_USBBUS15         0x50FU
#define PCAN_USBBUS16         0x510U
#define PCAN_PCCBUS1          0x61U
#define PCAN_PCCBUS2          0x62U
#define PCAN_LANBUS1          0x801U
#define PCAN_LANBUS2          0x802U
#define PCAN_LANBUS3          0x803U
#define PCAN_LANBUS4          0x804U
#define PCAN_LANBUS5          0x805U
#define PCAN_LANBUS6          0x806U
#define PCAN_LANBUS7          0x807U
#define PCAN_LANBUS8          0x808U
#define PCAN_LANBUS9          0x809U
#define PCAN_LANBUS10         0x80AU
```

```

#define PCAN_LANBUS1          0x80BU
#define PCAN_LANBUS2          0x80CU
#define PCAN_LANBUS3          0x80DU
#define PCAN_LANBUS4          0x80EU
#define PCAN_LANBUS5          0x80FU
#define PCAN_LANBUS16         0x810U

typedef enum _cantp_handle {
    PCANTP_HANDLE_NONEBUS = PCAN_NONEBUS,

    PCANTP_HANDLE_ISABUS1 = PCAN_ISABUS1,
    PCANTP_HANDLE_ISABUS2 = PCAN_ISABUS2,
    PCANTP_HANDLE_ISABUS3 = PCAN_ISABUS3,
    PCANTP_HANDLE_ISABUS4 = PCAN_ISABUS4,
    PCANTP_HANDLE_ISABUS5 = PCAN_ISABUS5,
    PCANTP_HANDLE_ISABUS6 = PCAN_ISABUS6,
    PCANTP_HANDLE_ISABUS7 = PCAN_ISABUS7,
    PCANTP_HANDLE_ISABUS8 = PCAN_ISABUS8,

    PCANTP_HANDLE_DNGBUS1 = PCAN_DNGBUS1,

    PCANTP_HANDLE_PCIBUS1 = PCAN_PCIBUS1,
    PCANTP_HANDLE_PCIBUS2 = PCAN_PCIBUS2,
    PCANTP_HANDLE_PCIBUS3 = PCAN_PCIBUS3,
    PCANTP_HANDLE_PCIBUS4 = PCAN_PCIBUS4,
    PCANTP_HANDLE_PCIBUS5 = PCAN_PCIBUS5,
    PCANTP_HANDLE_PCIBUS6 = PCAN_PCIBUS6,
    PCANTP_HANDLE_PCIBUS7 = PCAN_PCIBUS7,
    PCANTP_HANDLE_PCIBUS8 = PCAN_PCIBUS8,
    PCANTP_HANDLE_PCIBUS9 = PCAN_PCIBUS9,
    PCANTP_HANDLE_PCIBUS10 = PCAN_PCIBUS10,
    PCANTP_HANDLE_PCIBUS11 = PCAN_PCIBUS11,
    PCANTP_HANDLE_PCIBUS12 = PCAN_PCIBUS12,
    PCANTP_HANDLE_PCIBUS13 = PCAN_PCIBUS13,
    PCANTP_HANDLE_PCIBUS14 = PCAN_PCIBUS14,
    PCANTP_HANDLE_PCIBUS15 = PCAN_PCIBUS15,
    PCANTP_HANDLE_PCIBUS16 = PCAN_PCIBUS16,

    PCANTP_HANDLE_USBBUS1 = PCAN_USBBUS1,
    PCANTP_HANDLE_USBBUS2 = PCAN_USBBUS2,
    PCANTP_HANDLE_USBBUS3 = PCAN_USBBUS3,
    PCANTP_HANDLE_USBBUS4 = PCAN_USBBUS4,
    PCANTP_HANDLE_USBBUS5 = PCAN_USBBUS5,
    PCANTP_HANDLE_USBBUS6 = PCAN_USBBUS6,
    PCANTP_HANDLE_USBBUS7 = PCAN_USBBUS7,
    PCANTP_HANDLE_USBBUS8 = PCAN_USBBUS8,
    PCANTP_HANDLE_USBBUS9 = PCAN_USBBUS9,
    PCANTP_HANDLE_USBBUS10 = PCAN_USBBUS10,
    PCANTP_HANDLE_USBBUS11 = PCAN_USBBUS11,
    PCANTP_HANDLE_USBBUS12 = PCAN_USBBUS12,
    PCANTP_HANDLE_USBBUS13 = PCAN_USBBUS13,
    PCANTP_HANDLE_USBBUS14 = PCAN_USBBUS14,
    PCANTP_HANDLE_USBBUS15 = PCAN_USBBUS15,
    PCANTP_HANDLE_USBBUS16 = PCAN_USBBUS16,

    PCANTP_HANDLE_PCCBUS1 = PCAN_PCCBUS1,
    PCANTP_HANDLE_PCCBUS2 = PCAN_PCCBUS2,

    PCANTP_HANDLE_LANBUS1 = PCAN_LANBUS1,
    PCANTP_HANDLE_LANBUS2 = PCAN_LANBUS2,
    PCANTP_HANDLE_LANBUS3 = PCAN_LANBUS3,
    PCANTP_HANDLE_LANBUS4 = PCAN_LANBUS4,

```

```

PCANTP_HANDLE_LANBUS5 = PCAN_LANBUS5,
PCANTP_HANDLE_LANBUS6 = PCAN_LANBUS6,
PCANTP_HANDLE_LANBUS7 = PCAN_LANBUS7,
PCANTP_HANDLE_LANBUS8 = PCAN_LANBUS8,
PCANTP_HANDLE_LANBUS9 = PCAN_LANBUS9,
PCANTP_HANDLE_LANBUS10 = PCAN_LANBUS10,
PCANTP_HANDLE_LANBUS11 = PCAN_LANBUS11,
PCANTP_HANDLE_LANBUS12 = PCAN_LANBUS12,
PCANTP_HANDLE_LANBUS13 = PCAN_LANBUS13,
PCANTP_HANDLE_LANBUS14 = PCAN_LANBUS14,
PCANTP_HANDLE_LANBUS15 = PCAN_LANBUS15,
PCANTP_HANDLE_LANBUS16 = PCAN_LANBUS16,
} cantp_handle;

```

## C++ / CLR

```

public enum cantp_handle : UInt32
{
    PCANTP_HANDLE_NONEBUS = PCANBasic::PCAN_NONEBUS,
    PCANTP_HANDLE_ISABUS1 = PCANBasic::PCAN_ISABUS1,
    PCANTP_HANDLE_ISABUS2 = PCANBasic::PCAN_ISABUS2,
    PCANTP_HANDLE_ISABUS3 = PCANBasic::PCAN_ISABUS3,
    PCANTP_HANDLE_ISABUS4 = PCANBasic::PCAN_ISABUS4,
    PCANTP_HANDLE_ISABUS5 = PCANBasic::PCAN_ISABUS5,
    PCANTP_HANDLE_ISABUS6 = PCANBasic::PCAN_ISABUS6,
    PCANTP_HANDLE_ISABUS7 = PCANBasic::PCAN_ISABUS7,
    PCANTP_HANDLE_ISABUS8 = PCANBasic::PCAN_ISABUS8,
    PCANTP_HANDLE_DNGBUS1 = PCANBasic::PCAN_DNGBUS1,
    PCANTP_HANDLE_PCIBUS1 = PCANBasic::PCAN_PCIBUS1,
    PCANTP_HANDLE_PCIBUS2 = PCANBasic::PCAN_PCIBUS2,
    PCANTP_HANDLE_PCIBUS3 = PCANBasic::PCAN_PCIBUS3,
    PCANTP_HANDLE_PCIBUS4 = PCANBasic::PCAN_PCIBUS4,
    PCANTP_HANDLE_PCIBUS5 = PCANBasic::PCAN_PCIBUS5,
    PCANTP_HANDLE_PCIBUS6 = PCANBasic::PCAN_PCIBUS6,
    PCANTP_HANDLE_PCIBUS7 = PCANBasic::PCAN_PCIBUS7,
    PCANTP_HANDLE_PCIBUS8 = PCANBasic::PCAN_PCIBUS8,
    PCANTP_HANDLE_PCIBUS9 = PCANBasic::PCAN_PCIBUS9,
    PCANTP_HANDLE_PCIBUS10 = PCANBasic::PCAN_PCIBUS10,
    PCANTP_HANDLE_PCIBUS11 = PCANBasic::PCAN_PCIBUS11,
    PCANTP_HANDLE_PCIBUS12 = PCANBasic::PCAN_PCIBUS12,
    PCANTP_HANDLE_PCIBUS13 = PCANBasic::PCAN_PCIBUS13,
    PCANTP_HANDLE_PCIBUS14 = PCANBasic::PCAN_PCIBUS14,
    PCANTP_HANDLE_PCIBUS15 = PCANBasic::PCAN_PCIBUS15,
    PCANTP_HANDLE_PCIBUS16 = PCANBasic::PCAN_PCIBUS16,
    PCANTP_HANDLE_USBBUS1 = PCANBasic::PCAN_USBBUS1,
    PCANTP_HANDLE_USBBUS2 = PCANBasic::PCAN_USBBUS2,
    PCANTP_HANDLE_USBBUS3 = PCANBasic::PCAN_USBBUS3,
    PCANTP_HANDLE_USBBUS4 = PCANBasic::PCAN_USBBUS4,
    PCANTP_HANDLE_USBBUS5 = PCANBasic::PCAN_USBBUS5,
    PCANTP_HANDLE_USBBUS6 = PCANBasic::PCAN_USBBUS6,
    PCANTP_HANDLE_USBBUS7 = PCANBasic::PCAN_USBBUS7,
    PCANTP_HANDLE_USBBUS8 = PCANBasic::PCAN_USBBUS8,
    PCANTP_HANDLE_USBBUS9 = PCANBasic::PCAN_USBBUS9,
    PCANTP_HANDLE_USBBUS10 = PCANBasic::PCAN_USBBUS10,
    PCANTP_HANDLE_USBBUS11 = PCANBasic::PCAN_USBBUS11,
    PCANTP_HANDLE_USBBUS12 = PCANBasic::PCAN_USBBUS12,
    PCANTP_HANDLE_USBBUS13 = PCANBasic::PCAN_USBBUS13,
    PCANTP_HANDLE_USBBUS14 = PCANBasic::PCAN_USBBUS14,
    PCANTP_HANDLE_USBBUS15 = PCANBasic::PCAN_USBBUS15,
    PCANTP_HANDLE_USBBUS16 = PCANBasic::PCAN_USBBUS16,
    PCANTP_HANDLE_PCCBUS1 = PCANBasic::PCAN_PCCBUS1,
    PCANTP_HANDLE_PCCBUS2 = PCANBasic::PCAN_PCCBUS2,
}

```

```

PCANTP_HANDLE_LANBUS1 = PCANBasic::PCAN_LANBUS1,
PCANTP_HANDLE_LANBUS2 = PCANBasic::PCAN_LANBUS2,
PCANTP_HANDLE_LANBUS3 = PCANBasic::PCAN_LANBUS3,
PCANTP_HANDLE_LANBUS4 = PCANBasic::PCAN_LANBUS4,
PCANTP_HANDLE_LANBUS5 = PCANBasic::PCAN_LANBUS5,
PCANTP_HANDLE_LANBUS6 = PCANBasic::PCAN_LANBUS6,
PCANTP_HANDLE_LANBUS7 = PCANBasic::PCAN_LANBUS7,
PCANTP_HANDLE_LANBUS8 = PCANBasic::PCAN_LANBUS8,
PCANTP_HANDLE_LANBUS9 = PCANBasic::PCAN_LANBUS9,
PCANTP_HANDLE_LANBUS10 = PCANBasic::PCAN_LANBUS10,
PCANTP_HANDLE_LANBUS11 = PCANBasic::PCAN_LANBUS11,
PCANTP_HANDLE_LANBUS12 = PCANBasic::PCAN_LANBUS12,
PCANTP_HANDLE_LANBUS13 = PCANBasic::PCAN_LANBUS13,
PCANTP_HANDLE_LANBUS14 = PCANBasic::PCAN_LANBUS14,
PCANTP_HANDLE_LANBUS15 = PCANBasic::PCAN_LANBUS15,
PCANTP_HANDLE_LANBUS16 = PCANBasic::PCAN_LANBUS16,

```

```
};
```

## C#

```

public enum cantp_handle : UInt32
{
    PCANTP_HANDLE_NONEBUS = PCANBasic.PCAN_NONEBUS,
    PCANTP_HANDLE_ISABUS1 = PCANBasic.PCAN_ISABUS1,
    PCANTP_HANDLE_ISABUS2 = PCANBasic.PCAN_ISABUS2,
    PCANTP_HANDLE_ISABUS3 = PCANBasic.PCAN_ISABUS3,
    PCANTP_HANDLE_ISABUS4 = PCANBasic.PCAN_ISABUS4,
    PCANTP_HANDLE_ISABUS5 = PCANBasic.PCAN_ISABUS5,
    PCANTP_HANDLE_ISABUS6 = PCANBasic.PCAN_ISABUS6,
    PCANTP_HANDLE_ISABUS7 = PCANBasic.PCAN_ISABUS7,
    PCANTP_HANDLE_ISABUS8 = PCANBasic.PCAN_ISABUS8,
    PCANTP_HANDLE_DNGBUS1 = PCANBasic.PCAN_DNGBUS1,
    PCANTP_HANDLE_PCIBUS1 = PCANBasic.PCAN_PCIBUS1,
    PCANTP_HANDLE_PCIBUS2 = PCANBasic.PCAN_PCIBUS2,
    PCANTP_HANDLE_PCIBUS3 = PCANBasic.PCAN_PCIBUS3,
    PCANTP_HANDLE_PCIBUS4 = PCANBasic.PCAN_PCIBUS4,
    PCANTP_HANDLE_PCIBUS5 = PCANBasic.PCAN_PCIBUS5,
    PCANTP_HANDLE_PCIBUS6 = PCANBasic.PCAN_PCIBUS6,
    PCANTP_HANDLE_PCIBUS7 = PCANBasic.PCAN_PCIBUS7,
    PCANTP_HANDLE_PCIBUS8 = PCANBasic.PCAN_PCIBUS8,
    PCANTP_HANDLE_PCIBUS9 = PCANBasic.PCAN_PCIBUS9,
    PCANTP_HANDLE_PCIBUS10 = PCANBasic.PCAN_PCIBUS10,
    PCANTP_HANDLE_PCIBUS11 = PCANBasic.PCAN_PCIBUS11,
    PCANTP_HANDLE_PCIBUS12 = PCANBasic.PCAN_PCIBUS12,
    PCANTP_HANDLE_PCIBUS13 = PCANBasic.PCAN_PCIBUS13,
    PCANTP_HANDLE_PCIBUS14 = PCANBasic.PCAN_PCIBUS14,
    PCANTP_HANDLE_PCIBUS15 = PCANBasic.PCAN_PCIBUS15,
    PCANTP_HANDLE_PCIBUS16 = PCANBasic.PCAN_PCIBUS16,
    PCANTP_HANDLE_USBBUS1 = PCANBasic.PCAN_USBBUS1,
    PCANTP_HANDLE_USBBUS2 = PCANBasic.PCAN_USBBUS2,
    PCANTP_HANDLE_USBBUS3 = PCANBasic.PCAN_USBBUS3,
    PCANTP_HANDLE_USBBUS4 = PCANBasic.PCAN_USBBUS4,
    PCANTP_HANDLE_USBBUS5 = PCANBasic.PCAN_USBBUS5,
    PCANTP_HANDLE_USBBUS6 = PCANBasic.PCAN_USBBUS6,
    PCANTP_HANDLE_USBBUS7 = PCANBasic.PCAN_USBBUS7,
    PCANTP_HANDLE_USBBUS8 = PCANBasic.PCAN_USBBUS8,
    PCANTP_HANDLE_USBBUS9 = PCANBasic.PCAN_USBBUS9,
    PCANTP_HANDLE_USBBUS10 = PCANBasic.PCAN_USBBUS10,
    PCANTP_HANDLE_USBBUS11 = PCANBasic.PCAN_USBBUS11,
    PCANTP_HANDLE_USBBUS12 = PCANBasic.PCAN_USBBUS12,
    PCANTP_HANDLE_USBBUS13 = PCANBasic.PCAN_USBBUS13,
    PCANTP_HANDLE_USBBUS14 = PCANBasic.PCAN_USBBUS14,

```

```

PCANTP_HANDLE_USBBUS15 = PCANBasic.PCAN_USBBUS15,
PCANTP_HANDLE_USBBUS16 = PCANBasic.PCAN_USBBUS16,
PCANTP_HANDLE_PCCBUS1 = PCANBasic.PCAN_PCCBUS1,
PCANTP_HANDLE_PCCBUS2 = PCANBasic.PCAN_PCCBUS2,
PCANTP_HANDLE_LANBUS1 = PCANBasic.PCAN_LANBUS1,
PCANTP_HANDLE_LANBUS2 = PCANBasic.PCAN_LANBUS2,
PCANTP_HANDLE_LANBUS3 = PCANBasic.PCAN_LANBUS3,
PCANTP_HANDLE_LANBUS4 = PCANBasic.PCAN_LANBUS4,
PCANTP_HANDLE_LANBUS5 = PCANBasic.PCAN_LANBUS5,
PCANTP_HANDLE_LANBUS6 = PCANBasic.PCAN_LANBUS6,
PCANTP_HANDLE_LANBUS7 = PCANBasic.PCAN_LANBUS7,
PCANTP_HANDLE_LANBUS8 = PCANBasic.PCAN_LANBUS8,
PCANTP_HANDLE_LANBUS9 = PCANBasic.PCAN_LANBUS9,
PCANTP_HANDLE_LANBUS10 = PCANBasic.PCAN_LANBUS10,
PCANTP_HANDLE_LANBUS11 = PCANBasic.PCAN_LANBUS11,
PCANTP_HANDLE_LANBUS12 = PCANBasic.PCAN_LANBUS12,
PCANTP_HANDLE_LANBUS13 = PCANBasic.PCAN_LANBUS13,
PCANTP_HANDLE_LANBUS14 = PCANBasic.PCAN_LANBUS14,
PCANTP_HANDLE_LANBUS15 = PCANBasic.PCAN_LANBUS15,
PCANTP_HANDLE_LANBUS16 = PCANBasic.PCAN_LANBUS16,
}

```

## Pascal OO

```

cantp_handle = (
    PCANTP_HANDLE_NONEBUS = PCAN_NONEBUS,
    PCANTP_HANDLE_ISABUS1 = PCAN_ISABUS1,
    PCANTP_HANDLE_ISABUS2 = PCAN_ISABUS2,
    PCANTP_HANDLE_ISABUS3 = PCAN_ISABUS3,
    PCANTP_HANDLE_ISABUS4 = PCAN_ISABUS4,
    PCANTP_HANDLE_ISABUS5 = PCAN_ISABUS5,
    PCANTP_HANDLE_ISABUS6 = PCAN_ISABUS6,
    PCANTP_HANDLE_ISABUS7 = PCAN_ISABUS7,
    PCANTP_HANDLE_ISABUS8 = PCAN_ISABUS8,
    PCANTP_HANDLE_DNGBUS1 = PCAN_DNGBUS1,
    PCANTP_HANDLE_PCIBUS1 = PCAN_PCIBUS1,
    PCANTP_HANDLE_PCIBUS2 = PCAN_PCIBUS2,
    PCANTP_HANDLE_PCIBUS3 = PCAN_PCIBUS3,
    PCANTP_HANDLE_PCIBUS4 = PCAN_PCIBUS4,
    PCANTP_HANDLE_PCIBUS5 = PCAN_PCIBUS5,
    PCANTP_HANDLE_PCIBUS6 = PCAN_PCIBUS6,
    PCANTP_HANDLE_PCIBUS7 = PCAN_PCIBUS7,
    PCANTP_HANDLE_PCIBUS8 = PCAN_PCIBUS8,
    PCANTP_HANDLE_PCIBUS9 = PCAN_PCIBUS9,
    PCANTP_HANDLE_PCIBUS10 = PCAN_PCIBUS10,
    PCANTP_HANDLE_PCIBUS11 = PCAN_PCIBUS11,
    PCANTP_HANDLE_PCIBUS12 = PCAN_PCIBUS12,
    PCANTP_HANDLE_PCIBUS13 = PCAN_PCIBUS13,
    PCANTP_HANDLE_PCIBUS14 = PCAN_PCIBUS14,
    PCANTP_HANDLE_PCIBUS15 = PCAN_PCIBUS15,
    PCANTP_HANDLE_PCIBUS16 = PCAN_PCIBUS16,
    PCANTP_HANDLE_USBBUS1 = PCAN_USBBUS1,
    PCANTP_HANDLE_USBBUS2 = PCAN_USBBUS2,
    PCANTP_HANDLE_USBBUS3 = PCAN_USBBUS3,
    PCANTP_HANDLE_USBBUS4 = PCAN_USBBUS4,
    PCANTP_HANDLE_USBBUS5 = PCAN_USBBUS5,
    PCANTP_HANDLE_USBBUS6 = PCAN_USBBUS6,
    PCANTP_HANDLE_USBBUS7 = PCAN_USBBUS7,
    PCANTP_HANDLE_USBBUS8 = PCAN_USBBUS8,
    PCANTP_HANDLE_USBBUS9 = PCAN_USBBUS9,
    PCANTP_HANDLE_USBBUS10 = PCAN_USBBUS10,
    PCANTP_HANDLE_USBBUS11 = PCAN_USBBUS11,

```

```

PCANTP_HANDLE_USBBUS12 = PCAN_USBBUS12,
PCANTP_HANDLE_USBBUS13 = PCAN_USBBUS13,
PCANTP_HANDLE_USBBUS14 = PCAN_USBBUS14,
PCANTP_HANDLE_USBBUS15 = PCAN_USBBUS15,
PCANTP_HANDLE_USBBUS16 = PCAN_USBBUS16,
PCANTP_HANDLE_PCCBUS1 = PCAN_PCCBUS1,
PCANTP_HANDLE_PCCBUS2 = PCAN_PCCBUS2,
PCANTP_HANDLE_LANBUS1 = PCAN_LANBUS1,
PCANTP_HANDLE_LANBUS2 = PCAN_LANBUS2,
PCANTP_HANDLE_LANBUS3 = PCAN_LANBUS3,
PCANTP_HANDLE_LANBUS4 = PCAN_LANBUS4,
PCANTP_HANDLE_LANBUS5 = PCAN_LANBUS5,
PCANTP_HANDLE_LANBUS6 = PCAN_LANBUS6,
PCANTP_HANDLE_LANBUS7 = PCAN_LANBUS7,
PCANTP_HANDLE_LANBUS8 = PCAN_LANBUS8,
PCANTP_HANDLE_LANBUS9 = PCAN_LANBUS9,
PCANTP_HANDLE_LANBUS10 = PCAN_LANBUS10,
PCANTP_HANDLE_LANBUS11 = PCAN_LANBUS11,
PCANTP_HANDLE_LANBUS12 = PCAN_LANBUS12,
PCANTP_HANDLE_LANBUS13 = PCAN_LANBUS13,
PCANTP_HANDLE_LANBUS14 = PCAN_LANBUS14,
PCANTP_HANDLE_LANBUS15 = PCAN_LANBUS15,
PCANTP_HANDLE_LANBUS16 = PCAN_LANBUS16

```

```
);
```

## Visual Basic

```

Public Enum cantp_handle As UInt32
    PCANTP_HANDLE_NONEBUS = PCANBasic.PCAN_NONEBUS
    PCANTP_HANDLE_ISABUS1 = PCANBasic.PCAN_ISABUS1
    PCANTP_HANDLE_ISABUS2 = PCANBasic.PCAN_ISABUS2
    PCANTP_HANDLE_ISABUS3 = PCANBasic.PCAN_ISABUS3
    PCANTP_HANDLE_ISABUS4 = PCANBasic.PCAN_ISABUS4
    PCANTP_HANDLE_ISABUS5 = PCANBasic.PCAN_ISABUS5
    PCANTP_HANDLE_ISABUS6 = PCANBasic.PCAN_ISABUS6
    PCANTP_HANDLE_ISABUS7 = PCANBasic.PCAN_ISABUS7
    PCANTP_HANDLE_ISABUS8 = PCANBasic.PCAN_ISABUS8
    PCANTP_HANDLE_DNGBUS1 = PCANBasic.PCAN_DNGBUS1
    PCANTP_HANDLE_PCIBUS1 = PCANBasic.PCAN_PCIBUS1
    PCANTP_HANDLE_PCIBUS2 = PCANBasic.PCAN_PCIBUS2
    PCANTP_HANDLE_PCIBUS3 = PCANBasic.PCAN_PCIBUS3
    PCANTP_HANDLE_PCIBUS4 = PCANBasic.PCAN_PCIBUS4
    PCANTP_HANDLE_PCIBUS5 = PCANBasic.PCAN_PCIBUS5
    PCANTP_HANDLE_PCIBUS6 = PCANBasic.PCAN_PCIBUS6
    PCANTP_HANDLE_PCIBUS7 = PCANBasic.PCAN_PCIBUS7
    PCANTP_HANDLE_PCIBUS8 = PCANBasic.PCAN_PCIBUS8
    PCANTP_HANDLE_PCIBUS9 = PCANBasic.PCAN_PCIBUS9
    PCANTP_HANDLE_PCIBUS10 = PCANBasic.PCAN_PCIBUS10
    PCANTP_HANDLE_PCIBUS11 = PCANBasic.PCAN_PCIBUS11
    PCANTP_HANDLE_PCIBUS12 = PCANBasic.PCAN_PCIBUS12
    PCANTP_HANDLE_PCIBUS13 = PCANBasic.PCAN_PCIBUS13
    PCANTP_HANDLE_PCIBUS14 = PCANBasic.PCAN_PCIBUS14
    PCANTP_HANDLE_PCIBUS15 = PCANBasic.PCAN_PCIBUS15
    PCANTP_HANDLE_PCIBUS16 = PCANBasic.PCAN_PCIBUS16
    PCANTP_HANDLE_USBBUS1 = PCANBasic.PCAN_USBBUS1
    PCANTP_HANDLE_USBBUS2 = PCANBasic.PCAN_USBBUS2
    PCANTP_HANDLE_USBBUS3 = PCANBasic.PCAN_USBBUS3
    PCANTP_HANDLE_USBBUS4 = PCANBasic.PCAN_USBBUS4
    PCANTP_HANDLE_USBBUS5 = PCANBasic.PCAN_USBBUS5
    PCANTP_HANDLE_USBBUS6 = PCANBasic.PCAN_USBBUS6
    PCANTP_HANDLE_USBBUS7 = PCANBasic.PCAN_USBBUS7
    PCANTP_HANDLE_USBBUS8 = PCANBasic.PCAN_USBBUS8

```



```

PCANTP_HANDLE_USBBUS9 = PCANBasic.PCAN_USBBUS9
PCANTP_HANDLE_USBBUS10 = PCANBasic.PCAN_USBBUS10
PCANTP_HANDLE_USBBUS11 = PCANBasic.PCAN_USBBUS11
PCANTP_HANDLE_USBBUS12 = PCANBasic.PCAN_USBBUS12
PCANTP_HANDLE_USBBUS13 = PCANBasic.PCAN_USBBUS13
PCANTP_HANDLE_USBBUS14 = PCANBasic.PCAN_USBBUS14
PCANTP_HANDLE_USBBUS15 = PCANBasic.PCAN_USBBUS15
PCANTP_HANDLE_USBBUS16 = PCANBasic.PCAN_USBBUS16
PCANTP_HANDLE_PCCBUS1 = PCANBasic.PCAN_PCCBUS1
PCANTP_HANDLE_PCCBUS2 = PCANBasic.PCAN_PCCBUS2
PCANTP_HANDLE_LANBUS1 = PCANBasic.PCAN_LANBUS1
PCANTP_HANDLE_LANBUS2 = PCANBasic.PCAN_LANBUS2
PCANTP_HANDLE_LANBUS3 = PCANBasic.PCAN_LANBUS3
PCANTP_HANDLE_LANBUS4 = PCANBasic.PCAN_LANBUS4
PCANTP_HANDLE_LANBUS5 = PCANBasic.PCAN_LANBUS5
PCANTP_HANDLE_LANBUS6 = PCANBasic.PCAN_LANBUS6
PCANTP_HANDLE_LANBUS7 = PCANBasic.PCAN_LANBUS7
PCANTP_HANDLE_LANBUS8 = PCANBasic.PCAN_LANBUS8
PCANTP_HANDLE_LANBUS9 = PCANBasic.PCAN_LANBUS9
PCANTP_HANDLE_LANBUS10 = PCANBasic.PCAN_LANBUS10
PCANTP_HANDLE_LANBUS11 = PCANBasic.PCAN_LANBUS11
PCANTP_HANDLE_LANBUS12 = PCANBasic.PCAN_LANBUS12
PCANTP_HANDLE_LANBUS13 = PCANBasic.PCAN_LANBUS13
PCANTP_HANDLE_LANBUS14 = PCANBasic.PCAN_LANBUS14
PCANTP_HANDLE_LANBUS15 = PCANBasic.PCAN_LANBUS15
PCANTP_HANDLE_LANBUS16 = PCANBasic.PCAN_LANBUS16


```

End Enum









## Definitions

Defines the handles for the different PCAN buses (channels) within a class. The values are used as parameters where a `cantp_handle` is needed.


### Default/Undefined Handle:

	Name	Value	Description
	PCANTP_HANDLE_NONEBUS	0x0	Undefined/default value for a PCAN-ISO-TP 3.x channel

















### Handles for the ISA bus (Non-Plug and Play):

	Name	Value	Description
	PCANTP_HANDLE_ISABUS1	0x21	PCAN-ISA interface, channel 1
	PCANTP_HANDLE_ISABUS2	0x22	PCAN-ISA interface, channel 2
	PCANTP_HANDLE_ISABUS3	0x23	PCAN-ISA interface, channel 3
	PCANTP_HANDLE_ISABUS4	0x24	PCAN-ISA interface, channel 4
	PCANTP_HANDLE_ISABUS5	0x25	PCAN-ISA interface, channel 5
	PCANTP_HANDLE_ISABUS6	0x26	PCAN-ISA interface, channel 6
	PCANTP_HANDLE_ISABUS7	0x27	PCAN-ISA interface, channel 7
	PCANTP_HANDLE_ISABUS8	0x28	PCAN-ISA interface, channel 8

















### Handles for the Dongle Bus (Non-Plug and Play):

	Name	Value	Description
	PCANTP_HANDLE_DNGBUS1	0x31	PCAN-Dongle/LPT interface, channel 1



**Handles for the PCI bus:**

	Name	Value	Description
	PCANTP_HANDLE_PCIBUS1	0x41	PCAN-PCI interface, channel 1
	PCANTP_HANDLE_PCIBUS2	0x42	PCAN-PCI interface, channel 2
	PCANTP_HANDLE_PCIBUS3	0x43	PCAN-PCI interface, channel 3
	PCANTP_HANDLE_PCIBUS4	0x44	PCAN-PCI interface, channel 4
	PCANTP_HANDLE_PCIBUS5	0x45	PCAN-PCI interface, channel 5
	PCANTP_HANDLE_PCIBUS6	0x46	PCAN-PCI interface, channel 6
	PCANTP_HANDLE_PCIBUS7	0x47	PCAN-PCI interface, channel 7
	PCANTP_HANDLE_PCIBUS8	0x48	PCAN-PCI interface, channel 8
	PCANTP_HANDLE_PCIBUS9	0x409	PCAN-PCI interface, channel 9
	PCANTP_HANDLE_PCIBUS10	0x40A	PCAN-PCI interface, channel 10
	PCANTP_HANDLE_PCIBUS11	0x40B	PCAN-PCI interface, channel 11
	PCANTP_HANDLE_PCIBUS12	0x40C	PCAN-PCI interface, channel 12
	PCANTP_HANDLE_PCIBUS13	0x40D	PCAN-PCI interface, channel 13
	PCANTP_HANDLE_PCIBUS14	0x40E	PCAN-PCI interface, channel 14
	PCANTP_HANDLE_PCIBUS15	0x40F	PCAN-PCI interface, channel 15
	PCANTP_HANDLE_PCIBUS16	0x410	PCAN-PCI interface, channel 16



**Handles for the USB Bus:**

	Name	Value	Description
	PCANTP_HANDLE_USBBUS1	0x51	PCAN-USB interface, channel 1
	PCANTP_HANDLE_USBBUS2	0x52	PCAN-USB interface, channel 2
	PCANTP_HANDLE_USBBUS3	0x53	PCAN-USB interface, channel 3
	PCANTP_HANDLE_USBBUS4	0x54	PCAN-USB interface, channel 4
	PCANTP_HANDLE_USBBUS5	0x55	PCAN-USB interface, channel 5
	PCANTP_HANDLE_USBBUS6	0x56	PCAN-USB interface, channel 6
	PCANTP_HANDLE_USBBUS7	0x57	PCAN-USB interface, channel 7
	PCANTP_HANDLE_USBBUS8	0x58	PCAN-USB interface, channel 8
	PCANTP_HANDLE_USBBUS9	0x509	PCAN-USB interface, channel 9
	PCANTP_HANDLE_USBBUS10	0x50A	PCAN-USB interface, channel 10
	PCANTP_HANDLE_USBBUS11	0x50B	PCAN-USB interface, channel 11
	PCANTP_HANDLE_USBBUS12	0x50C	PCAN-USB interface, channel 12
	PCANTP_HANDLE_USBBUS13	0x50D	PCAN-USB interface, channel 13
	PCANTP_HANDLE_USBBUS14	0x50E	PCAN-USB interface, channel 14
	PCANTP_HANDLE_USBBUS15	0x50F	PCAN-USB interface, channel 15
	PCANTP_HANDLE_USBBUS16	0x510	PCAN-USB interface, channel 16















**Handles for the PC Card Bus:**

	Name	Value	Description
	PCANTP_HANDLE_PCCBUS1	0x61	PCAN-PC Card interface, channel 1
	PCANTP_HANDLE_PCCBUS2	0x62	PCAN-PC Card interface, channel 2

**Handles for the LAN interface:**

	Name	Value	Description
	PCANTP_HANDLE_LANBUS1	0x801	PCAN-LAN interface, channel 1
	PCANTP_HANDLE_LANBUS2	0x802	PCAN-LAN interface, channel 2



	Name	Value	Description
	PCANTP_HANDLE_LANBUS3	0x803	PCAN-LAN interface, channel 3
	PCANTP_HANDLE_LANBUS4	0x804	PCAN-LAN interface, channel 4
	PCANTP_HANDLE_LANBUS5	0x805	PCAN-LAN interface, channel 5
	PCANTP_HANDLE_LANBUS6	0x806	PCAN-LAN interface, channel 6
	PCANTP_HANDLE_LANBUS7	0x807	PCAN-LAN interface, channel 7
	PCANTP_HANDLE_LANBUS8	0x808	PCAN-LAN interface, channel 8
	PCANTP_HANDLE_LANBUS9	0x809	PCAN-LAN interface, channel 9
	PCANTP_HANDLE_LANBUS10	0x80A	PCAN-LAN interface, channel 10
	PCANTP_HANDLE_LANBUS11	0x80B	PCAN-LAN interface, channel 11
	PCANTP_HANDLE_LANBUS12	0x80C	PCAN-LAN interface, channel 12
	PCANTP_HANDLE_LANBUS13	0x80D	PCAN-LAN interface, channel 13
	PCANTP_HANDLE_LANBUS14	0x80E	PCAN-LAN interface, channel 14
	PCANTP_HANDLE_LANBUS15	0x80F	PCAN-LAN interface, channel 15
	PCANTP_HANDLE_LANBUS16	0x810	PCAN-LAN interface, channel 16

## Remarks

### Hardware Type and Channels

**Non-Plug and Play:** The hardware channels of this kind are used as registered. This means, for example, it can register the `PCANTP_HANDLE_ISABUS3` without having registered `PCANTP_HANDLE_ISA1` and `PCANTP_HANDLE_ISA2`. It is a decision of each user, how to associate a PCAN-channel (logical part) and a port/interrupt pair (physical part).

**Plug and Play:** For hardware handles of PCI, USB, and PC-Card, the availability of the channels is determined by the count of hardware connected to a computer at a specific moment, in conjunction with their internal handle. This means that having four PCAN-USB connected to a computer will let the user to connect the channels `PCANTP_HANDLE_USBBUS1` to `PCANTP_HANDLE_USBBUS4`. The association of each channel with hardware is managed internally using the handle of hardware.

**See also:** Detailed Parameters Characteristics on page 45.

### 3.6.4 cantp\_hwtype

Represents the type of PCAN (non-Plug and Play) hardware to be initialized. According to the programming language, this type can be a group of defined values or an enumeration. This type is used in `Initialize_2013` method and `UDS_Initialize_2013` function.

## Syntax

### C/C++

```
#define PCAN_TYPE_ISA            0x01U
#define PCAN_TYPE_ISA_SJA       0x09U
#define PCAN_TYPE_ISA_PHYTEC    0x04U
#define PCAN_TYPE_DNG           0x02U
#define PCAN_TYPE_DNG_EPP       0x03U
#define PCAN_TYPE_DNG_SJA       0x05U
#define PCAN_TYPE_DNG_SJA_EPP   0x06U

typedef enum _cantp_hwtype {
    PCANTP_HWTYPE_ISA = PCAN_TYPE_ISA,
    PCANTP_HWTYPE_ISA_SJA = PCAN_TYPE_ISA_SJA,
    PCANTP_HWTYPE_ISA_PHYTEC = PCAN_TYPE_ISA_PHYTEC,
    PCANTP_HWTYPE_DNG = PCAN_TYPE_DNG,
    PCANTP_HWTYPE_DNG_EPP = PCAN_TYPE_DNG_EPP,
```

```

PCANTP_HWTYPE_DNG_SJA = PCAN_TYPE_DNG_SJA,
PCANTP_HWTYPE_DNG_SJA_EPP = PCAN_TYPE_DNG_SJA_EPP,
} cantp_hwtype;

```

## Pascal OO

```

cantp_hwtype = (
  PCANTP_HWTYPE_ISA = UInt32(PCAN_TYPE_ISA),
  PCANTP_HWTYPE_ISA_SJA = UInt32(PCAN_TYPE_ISA_SJA),
  PCANTP_HWTYPE_ISA_PHYTEC = UInt32(PCAN_TYPE_ISA_PHYTEC),
  PCANTP_HWTYPE_DNG = UInt32(PCAN_TYPE_DNG),
  PCANTP_HWTYPE_DNG_EPP = UInt32(PCAN_TYPE_DNG_EPP),
  PCANTP_HWTYPE_DNG_SJA = UInt32(PCAN_TYPE_DNG_SJA),
  PCANTP_HWTYPE_DNG_SJA_EPP = UInt32(PCAN_TYPE_DNG_SJA_EPP)
);

```

## C#

```

public enum cantp_hwtype : UInt32
{
  PCANTP_HWTYPE_ISA = TPCANType.PCAN_TYPE_ISA,
  PCANTP_HWTYPE_ISA_SJA = TPCANType.PCAN_TYPE_ISA_SJA,
  PCANTP_HWTYPE_ISA_PHYTEC = TPCANType.PCAN_TYPE_ISA_PHYTEC,
  PCANTP_HWTYPE_DNG = TPCANType.PCAN_TYPE_DNG,
  PCANTP_HWTYPE_DNG_EPP = TPCANType.PCAN_TYPE_DNG_EPP,
  PCANTP_HWTYPE_DNG_SJA = TPCANType.PCAN_TYPE_DNG_SJA,
  PCANTP_HWTYPE_DNG_SJA_EPP = TPCANType.PCAN_TYPE_DNG_SJA_EPP,
}

```

## C++ / CLR

```

public enum cantp_hwtype : UInt32
{
  PCANTP_HWTYPE_ISA = (UInt32)TPCANType::PCAN_TYPE_ISA,
  PCANTP_HWTYPE_ISA_SJA = (UInt32)TPCANType::PCAN_TYPE_ISA_SJA,
  PCANTP_HWTYPE_ISA_PHYTEC = (UInt32)TPCANType::PCAN_TYPE_ISA_PHYTEC,
  PCANTP_HWTYPE_DNG = (UInt32)TPCANType::PCAN_TYPE_DNG,
  PCANTP_HWTYPE_DNG_EPP = (UInt32)TPCANType::PCAN_TYPE_DNG_EPP,
  PCANTP_HWTYPE_DNG_SJA = (UInt32)TPCANType::PCAN_TYPE_DNG_SJA,
  PCANTP_HWTYPE_DNG_SJA_EPP = (UInt32)TPCANType::PCAN_TYPE_DNG_SJA_EPP,
};

```

## Visual Basic

```

Public Enum cantp_hwtype : UInt32
  PCANTP_HWTYPE_ISA = TPCANType.PCAN_TYPE_ISA
  PCANTP_HWTYPE_ISA_SJA = TPCANType.PCAN_TYPE_ISA_SJA
  PCANTP_HWTYPE_ISA_PHYTEC = TPCANType.PCAN_TYPE_ISA_PHYTEC
  PCANTP_HWTYPE_DNG = TPCANType.PCAN_TYPE_DNG
  PCANTP_HWTYPE_DNG_EPP = TPCANType.PCAN_TYPE_DNG_EPP
  PCANTP_HWTYPE_DNG_SJA = TPCANType.PCAN_TYPE_DNG_SJA
  PCANTP_HWTYPE_DNG_SJA_EPP = TPCANType.PCAN_TYPE_DNG_SJA_EPP
End Enum

```

## Values

Name	Value	Description
PCANTP_HWTYPE_ISA	1	PCAN-ISA 82C200
PCANTP_HWTYPE_ISA_SJA	9	PCAN-ISA SJA1000
PCANTP_HWTYPE_ISA_PHYTEC	4	PHYTEC ISA
PCANTP_HWTYPE_DNG	2	PCAN-Dongle 82C200
PCANTP_HWTYPE_DNG_EPP	3	PCAN-Dongle EPP 82C200

Name	Value	Description
PCANTP_HWTYPE_DNG_SJA	5	PCAN-Dongle SJA1000
PCANTP_HWTYPE_DNG_SJA_EPP	6	PCAN-Dongle EPP SJA1000

**See also:** [UDS\\_Initialize\\_2013](#) on page 624, **class method:** [Initialize\\_2013](#) on page 142.

### 3.6.5 cantp\_isotp\_addressing

Represents the type of target of a PCANTP or PUDS message.

#### Syntax

##### C/C++

```
typedef enum _cantp_isotp_addressing {
    PCANTP_ISOTP_ADDRESSING_UNKNOWN = 0x00,
    PCANTP_ISOTP_ADDRESSING_PHYSICAL = 0x01,
    PCANTP_ISOTP_ADDRESSING_FUNCTIONAL = 0x02,
} cantp_isotp_addressing;
```

##### Pascal OO

```
cantp_isotp_addressing = (
    PCANTP_ISOTP_ADDRESSING_UNKNOWN = $00,
    PCANTP_ISOTP_ADDRESSING_PHYSICAL = $01,
    PCANTP_ISOTP_ADDRESSING_FUNCTIONAL = $02
);
```

##### C#

```
public enum cantp_isotp_addressing : UInt32
{
    PCANTP_ISOTP_ADDRESSING_UNKNOWN = 0x00,
    PCANTP_ISOTP_ADDRESSING_PHYSICAL = 0x01,
    PCANTP_ISOTP_ADDRESSING_FUNCTIONAL = 0x02,
}
```

##### C++ / CLR

```
public enum cantp_isotp_addressing : UInt32
{
    PCANTP_ISOTP_ADDRESSING_UNKNOWN = 0x00,
    PCANTP_ISOTP_ADDRESSING_PHYSICAL = 0x01,
    PCANTP_ISOTP_ADDRESSING_FUNCTIONAL = 0x02,
};
```

##### Visual Basic

```
Public Enum cantp_isotp_addressing As UInt32
    PCANTP_ISOTP_ADDRESSING_UNKNOWN = &H0
    PCANTP_ISOTP_ADDRESSING_PHYSICAL = &H1
    PCANTP_ISOTP_ADDRESSING_FUNCTIONAL = &H2
End Enum
```

#### Values

Name	Value	Description
PCANTP_ISOTP_ADDRESSING_UNKNOWN	0x00	Unknown addressing format.
PCANTP_ISOTP_ADDRESSING_PHYSICAL	0x01	Physical addressing ("peer to peer").
PCANTP_ISOTP_ADDRESSING_FUNCTIONAL	0x02	Functional addressing ("peer to any").

### 3.6.6 cantp\_baudrate

Represents a PCAN Baud rate register value for PCANTP channel or PUDS channel.

#### Syntax

**C**

```
#define PCAN_BAUD_1M          0x0014U
#define PCAN_BAUD_800K       0x0016U
#define PCAN_BAUD_500K       0x001CU
#define PCAN_BAUD_250K       0x011CU
#define PCAN_BAUD_125K       0x031CU
#define PCAN_BAUD_100K       0x432FU
#define PCAN_BAUD_95K        0xC34EU
#define PCAN_BAUD_83K        0x852BU
#define PCAN_BAUD_50K        0x472FU
#define PCAN_BAUD_47K        0x1414U
#define PCAN_BAUD_33K        0x8B2FU
#define PCAN_BAUD_20K        0x532FU
#define PCAN_BAUD_10K        0x672FU
#define PCAN_BAUD_5K         0x7F7FU

typedef enum _cantp_baudrate {
    PCANTP_BAUDRATE_1M = PCAN_BAUD_1M,
    PCANTP_BAUDRATE_800K = PCAN_BAUD_800K,
    PCANTP_BAUDRATE_500K = PCAN_BAUD_500K,
    PCANTP_BAUDRATE_250K = PCAN_BAUD_250K,
    PCANTP_BAUDRATE_125K = PCAN_BAUD_125K,
    PCANTP_BAUDRATE_100K = PCAN_BAUD_100K,
    PCANTP_BAUDRATE_95K = PCAN_BAUD_95K,
    PCANTP_BAUDRATE_83K = PCAN_BAUD_83K,
    PCANTP_BAUDRATE_50K = PCAN_BAUD_50K,
    PCANTP_BAUDRATE_47K = PCAN_BAUD_47K,
    PCANTP_BAUDRATE_33K = PCAN_BAUD_33K,
    PCANTP_BAUDRATE_20K = PCAN_BAUD_20K,
    PCANTP_BAUDRATE_10K = PCAN_BAUD_10K,
    PCANTP_BAUDRATE_5K = PCAN_BAUD_5K,
} cantp_baudrate;
```

#### Pascal OO

```
cantp_baudrate = (
    PCANTP_BAUDRATE_1M = UInt32(PCAN_BAUD_1M),
    PCANTP_BAUDRATE_800K = UInt32(PCAN_BAUD_800K),
    PCANTP_BAUDRATE_500K = UInt32(PCAN_BAUD_500K),
    PCANTP_BAUDRATE_250K = UInt32(PCAN_BAUD_250K),
    PCANTP_BAUDRATE_125K = UInt32(PCAN_BAUD_125K),
    PCANTP_BAUDRATE_100K = UInt32(PCAN_BAUD_100K),
    PCANTP_BAUDRATE_95K = UInt32(PCAN_BAUD_95K),
    PCANTP_BAUDRATE_83K = UInt32(PCAN_BAUD_83K),
    PCANTP_BAUDRATE_50K = UInt32(PCAN_BAUD_50K),
    PCANTP_BAUDRATE_47K = UInt32(PCAN_BAUD_47K),
    PCANTP_BAUDRATE_33K = UInt32(PCAN_BAUD_33K),
    PCANTP_BAUDRATE_20K = UInt32(PCAN_BAUD_20K),
    PCANTP_BAUDRATE_10K = UInt32(PCAN_BAUD_10K),
    PCANTP_BAUDRATE_5K = UInt32(PCAN_BAUD_5K)
);
```

**C#**

```
public enum cantp_baudrate : UInt32
{
    PCANTP_BAUDRATE_1M = TPCANBaudrate.PCAN_BAUD_1M,
    PCANTP_BAUDRATE_800K = TPCANBaudrate.PCAN_BAUD_800K,
    PCANTP_BAUDRATE_500K = TPCANBaudrate.PCAN_BAUD_500K,
    PCANTP_BAUDRATE_250K = TPCANBaudrate.PCAN_BAUD_250K,
    PCANTP_BAUDRATE_125K = TPCANBaudrate.PCAN_BAUD_125K,
    PCANTP_BAUDRATE_100K = TPCANBaudrate.PCAN_BAUD_100K,
    PCANTP_BAUDRATE_95K = TPCANBaudrate.PCAN_BAUD_95K,
    PCANTP_BAUDRATE_83K = TPCANBaudrate.PCAN_BAUD_83K,
    PCANTP_BAUDRATE_50K = TPCANBaudrate.PCAN_BAUD_50K,
    PCANTP_BAUDRATE_47K = TPCANBaudrate.PCAN_BAUD_47K,
    PCANTP_BAUDRATE_33K = TPCANBaudrate.PCAN_BAUD_33K,
    PCANTP_BAUDRATE_20K = TPCANBaudrate.PCAN_BAUD_20K,
    PCANTP_BAUDRATE_10K = TPCANBaudrate.PCAN_BAUD_10K,
    PCANTP_BAUDRATE_5K = TPCANBaudrate.PCAN_BAUD_5K,
}
```

**C++ / CLR**

```
public enum cantp_baudrate : UInt32
{
    PCANTP_BAUDRATE_1M = (UInt32)TPCANBaudrate::PCAN_BAUD_1M,
    PCANTP_BAUDRATE_800K = (UInt32)TPCANBaudrate::PCAN_BAUD_800K,
    PCANTP_BAUDRATE_500K = (UInt32)TPCANBaudrate::PCAN_BAUD_500K,
    PCANTP_BAUDRATE_250K = (UInt32)TPCANBaudrate::PCAN_BAUD_250K,
    PCANTP_BAUDRATE_125K = (UInt32)TPCANBaudrate::PCAN_BAUD_125K,
    PCANTP_BAUDRATE_100K = (UInt32)TPCANBaudrate::PCAN_BAUD_100K,
    PCANTP_BAUDRATE_95K = (UInt32)TPCANBaudrate::PCAN_BAUD_95K,
    PCANTP_BAUDRATE_83K = (UInt32)TPCANBaudrate::PCAN_BAUD_83K,
    PCANTP_BAUDRATE_50K = (UInt32)TPCANBaudrate::PCAN_BAUD_50K,
    PCANTP_BAUDRATE_47K = (UInt32)TPCANBaudrate::PCAN_BAUD_47K,
    PCANTP_BAUDRATE_33K = (UInt32)TPCANBaudrate::PCAN_BAUD_33K,
    PCANTP_BAUDRATE_20K = (UInt32)TPCANBaudrate::PCAN_BAUD_20K,
    PCANTP_BAUDRATE_10K = (UInt32)TPCANBaudrate::PCAN_BAUD_10K,
    PCANTP_BAUDRATE_5K = (UInt32)TPCANBaudrate::PCAN_BAUD_5K,
};
```

**Visual Basic**

```
Public Enum cantp_baudrate : UInt32
    PCANTP_BAUDRATE_1M = TPCANBaudrate.PCAN_BAUD_1M
    PCANTP_BAUDRATE_800K = TPCANBaudrate.PCAN_BAUD_800K
    PCANTP_BAUDRATE_500K = TPCANBaudrate.PCAN_BAUD_500K
    PCANTP_BAUDRATE_250K = TPCANBaudrate.PCAN_BAUD_250K
    PCANTP_BAUDRATE_125K = TPCANBaudrate.PCAN_BAUD_125K
    PCANTP_BAUDRATE_100K = TPCANBaudrate.PCAN_BAUD_100K
    PCANTP_BAUDRATE_95K = TPCANBaudrate.PCAN_BAUD_95K
    PCANTP_BAUDRATE_83K = TPCANBaudrate.PCAN_BAUD_83K
    PCANTP_BAUDRATE_50K = TPCANBaudrate.PCAN_BAUD_50K
    PCANTP_BAUDRATE_47K = TPCANBaudrate.PCAN_BAUD_47K
    PCANTP_BAUDRATE_33K = TPCANBaudrate.PCAN_BAUD_33K
    PCANTP_BAUDRATE_20K = TPCANBaudrate.PCAN_BAUD_20K
    PCANTP_BAUDRATE_10K = TPCANBaudrate.PCAN_BAUD_10K
    PCANTP_BAUDRATE_5K = TPCANBaudrate.PCAN_BAUD_5K
End Enum
```

## values

Name	Value	Description
PCANTP_BAUDRATE_1M	20	1 Mbit/s
PCANTP_BAUDRATE_800K	22	800 kBit/s
PCANTP_BAUDRATE_500K	28	500 kBit/s
PCANTP_BAUDRATE_250K	284	250 kBit/s
PCANTP_BAUDRATE_125K	796	125 kBit/s
PCANTP_BAUDRATE_100K	17199	100 kBit/s
PCANTP_BAUDRATE_95K	49998	95,238 kBit/s
PCANTP_BAUDRATE_83K	34091	83,333 kBit/s
PCANTP_BAUDRATE_50K	18223	50 kBit/s
PCANTP_BAUDRATE_47K	5140	47,619 kBit/s
PCANTP_BAUDRATE_33K	35631	33,333 kBit/s
PCANTP_BAUDRATE_20K	21295	20 kBit/s
PCANTP_BAUDRATE_10K	26415	10 kBit/s
PCANTP_BAUDRATE_5K	32639	5 kBit/s

See also: `UDS_Initialize_2013` on page 624, **class method:** `Initialize_2013` on page 142.

### 3.6.7 cantp\_msg

A `cantp_msg` message is a generic CAN related message that can be either a standard CAN message, a CAN FD message, or an ISO-TP message. The structure `uds_msg` includes a `cantp_msg` (see `uds_msg` on page 21).

## Syntax

### C/C++

```
typedef struct _cantp_msg {
    cantp_msgtype type;
    cantp_msginfo reserved;
    cantp_can_info can_info;
    union {
        cantp_msgdata* any;
        cantp_msgdata_can* can;
        cantp_msgdata_canfd* canfd;
        cantp_msgdata_isotp* isotp;
    } msgdata;
} cantp_msg;
```

### Pascal OO

```
cantp_msg = record
    typem: cantp_msgtype;
    reserved: cantp_msginfo;
    can_info: cantp_can_info;
    case Integer of
        0:
            (msgdata_any: ^cantp_msgdata;);
        1:
            (msgdata_can: ^cantp_msgdata_can;);
        2:
            (msgdata_canfd: ^cantp_msgdata_canfd;);
        3:
            (msgdata_isotp: ^cantp_msgdata_isotp;);
    end;
```

**C#**

```
[StructLayout(LayoutKind.Sequential, Pack = 8)]
public struct cantp_msg
{
    [MarshalAs(UnmanagedType.U4)]
    public cantp_msgtype type;
    public cantp_msginfo reserved;
    public cantp_can_info can_info;
    private IntPtr msgdata;
    public IntPtr Msgdata
    {
        get { return msgdata; }
    }
    public cantp_msgdata Msgdata_any_Copy
    {
        get
        {
            return (cantp_msgdata)Marshal.PtrToStructure(msgdata, typeof(cantp_msgdata));
        }
    }
    public cantp_msgdata_can Msgdata_can_Copy
    {
        get
        {
            return (cantp_msgdata_can)Marshal.PtrToStructure(msgdata, typeof(cantp_msgdata_can));
        }
    }
    public cantp_msgdata_canfd Msgdata_canfd_Copy
    {
        get
        {
            return (cantp_msgdata_canfd)Marshal.PtrToStructure(msgdata, typeof(cantp_msgdata_canfd));
        }
    }
    public cantp_msgdata_isotp Msgdata_isotp_Copy
    {
        get
        {
            return (cantp_msgdata_isotp)Marshal.PtrToStructure(msgdata, typeof(cantp_msgdata_isotp));
        }
    }
}
```

**C++/CLR**

```
[StructLayout(LayoutKind::Explicit)]
public value struct cantp_msg_union_msgdata
{
    [FieldOffset(0)]
    cantp_msgdata *any;
    [FieldOffset(0)]
    cantp_msgdata_can *can;
    [FieldOffset(0)]
    cantp_msgdata_canfd *canfd;
    [FieldOffset(0)]
    cantp_msgdata_isotp *isotp;
};

[StructLayout(LayoutKind::Sequential, Pack = 8)]
public value struct cantp_msg
{

```

```
public:
    [MarshalAs(UnmanagedType::U4)]
    cantp_msgtype type;
    cantp_msginfo reserved;
    cantp_can_info can_info;
    cantp_msg_union_msgdata msgdata;
};
```

## Visual Basic

```
<StructLayout(LayoutKind.Sequential, Pack:=8)>
Public Structure cantp_msg

    <MarshalAs(UnmanagedType.U4)>
    Public type As cantp_msgtype
    Public reserved As cantp_msginfo
    Public can_info As cantp_can_info
    Private _msgdata As IntPtr
    Public ReadOnly Property Msgdata() As IntPtr
        Get
            Return _msgdata
        End Get
    End Property

    Public ReadOnly Property Msgdata_any_Copy() As cantp_msgdata
        Get
            Return CType(Marshal.PtrToStructure(_msgdata, GetType(cantp_msgdata)), cantp_msgdata)
        End Get
    End Property

    Public ReadOnly Property Msgdata_can_Copy() As cantp_msgdata_can
        Get
            Return CType(Marshal.PtrToStructure(_msgdata, GetType(cantp_msgdata_can)),
                cantp_msgdata_can)
        End Get
    End Property

    Public ReadOnly Property Msgdata_canfd_Copy() As cantp_msgdata_canfd
        Get
            Return CType(Marshal.PtrToStructure(_msgdata, GetType(cantp_msgdata_canfd)),
                cantp_msgdata_canfd)
        End Get
    End Property

    Public ReadOnly Property Msgdata_isotp_Copy() As cantp_msgdata_isotp
        Get
            Return CType(Marshal.PtrToStructure(_msgdata, GetType(cantp_msgdata_isotp)),
                cantp_msgdata_isotp)
        End Get
    End Property
End Structure
```

## Fields

Name	Description
type	Type of the message (see cantp_msgtype on page 123).
reserved	PCAN-ISO-TP 3.x API reserved miscellaneous read-only information.
can_info	Common CAN information (see cantp_can_info on page 124).
any	Shortcut to access message data as Generic content (see cantp_msgdata on page 125).
can	Shortcut to access message data as CAN content (see cantp_msgdata_can on page 126).
canfd	Shortcut to access message data as CAN FD content (see cantp_msgdata_canfd on page 128).



Name	Description
isotp	Shortcut to access message data as ISO-TP content (see <code>cantp_msgdata_isotp</code> on page 129).

See also: `uds_msg` on page 21.

### 3.6.8 `cantp_can_msgtype`

Represents the flags of a CAN or CAN FD message (must be used as flags for ex. `EXTENDED|FD|BRS`.) (see field `cantp_msg.can_info.can_msgtype` in `cantp_msg` on page 118).

#### Syntax

##### C/C++

```
#define PCAN_MESSAGE_STANDARD      0x00U
#define PCAN_MESSAGE_RTR          0x01U
#define PCAN_MESSAGE_EXTENDED    0x02U
#define PCAN_MESSAGE_FD          0x04U
#define PCAN_MESSAGE_BRS         0x08U
#define PCAN_MESSAGE_ESI         0x10U
#define PCAN_MESSAGE_ERRFRAME    0x40U
#define PCAN_MESSAGE_STATUS      0x80U
typedef enum _cantp_can_msgtype {
    PCANTP_CAN_MSGTYPE_STANDARD = PCAN_MESSAGE_STANDARD,
    PCANTP_CAN_MSGTYPE_RTR      = PCAN_MESSAGE_RTR,
    PCANTP_CAN_MSGTYPE_EXTENDED = PCAN_MESSAGE_EXTENDED,
    PCANTP_CAN_MSGTYPE_FD       = PCAN_MESSAGE_FD,
    PCANTP_CAN_MSGTYPE_BRS      = PCAN_MESSAGE_BRS,
    PCANTP_CAN_MSGTYPE_ESI      = PCAN_MESSAGE_ESI,
    PCANTP_CAN_MSGTYPE_ERRFRAME = PCAN_MESSAGE_ERRFRAME,
    PCANTP_CAN_MSGTYPE_STATUS   = PCAN_MESSAGE_STATUS,
    PCANTP_CAN_MSGTYPE_SELFRECEIVE = 0xC0U,
    PCANTP_CAN_MSGTYPE_FLAG_INFO = (PCAN_MESSAGE_ERRFRAME | PCAN_MESSAGE_STATUS)
} cantp_can_msgtype;
```

##### Pascal OO

```
cantp_can_msgtype = (
    PCANTP_CAN_MSGTYPE_STANDARD = UInt32(PCAN_MESSAGE_STANDARD),
    PCANTP_CAN_MSGTYPE_RTR      = UInt32(PCAN_MESSAGE_RTR),
    PCANTP_CAN_MSGTYPE_EXTENDED = UInt32(PCAN_MESSAGE_EXTENDED),
    PCANTP_CAN_MSGTYPE_FD       = UInt32(PCAN_MESSAGE_FD),
    PCANTP_CAN_MSGTYPE_BRS      = UInt32(PCAN_MESSAGE_BRS),
    PCANTP_CAN_MSGTYPE_ESI      = UInt32(PCAN_MESSAGE_ESI),
    PCANTP_CAN_MSGTYPE_ERRFRAME = UInt32(PCAN_MESSAGE_ERRFRAME),
    PCANTP_CAN_MSGTYPE_STATUS   = UInt32(PCAN_MESSAGE_STATUS),
    PCANTP_CAN_MSGTYPE_SELFRECEIVE = UInt32($C0),
    PCANTP_CAN_MSGTYPE_FLAG_INFO = (UInt32(PCAN_MESSAGE_ERRFRAME)
    Or UInt32(PCAN_MESSAGE_STATUS))
);
```

##### C#

```
public enum cantp_can_msgtype : UInt32
{
    PCANTP_CAN_MSGTYPE_STANDARD = TPCANMessageType.PCAN_MESSAGE_STANDARD,
    PCANTP_CAN_MSGTYPE_RTR      = TPCANMessageType.PCAN_MESSAGE_RTR,
    PCANTP_CAN_MSGTYPE_EXTENDED = TPCANMessageType.PCAN_MESSAGE_EXTENDED,
    PCANTP_CAN_MSGTYPE_FD       = TPCANMessageType.PCAN_MESSAGE_FD,
    PCANTP_CAN_MSGTYPE_BRS      = TPCANMessageType.PCAN_MESSAGE_BRS,
    PCANTP_CAN_MSGTYPE_ESI      = TPCANMessageType.PCAN_MESSAGE_ESI,
```

```

PCANTP_CAN_MSGTYPE_ERRFRAME = TPCANMessageType.PCAN_MESSAGE_ERRFRAME,
PCANTP_CAN_MSGTYPE_STATUS = TPCANMessageType.PCAN_MESSAGE_STATUS,
PCANTP_CAN_MSGTYPE_SELFRECEIVE = 0xC0,
PCANTP_CAN_MSGTYPE_FLAG_INFO = (TPCANMessageType.PCAN_MESSAGE_ERRFRAME
    | TPCANMessageType.PCAN_MESSAGE_STATUS)
}

```

## C++ / CLR

```

public enum cantp_can_msgtype : UInt32
{
    PCANTP_CAN_MSGTYPE_STANDARD = (UInt32)TPCANMessageType::PCAN_MESSAGE_STANDARD,
    PCANTP_CAN_MSGTYPE_RTR = (UInt32)TPCANMessageType::PCAN_MESSAGE_RTR,
    PCANTP_CAN_MSGTYPE_EXTENDED = (UInt32)TPCANMessageType::PCAN_MESSAGE_EXTENDED,
    PCANTP_CAN_MSGTYPE_FD = (UInt32)TPCANMessageType::PCAN_MESSAGE_FD,
    PCANTP_CAN_MSGTYPE_BRS = (UInt32)TPCANMessageType::PCAN_MESSAGE_BRS,
    PCANTP_CAN_MSGTYPE_ESI = (UInt32)TPCANMessageType::PCAN_MESSAGE_ESI,
    PCANTP_CAN_MSGTYPE_ERRFRAME = (UInt32)TPCANMessageType::PCAN_MESSAGE_ERRFRAME,
    PCANTP_CAN_MSGTYPE_STATUS = (UInt32)TPCANMessageType::PCAN_MESSAGE_STATUS,
    PCANTP_CAN_MSGTYPE_SELFRECEIVE = 0xC0,
    PCANTP_CAN_MSGTYPE_FLAG_INFO = ((UInt32)TPCANMessageType::PCAN_MESSAGE_ERRFRAME
        | (UInt32)TPCANMessageType::PCAN_MESSAGE_STATUS)
};

```

## Visual Basic

```

Public Enum cantp_can_msgtype As UInt32
    PCANTP_CAN_MSGTYPE_STANDARD = TPCANMessageType.PCAN_MESSAGE_STANDARD
    PCANTP_CAN_MSGTYPE_RTR = TPCANMessageType.PCAN_MESSAGE_RTR
    PCANTP_CAN_MSGTYPE_EXTENDED = TPCANMessageType.PCAN_MESSAGE_EXTENDED
    PCANTP_CAN_MSGTYPE_FD = TPCANMessageType.PCAN_MESSAGE_FD
    PCANTP_CAN_MSGTYPE_BRS = TPCANMessageType.PCAN_MESSAGE_BRS
    PCANTP_CAN_MSGTYPE_ESI = TPCANMessageType.PCAN_MESSAGE_ESI
    PCANTP_CAN_MSGTYPE_ERRFRAME = TPCANMessageType.PCAN_MESSAGE_ERRFRAME
    PCANTP_CAN_MSGTYPE_STATUS = TPCANMessageType.PCAN_MESSAGE_STATUS
    PCANTP_CAN_MSGTYPE_SELFRECEIVE = &HC0
    PCANTP_CAN_MSGTYPE_FLAG_INFO = (TPCANMessageType.PCAN_MESSAGE_ERRFRAME
        Or TPCANMessageType.PCAN_MESSAGE_STATUS)
End Enum

```

## Values

Name	Value	Description
PCANTP_CAN_MSGTYPE_STANDARD	0x00	The PCAN message is a CAN Standard Frame (11-bit identifier).
PCANTP_CAN_MSGTYPE_RTR	0x01	The PCAN message is a CAN Remote-Transfer-Request Frame.
PCANTP_CAN_MSGTYPE_EXTENDED	0x02	The PCAN message is a CAN Extended Frame (29-bit identifier).
PCANTP_CAN_MSGTYPE_FD	0x04	The PCAN message represents a FD frame in terms of CiA Specs.
PCANTP_CAN_MSGTYPE_BRS	0x08	The PCAN message represents a FD bit rate switch (CAN data at a higher bit rate).
PCANTP_CAN_MSGTYPE_ESI	0x10	The PCAN message represents a FD error state indicator (CAN FD transmitter was error active).
PCANTP_CAN_MSGTYPE_ERRFRAME	0x40	The PCAN message represents an error frame.
PCANTP_CAN_MSGTYPE_STATUS	0x80	The PCAN message represents a PCAN status message.
PCANTP_CAN_MSGTYPE_SELFRECEIVE	0xC0	The PCAN message represents a self-received (Tx-loopback) message.
PCANTP_CAN_MSGTYPE_FLAG_INFO	0xC0	Mask filtering error frame messages and status messages.

**See also:** [cantp\\_msg](#) on page 118, [cantp\\_can\\_info](#) on page 124.

### 3.6.9 cantp\_msgtype

Represents the type of a PCANTP message (see field `type` in `cantp_msg` on page 118).

#### Syntax

##### C/C++

```
typedef enum _cantp_msgtype {
    PCANTP_MSGTYPE_NONE = 0,
    PCANTP_MSGTYPE_CAN = 1,
    PCANTP_MSGTYPE_CANFD = 2,
    PCANTP_MSGTYPE_ISOTP = 4,
    PCANTP_MSGTYPE_FRAME = PCANTP_MSGTYPE_CAN | PCANTP_MSGTYPE_CANFD,
    PCANTP_MSGTYPE_ANY = PCANTP_MSGTYPE_FRAME | PCANTP_MSGTYPE_ISOTP | 0xFFFFFFFF
} cantp_msgtype;
```

##### Pascal OO

```
cantp_msgtype = (
    PCANTP_MSGTYPE_NONE = 0,
    PCANTP_MSGTYPE_CAN = 1,
    PCANTP_MSGTYPE_CANFD = 2,
    PCANTP_MSGTYPE_ISOTP = 4,
    PCANTP_MSGTYPE_FRAME = UInt32(PCANTP_MSGTYPE_CAN) Or UInt32(PCANTP_MSGTYPE_CANFD),
    PCANTP_MSGTYPE_ANY = UInt32(PCANTP_MSGTYPE_FRAME) Or UInt32(PCANTP_MSGTYPE_ISOTP)
    Or UInt32($FFFFFFFF)
);
```

##### C#

```
[Flags]
public enum cantp_msgtype : UInt32
{
    PCANTP_MSGTYPE_NONE = 0,
    PCANTP_MSGTYPE_CAN = 1,
    PCANTP_MSGTYPE_CANFD = 2,
    PCANTP_MSGTYPE_ISOTP = 4,
    PCANTP_MSGTYPE_FRAME = PCANTP_MSGTYPE_CAN | PCANTP_MSGTYPE_CANFD,
    PCANTP_MSGTYPE_ANY = PCANTP_MSGTYPE_FRAME | PCANTP_MSGTYPE_ISOTP | 0xFFFFFFFF
}
```

##### C++ / CLR

```
public enum cantp_msgtype : UInt32
{
    PCANTP_MSGTYPE_NONE = 0,
    PCANTP_MSGTYPE_CAN = 1,
    PCANTP_MSGTYPE_CANFD = 2,
    PCANTP_MSGTYPE_ISOTP = 4,
    PCANTP_MSGTYPE_FRAME = PCANTP_MSGTYPE_CAN | PCANTP_MSGTYPE_CANFD,
    PCANTP_MSGTYPE_ANY = PCANTP_MSGTYPE_FRAME | PCANTP_MSGTYPE_ISOTP | 0xFFFFFFFF
};
```

##### Visual Basic

```
<Flags()>
Public Enum cantp_msgtype As UInt32
    PCANTP_MSGTYPE_NONE = 0
    PCANTP_MSGTYPE_CAN = 1
    PCANTP_MSGTYPE_CANFD = 2
    PCANTP_MSGTYPE_ISOTP = 4
```

```
PCANTP_MSGTYPE_FRAME = PCANTP_MSGTYPE_CAN Or PCANTP_MSGTYPE_CANFD
PCANTP_MSGTYPE_ANY = PCANTP_MSGTYPE_FRAME Or PCANTP_MSGTYPE_ISOTP Or &HFFFFFFFUI
```

End Enum

## Values

Name	Value	Description
PCANTP_MSGTYPE_NONE	0x00000000	Uninitialized message (data is NULL).
PCANTP_MSGTYPE_CAN	0x00000001	Standard CAN message.
PCANTP_MSGTYPE_CANFD	0x00000002	CAN message with FD support.
PCANTP_MSGTYPE_ISOTP	0x00000004	PCAN-ISO-TP message (ISO:15765).
PCANTP_MSGTYPE_FRAME	0x00000003	Frame only: unsegmented messages.
PCANTP_MSGTYPE_ANY	0xFFFFFFFF	Any supported message types.

See also: `cantp_msg` on page 118.

### 3.6.10 cantp\_can\_info

Represents common CAN information.

#### Syntax

##### C/C++

```
typedef struct _cantp_can_info {
    uint32_t can_id;
    cantp_can_msgtype can_msgtype;
    uint8_t dlc;
} cantp_can_info;
```

##### Pascal OO

```
cantp_can_info = record
    can_id: UInt32;
    can_msgtype: cantp_can_msgtype;
    dlc: Byte;
end;
```

##### C#

```
[StructLayout(LayoutKind.Sequential, Pack = 8)]
public struct cantp_can_info
{
    public UInt32 can_id;
    [MarshalAs(UnmanagedType.U4)]
    public cantp_can_msgtype can_msgtype;
    public byte dlc;
}
```

##### C++/CLR

```
[StructLayout(LayoutKind::Sequential, Pack = 8)]
public value struct cantp_can_info
{
    UInt32 can_id;
    [MarshalAs(UnmanagedType::U4)]
    cantp_can_msgtype can_msgtype;
    Byte dlc;
};
```

## Visual Basic

```
<StructLayout(LayoutKind.Sequential, Pack:=8)>
Public Structure cantp_can_info
    Public can_id As UInt32
    <MarshalAs(UnmanagedType.U4)>
    Public can_msgtype As cantp_can_msgtype
    Public dlc As Byte
End Structure
```

## Fields

Name	Description
can_id	CAN identifier.
can_msgtype	Type and flags of the CAN/CAN FD frame (see cantp_can_msgtype on page 121).
dlc	Data Length Code of the frame.

## Remarks

Specifying a non-zero `dlc` value when writing an ISO-TP message will override the value `can_tx_dlc` of its corresponding mapping (if it exists) and the value of parameter `PUDS_PARAMETER_CAN_TX_DL`.

**See also:** `cantp_msg` on page 118, `uds_mapping` on page 25.

### 3.6.11 cantp\_msgdata

Represents the content of a generic PCANTP message.

## Syntax

### C/C++

```
typedef struct _cantp_msgdata {
    cantp_msgflag flags;
    uint32_t length;
    uint8_t* data;
    cantp_netstatus netstatus;
    cantp_msgoption_list* options;
} cantp_msgdata;
```

### Pascal OO

```
cantp_msgdata = record
    flags: cantp_msgflag;
    length: UInt32;
    data: ^Byte;
    netstatus: cantp_netstatus;
    options: ^cantp_msgoption_list;
end;
```

### C#

```
[StructLayout(LayoutKind.Sequential, Pack = 8)]
public struct cantp_msgdata
{
    [MarshalAs(UnmanagedType.U4)]
    public cantp_msgflag flags;
    public UInt32 length;
    public IntPtr data;
    [MarshalAs(UnmanagedType.U4)]
```

```

    public cantp_netstatus netstatus;
    public IntPtr options;
}

```

### C++/CLR

```

[StructLayout(LayoutKind::Sequential, Pack = 8)]
public value struct cantp_msgdata
{
    [MarshalAs(UnmanagedType::U4)]
    cantp_msgflag flags;
    UInt32 length;
    Byte *data;
    [MarshalAs(UnmanagedType::U4)]
    cantp_netstatus netstatus;
    cantp_msgoption_list *options;
};

```

### Visual Basic

```

<StructLayout(LayoutKind.Sequential, Pack:=8)>
Public Structure cantp_msgdata
    <MarshalAs(UnmanagedType.U4)>
    Public flags As cantp_msgflag
    Public length As UInt32
    Public data As IntPtr
    <MarshalAs(UnmanagedType.U4)>
    Public netstatus As cantp_netstatus
    Public options As IntPtr
End Structure

```

## Fields

Name	Description
flags	Structure specific flags (see cantp_msgflag on page 131).
Length	Length of the message.
Data	Data of the message.
Netstatus	Network status (see cantp_netstatus on page 132).
Options	Defines specific options to override global message configuration (not used with UDS_Scv*).

**See also:** `cantp_msg` on page 118.

### 3.6.12 cantp\_msgdata\_can

Represents the content of a standard CAN message.

## Syntax

### C/C++

```

typedef struct _cantp_msgdata_can {
    cantp_msgflag flags;
    uint32_t length;
    uint8_t* data;
    cantp_netstatus netstatus;
    cantp_msgoption_list* options;
    uint8_t data_max[PCANTP_MAX_LENGTH_CAN_STANDARD];
} cantp_msgdata_can;

```

## Pascal OO

```
cantp_msgdata_can = record
    flags: cantp_msgflag;
    length: UInt32;
    data: ^Byte;
    netstatus: cantp_netstatus;
    options: ^cantp_msgoption_list;
    data_max: array [0 .. PCANTP_MAX_LENGTH_CAN_STANDARD - 1] of Byte;
end;
```

## C#

```
[StructLayout(LayoutKind.Sequential, Pack = 8)]
public struct cantp_msgdata_can
{
    [MarshalAs(UnmanagedType.U4)]
    public cantp_msgflag flags;
    public UInt32 length;
    public IntPtr data;
    [MarshalAs(UnmanagedType.U4)]
    public cantp_netstatus netstatus;
    public IntPtr options;
    [MarshalAs(UnmanagedType.ByValArray, SizeConst = CanTpApi.PCANTP_MAX_LENGTH_CAN_STANDARD)]
    public byte[] data_max;
}
```

## C++/CLR

```
public struct cantp_msgdata_can
{
    [MarshalAs(UnmanagedType::U4)]
    cantp_msgflag flags;
    UInt32 length;
    Byte *data;
    [MarshalAs(UnmanagedType::U4)]
    cantp_netstatus netstatus;
    cantp_msgoption_list *options;
    [MarshalAs(UnmanagedType::ByValArray, SizeConst = 8)]
    Byte data_max[];
};
```

## Visual Basic

```
<StructLayout(LayoutKind.Sequential, Pack:=8)>
Public Structure cantp_msgdata_can
    <MarshalAs(UnmanagedType.U4)>
    Public flags As cantp_msgflag
    Public length As UInt32
    Public data As IntPtr
    <MarshalAs(UnmanagedType.U4)>
    Public netstatus As cantp_netstatus
    Public options As IntPtr
    <MarshalAs(UnmanagedType.ByValArray, SizeConst:=CanTpApi.PCANTP_MAX_LENGTH_CAN_STANDARD)>
    Public data_max As Byte()
End Structure
```

## Fields

Name	Description
flags	Structure specific flags (see <code>cantp_msgflag</code> on page 131).
length	Length of the message (0..8).
data	Data of the message.
netstatus	Network status. (see <code>cantp_netstatus</code> on page 132).
options	Defines specific options to override global CAN configuration (not used yet).
data_max	Data of the message ( <code>data[0]..data[7]</code> ).

**See also:** `cantp_msg` on page 118, `cantp_msgdata` on page 125.

### 3.6.13 `cantp_msgdata_canfd`

Represents the content of a CAN FD message.

#### Syntax

##### C/C++

```
typedef struct _cantp_msgdata_canfd {
    cantp_msgflag flags;
    uint32_t length;
    uint8_t* data;
    cantp_netstatus netstatus;
    cantp_msgoption_list* options;
    uint8_t data_max[PCANTP_MAX_LENGTH_CAN_FD];
} cantp_msgdata_canfd;
```

##### Pascal OO

```
cantp_msgdata_canfd = record
    flags: cantp_msgflag;
    length: UInt32;
    data: ^Byte;
    netstatus: cantp_netstatus;
    options: ^cantp_msgoption_list;
    data_max: array [0 .. PCANTP_MAX_LENGTH_CAN_FD - 1] of Byte;
end;
```

##### C#

```
[StructLayout(LayoutKind.Sequential, Pack = 8)]
public struct cantp_msgdata_canfd
{
    [MarshalAs(UnmanagedType.U4)]
    public cantp_msgflag flags;
    public UInt32 length;
    public IntPtr data;
    [MarshalAs(UnmanagedType.U4)]
    public cantp_netstatus netstatus;
    public IntPtr options;
    [MarshalAs(UnmanagedType.ByValArray, SizeConst = CanTpApi.PCANTP_MAX_LENGTH_CAN_FD)]
    public byte[] data_max;
}
```



**C++/CLR**

```
public struct cantp_msgdata_canfd
{
    [MarshalAs(UnmanagedType::U4)]
    cantp_msgflag flags;
    UInt32 length;
    Byte *data;
    [MarshalAs(UnmanagedType::U4)]
    cantp_netstatus netstatus;
    cantp_msgoption_list *options;
    [MarshalAs(UnmanagedType::ByValArray, SizeConst = 64)]
    Byte data_max[];
};
```

**Visual Basic**

```
<StructLayout(LayoutKind.Sequential, Pack:=8)>
Public Structure cantp_msgdata_canfd
    <MarshalAs(UnmanagedType.U4)>
    Public flags As cantp_msgflag
    Public length As UInt32
    Public data As IntPtr
    <MarshalAs(UnmanagedType.U4)>
    Public netstatus As cantp_netstatus
    Public options As IntPtr
    <MarshalAs(UnmanagedType.ByValArray, SizeConst:=CanTpApi.PCANTP_MAX_LENGTH_CAN_FD)>
    Public data_max As Byte()
End Structure
```

**Fields**

Name	Description
flags	Structure specific flags (see cantp_msgflag on page 131).
length	Length of the message (0..64).
data	Data of the message.
netstatus	Network status (see cantp_netstatus on page 132).
options	Defines specific options to override global CAN configuration (not used yet).
data_max	Data of the message (data[0]..data[63]).

**See also:** `cantp_msg` on page 118, `cantp_msgdata` on page 125.

**3.6.14 cantp\_msgdata\_isotp**

Represents the content of an ISO-TP message.

**Syntax****C/C++**

```
typedef struct _cantp_msgdata_isotp {
    cantp_msgflag flags;
    uint32_t length;
    uint8_t* data;
    cantp_netstatus netstatus;
    cantp_msgoption_list* options;
    cantp_netaddrinfo netaddrinfo;
    cantp_isotp_info reserved;
} cantp_msgdata_isotp;
```

## Pascal OO

```
cantp_msgdata_isotp = record
  flags: cantp_msgflag;
  length: UInt32;
  data: ^Byte;
  netstatus: cantp_netstatus;
  options: ^cantp_msgoption_list;
  netaddrinfo: cantp_netaddrinfo;
  reserved: cantp_isotp_info;
end;
```

## C#

```
[StructLayout(LayoutKind.Sequential, Pack = 8)]
public struct cantp_msgdata_isotp
{
    [MarshalAs(UnmanagedType.U4)]
    public cantp_msgflag flags;
    public UInt32 length;
    public IntPtr data;
    [MarshalAs(UnmanagedType.U4)]
    public cantp_netstatus netstatus;
    public IntPtr options;
    public cantp_netaddrinfo netaddrinfo;
    public cantp_isotp_info reserved;
}
```

## C++/CLR

```
[StructLayout(LayoutKind::Sequential, Pack = 8)]
public value struct cantp_msgdata_isotp
{
    [MarshalAs(UnmanagedType::U4)]
    cantp_msgflag flags;
    UInt32 length;
    Byte *data;
    [MarshalAs(UnmanagedType::U4)]
    cantp_netstatus netstatus;
    cantp_msgoption_list *options;
    cantp_netaddrinfo netaddrinfo;
    cantp_isotp_info reserved;
};
```

## Visual Basic

```
<StructLayout(LayoutKind.Sequential, Pack:=8)>
Public Structure cantp_msgdata_isotp
    <MarshalAs(UnmanagedType.U4)>
    Public flags As cantp_msgflag
    Public length As UInt32
    Public data As IntPtr
    <MarshalAs(UnmanagedType.U4)>
    Public netstatus As cantp_netstatus
    Public options As IntPtr
    Public netaddrinfo As cantp_netaddrinfo
    Public reserved As cantp_isotp_info
End Structure
```

## Fields

Name	Description
flags	Structure specific flags (see <code>cantp_msgflag</code> on page 131).
length	Length of the data.
data	Data of the message.
netstatus	Network status (see <code>cantp_netstatus</code> on page 132).
options	Defines specific options to override global CAN configuration (not used in UDS_Scv* functions).
netaddrinfo	PCAN-ISO-TP 3.x network address information (see <code>cantp_netaddrinfo</code> on page 134).
reserved	Reserved PCAN-ISO-TP 3.x information.

**See also:** `cantp_msg` on page 118, `cantp_msgdata` on page 125.

### 3.6.15 `cantp_msgflag`

Represents the flags common to all types of `cantp_msg` (see field `cantp_msg.msgdata.flags` on page 118).

## Syntax

### C/C++

```
typedef enum _cantp_msgflag {
    PCANTP_MSGFLAG_NONE = 0,
    PCANTP_MSGFLAG_LOOPBACK = 1,
    PCANTP_MSGFLAG_ISOTP_FRAME = 2,
} cantp_msgflag;
```

### Pascal OO

```
cantp_msgflag = (
    PCANTP_MSGFLAG_NONE = 0,
    PCANTP_MSGFLAG_LOOPBACK = 1,
    PCANTP_MSGFLAG_ISOTP_FRAME = 2
);
```

### C#

```
public enum cantp_msgflag : UInt32
{
    PCANTP_MSGFLAG_NONE = 0,
    PCANTP_MSGFLAG_LOOPBACK = 1,
    PCANTP_MSGFLAG_ISOTP_FRAME = 2,
}
```

### C++ / CLR

```
public enum cantp_msgflag : UInt32
{
    PCANTP_MSGFLAG_NONE = 0,
    PCANTP_MSGFLAG_LOOPBACK = 1,
    PCANTP_MSGFLAG_ISOTP_FRAME = 2,
};
```

## Visual Basic

```
Public Enum cantp_msgflag As UInt32
    PCANTP_MSGFLAG_NONE = 0
    PCANTP_MSGFLAG_LOOPBACK = 1
    PCANTP_MSGFLAG_ISOTP_FRAME = 2
End Enum
```

## Values

Name	Value	Description
PCANTP_MSGFLAG_NONE	0	No flag.
PCANTP_MSGFLAG_LOOPBACK	1	Message is the confirmation of a transmitted message.
PCANTP_MSGFLAG_ISOTP_FRAME	2	Message is a frame of a segmented ISO-TP message.

**See also:** `cantp_msg` on page 118, `cantp_msgdata` on page 125.

### 3.6.16 cantp\_netstatus

Represents the network result of the communication of a PCANTP message.

## Syntax

### C/C++

```
typedef enum _cantp_netstatus {
    PCANTP_NETSTATUS_OK = 0x00,
    PCANTP_NETSTATUS_TIMEOUT_A = 0x01,
    PCANTP_NETSTATUS_TIMEOUT_Bs = 0x02,
    PCANTP_NETSTATUS_TIMEOUT_Cr = 0x03,
    PCANTP_NETSTATUS_WRONG_SN = 0x04,
    PCANTP_NETSTATUS_INVALID_FS = 0x05,
    PCANTP_NETSTATUS_UNEXP_PDU = 0x06,
    PCANTP_NETSTATUS_WFT_OVRN = 0x07,
    PCANTP_NETSTATUS_BUFFER_OVFLW = 0x08,
    PCANTP_NETSTATUS_ERROR = 0x09,
    PCANTP_NETSTATUS_IGNORED = 0x0A,
    PCANTP_NETSTATUS_TIMEOUT_As = 0x10,
    PCANTP_NETSTATUS_TIMEOUT_Ar = 0x11,
    PCANTP_NETSTATUS_XMT_FULL = 0x11,
    PCANTP_NETSTATUS_BUS_ERROR = 0x12,
    PCANTP_NETSTATUS_NO_MEMORY = 0x13,
} cantp_netstatus;
```

### Pascal OO

```
cantp_netstatus = (
    PCANTP_NETSTATUS_OK = $00,
    PCANTP_NETSTATUS_TIMEOUT_A = $01,
    PCANTP_NETSTATUS_TIMEOUT_Bs = $02,
    PCANTP_NETSTATUS_TIMEOUT_Cr = $03,
    PCANTP_NETSTATUS_WRONG_SN = $04,
    PCANTP_NETSTATUS_INVALID_FS = $05,
    PCANTP_NETSTATUS_UNEXP_PDU = $06,
    PCANTP_NETSTATUS_WFT_OVRN = $07,
    PCANTP_NETSTATUS_BUFFER_OVFLW = $08,
    PCANTP_NETSTATUS_ERROR = $09,
    PCANTP_NETSTATUS_IGNORED = $0A,
    PCANTP_NETSTATUS_TIMEOUT_As = $10,
    PCANTP_NETSTATUS_TIMEOUT_Ar = $11,
    PCANTP_NETSTATUS_XMT_FULL = $11,
```

```

PCANTP_NETSTATUS_BUS_ERROR = $12,
PCANTP_NETSTATUS_NO_MEMORY = $13
);

```

**C#**

```

public enum cantp_netstatus : UInt32
{
    PCANTP_NETSTATUS_OK = 0x00,
    PCANTP_NETSTATUS_TIMEOUT_A = 0x01,
    PCANTP_NETSTATUS_TIMEOUT_Bs = 0x02,
    PCANTP_NETSTATUS_TIMEOUT_Cr = 0x03,
    PCANTP_NETSTATUS_WRONG_SN = 0x04,
    PCANTP_NETSTATUS_INVALID_FS = 0x05,
    PCANTP_NETSTATUS_UNEXP_PDU = 0x06,
    PCANTP_NETSTATUS_WFT_OVRN = 0x07,
    PCANTP_NETSTATUS_BUFFER_OVFLW = 0x08,
    PCANTP_NETSTATUS_ERROR = 0x09,
    PCANTP_NETSTATUS_IGNORED = 0x0A,
    PCANTP_NETSTATUS_TIMEOUT_As = 0x10,
    PCANTP_NETSTATUS_TIMEOUT_Ar = 0x11,
    PCANTP_NETSTATUS_XMT_FULL = 0x11,
    PCANTP_NETSTATUS_BUS_ERROR = 0x12,
    PCANTP_NETSTATUS_NO_MEMORY = 0x13,
}

```

**C++ / CLR**

```

public enum cantp_netstatus : UInt32
{
    PCANTP_NETSTATUS_OK = 0x00,
    PCANTP_NETSTATUS_TIMEOUT_A = 0x01,
    PCANTP_NETSTATUS_TIMEOUT_Bs = 0x02,
    PCANTP_NETSTATUS_TIMEOUT_Cr = 0x03,
    PCANTP_NETSTATUS_WRONG_SN = 0x04,
    PCANTP_NETSTATUS_INVALID_FS = 0x05,
    PCANTP_NETSTATUS_UNEXP_PDU = 0x06,
    PCANTP_NETSTATUS_WFT_OVRN = 0x07,
    PCANTP_NETSTATUS_BUFFER_OVFLW = 0x08,
    PCANTP_NETSTATUS_ERROR = 0x09,
    PCANTP_NETSTATUS_IGNORED = 0x0A,
    PCANTP_NETSTATUS_TIMEOUT_As = 0x10,
    PCANTP_NETSTATUS_TIMEOUT_Ar = 0x11,
    PCANTP_NETSTATUS_XMT_FULL = 0x11,
    PCANTP_NETSTATUS_BUS_ERROR = 0x12,
    PCANTP_NETSTATUS_NO_MEMORY = 0x13,
};

```

**Visual Basic**

```

Public Enum cantp_netstatus As UInt32
    PCANTP_NETSTATUS_OK = &H0
    PCANTP_NETSTATUS_TIMEOUT_A = &H1
    PCANTP_NETSTATUS_TIMEOUT_Bs = &H2
    PCANTP_NETSTATUS_TIMEOUT_Cr = &H3
    PCANTP_NETSTATUS_WRONG_SN = &H4
    PCANTP_NETSTATUS_INVALID_FS = &H5
    PCANTP_NETSTATUS_UNEXP_PDU = &H6
    PCANTP_NETSTATUS_WFT_OVRN = &H7
    PCANTP_NETSTATUS_BUFFER_OVFLW = &H8
    PCANTP_NETSTATUS_ERROR = &H9
    PCANTP_NETSTATUS_IGNORED = &HA
    PCANTP_NETSTATUS_TIMEOUT_As = &H10
    PCANTP_NETSTATUS_TIMEOUT_Ar = &H11

```

```
PCANTP_NETSTATUS_XMT_FULL = &H11
PCANTP_NETSTATUS_BUS_ERROR = &H12
PCANTP_NETSTATUS_NO_MEMORY = &H13
```

End Enum

## Values

Name	Value	Description
PCANTP_NETSTATUS_OK	0x00	No network errors.
PCANTP_NETSTATUS_TIMEOUT_A	0x01	Timeout occurred between 2 frames transmission (sender and receiver side).
PCANTP_NETSTATUS_TIMEOUT_Bs	0x02	Sender side timeout while waiting for flow control frame.
PCANTP_NETSTATUS_TIMEOUT_Cr	0x03	Receiver side timeout while waiting for consecutive frame.
PCANTP_NETSTATUS_WRONG_SN	0x04	Unexpected sequence number.
PCANTP_NETSTATUS_INVALID_FS	0x05	Invalid or unknown FlowStatus.
PCANTP_NETSTATUS_UNEXP_PDU	0x06	Unexpected protocol data unit.
PCANTP_NETSTATUS_WFT_OVRN	0x07	Reception of flow control WAIT frame that exceeds the maximum counter defined by PCANTP_PARAMETER_WFT_MAX.
PCANTP_NETSTATUS_BUFFER_OVFLW	0x08	Buffer on the receiver side cannot store the data length (server side only).
PCANTP_NETSTATUS_ERROR	0x09	General error.
PCANTP_NETSTATUS_IGNORED	0x0A	Message was invalid and ignored.
PCANTP_NETSTATUS_TIMEOUT_As	0x10	Sender side timeout while transmitting.
PCANTP_NETSTATUS_TIMEOUT_Ar	0x11	Receiver side timeout while transmitting.
PCANTP_NETSTATUS_XMT_FULL	0x11	Transmit queue is full (failed too many times; NON PCANTP related network results).
PCANTP_NETSTATUS_BUS_ERROR	0x12	CAN bus error (NON PCANTP related network results).
PCANTP_NETSTATUS_NO_MEMORY	0x13	Memory allocation error (NON PCANTP related network results).

See also: `cantp_msg` on page 118, `cantp_msgdata` on page 125.

### 3.6.17 cantp\_netaddrinfo

Represents the network address information of a PCANTP message.

## Syntax

### C/C++

```
typedef struct _cantp_netaddrinfo {
    cantp_isotp_msgtype msgtype;
    cantp_isotp_format format;
    cantp_isotp_addressing target_type;
    uint16_t source_addr;
    uint16_t target_addr;
    uint8_t extension_addr;
} cantp_netaddrinfo;
```

### Pascal OO

```
cantp_netaddrinfo = record
    msgtype: cantp_isotp_msgtype;
    format: cantp_isotp_format;
    target_type: cantp_isotp_addressing;
    source_addr: UInt16;
    target_addr: UInt16;
    extension_addr: Byte;
end;
```

**C#**

```
[StructLayout(LayoutKind.Sequential, Pack = 8)]
public struct cantp_netaddrinfo
{
    [MarshalAs(UnmanagedType.U4)]
    public cantp_isotp_msgtype msgtype;
    [MarshalAs(UnmanagedType.U4)]
    public cantp_isotp_format format;
    [MarshalAs(UnmanagedType.U4)]
    public cantp_isotp_addressing target_type;
    public UInt16 source_addr;
    public UInt16 target_addr;
    public byte extension_addr;
}
```

**C++/CLR**

```
[StructLayout(LayoutKind::Sequential, Pack = 8)]
public value struct cantp_netaddrinfo
{
    [MarshalAs(UnmanagedType::U4)]
    cantp_isotp_msgtype msgtype;
    [MarshalAs(UnmanagedType::U4)]
    cantp_isotp_format format;
    [MarshalAs(UnmanagedType::U4)]
    cantp_isotp_addressing target_type;
    UInt16 source_addr;
    UInt16 target_addr;
    Byte extension_addr;
};
```

**Visual Basic**

```
<StructLayout(LayoutKind.Sequential, Pack:=8)>
Public Structure cantp_netaddrinfo
    <MarshalAs(UnmanagedType.U4)>
    Public msgtype As cantp_isotp_msgtype
    <MarshalAs(UnmanagedType.U4)>
    Public format As cantp_isotp_format
    <MarshalAs(UnmanagedType.U4)>
    Public target_type As cantp_isotp_addressing
    Public source_addr As UInt16
    Public target_addr As UInt16
    Public extension_addr As Byte
End Structure
```

**Fields**

Name	Description
msgtype	PCANTP message type (see cantp_isotp_msgtype on page 136).
format	PCANTP format addressing (see cantp_isotp_format on page 137).
target_type	PCANTP addressing/target type (see cantp_isotp_addressing on page 115).
source_addr	Source address.
target_addr	Target address.
extension_addr	Extension address.

**See also:** `cantp_msg` on page 118, `cantp_msgdata` on page 125.

### 3.6.18 cantp\_isotp\_msgtype

Represents the addressing format of a PCANTP message (see field `cantp_msg.msgdata.isotp.netaddrinfo.msgtype` on page 118).

#### Syntax

##### C/C++

```
typedef enum _cantp_isotp_msgtype {
    PCANTP_ISOTP_MSGTYPE_UNKNOWN = 0x00,
    PCANTP_ISOTP_MSGTYPE_DIAGNOSTIC = 0x01,
    PCANTP_ISOTP_MSGTYPE_REMOTE_DIAGNOSTIC = 0x02,
    PCANTP_ISOTP_MSGTYPE_FLAG_INDICATION_RX = 0x10,
    PCANTP_ISOTP_MSGTYPE_FLAG_INDICATION_TX = 0x20,
    PCANTP_ISOTP_MSGTYPE_FLAG_INDICATION = (0x10 | 0x20),
    PCANTP_ISOTP_MSGTYPE_MASK_INDICATION = 0x0F
} cantp_isotp_msgtype;
```

##### Pascal OO

```
cantp_isotp_msgtype = (
    PCANTP_ISOTP_MSGTYPE_UNKNOWN = $00,
    PCANTP_ISOTP_MSGTYPE_DIAGNOSTIC = $01,
    PCANTP_ISOTP_MSGTYPE_REMOTE_DIAGNOSTIC = $02,
    PCANTP_ISOTP_MSGTYPE_FLAG_INDICATION_RX = $10,
    PCANTP_ISOTP_MSGTYPE_FLAG_INDICATION_TX = $20,
    PCANTP_ISOTP_MSGTYPE_FLAG_INDICATION = ($10 Or $20),
    PCANTP_ISOTP_MSGTYPE_MASK_INDICATION = $0F
);
```

##### C#

```
public enum cantp_isotp_msgtype : UInt32
{
    PCANTP_ISOTP_MSGTYPE_UNKNOWN = 0x00,
    PCANTP_ISOTP_MSGTYPE_DIAGNOSTIC = 0x01,
    PCANTP_ISOTP_MSGTYPE_REMOTE_DIAGNOSTIC = 0x02,
    PCANTP_ISOTP_MSGTYPE_FLAG_INDICATION_RX = 0x10,
    PCANTP_ISOTP_MSGTYPE_FLAG_INDICATION_TX = 0x20,
    PCANTP_ISOTP_MSGTYPE_FLAG_INDICATION = (0x10 | 0x20),
    PCANTP_ISOTP_MSGTYPE_MASK_INDICATION = 0x0F
}
```

##### C++ / CLR

```
public enum cantp_isotp_msgtype : UInt32
{
    PCANTP_ISOTP_MSGTYPE_UNKNOWN = 0x00,
    PCANTP_ISOTP_MSGTYPE_DIAGNOSTIC = 0x01,
    PCANTP_ISOTP_MSGTYPE_REMOTE_DIAGNOSTIC = 0x02,
    PCANTP_ISOTP_MSGTYPE_FLAG_INDICATION_RX = 0x10,
    PCANTP_ISOTP_MSGTYPE_FLAG_INDICATION_TX = 0x20,
    PCANTP_ISOTP_MSGTYPE_FLAG_INDICATION = (0x10 | 0x20),
    PCANTP_ISOTP_MSGTYPE_MASK_INDICATION = 0x0F
};
```

#### Visual Basic

```
Public Enum cantp_isotp_msgtype As UInt32
    PCANTP_ISOTP_MSGTYPE_UNKNOWN = &H0
    PCANTP_ISOTP_MSGTYPE_DIAGNOSTIC = &H1
```



```

PCANTP_ISOTP_MSGTYPE_REMOTE_DIAGNOSTIC = &H2
PCANTP_ISOTP_MSGTYPE_FLAG_INDICATION_RX = &H10
PCANTP_ISOTP_MSGTYPE_FLAG_INDICATION_TX = &H20
PCANTP_ISOTP_MSGTYPE_FLAG_INDICATION = (&H10 Or &H20)
PCANTP_ISOTP_MSGTYPE_MASK_INDICATION = &HF

```

End Enum

## Values

Name	Value	Description
PCANTP_ISOTP_MSGTYPE_UNKNOWN	0x00	Unknown (non-PCAN-ISO-TP) message.
PCANTP_ISOTP_MSGTYPE_DIAGNOSTIC	0x01	Diagnostic message (request or confirmation).
PCANTP_ISOTP_MSGTYPE_REMOTE_DIAGNOSTIC	0x02	Remote Diagnostic message (request or confirmation).
PCANTP_ISOTP_MSGTYPE_FLAG_INDICATION_RX	0x10	Multi-Frame message is being received.
PCANTP_ISOTP_MSGTYPE_FLAG_INDICATION_TX	0x20	Multi-Frame message is being transmitted.
PCANTP_ISOTP_MSGTYPE_FLAG_INDICATION	0x30	Multi-Frame message is being communicated (Tx or Rx).
PCANTP_ISOTP_MSGTYPE_MASK_INDICATION	0x0F	Mask to remove Indication flags.

**See also:** `cantp_msg` on page 118, `cantp_msgdata` on page 125, `cantp_msgdata_isotp` on page 129, `cantp_netaddrinfo` on page 134.

### 3.6.19 cantp\_isotp\_format

Represents the addressing format of a PCANTP message (see field `cantp_msg.msgdata.isotp.netaddrinfo.format` on page 118).

## Syntax

### C/C++

```

typedef enum _cantp_isotp_format {
    PCANTP_ISOTP_FORMAT_UNKNOWN = 0xFF,
    PCANTP_ISOTP_FORMAT_NONE = 0x00,
    PCANTP_ISOTP_FORMAT_NORMAL = 0x01,
    PCANTP_ISOTP_FORMAT_FIXED_NORMAL = 0x02,
    PCANTP_ISOTP_FORMAT_EXTENDED = 0x03,
    PCANTP_ISOTP_FORMAT_MIXED = 0x04,
    PCANTP_ISOTP_FORMAT_ENHANCED = 0x05,
} cantp_isotp_format;

```

### Pascal OO

```

cantp_isotp_format = (
    PCANTP_ISOTP_FORMAT_UNKNOWN = $FF,
    PCANTP_ISOTP_FORMAT_NONE = $00,
    PCANTP_ISOTP_FORMAT_NORMAL = $01,
    PCANTP_ISOTP_FORMAT_FIXED_NORMAL = $02,
    PCANTP_ISOTP_FORMAT_EXTENDED = $03,
    PCANTP_ISOTP_FORMAT_MIXED = $04,
    PCANTP_ISOTP_FORMAT_ENHANCED = $05
);

```

### C#

```

public enum cantp_isotp_format : UInt32
{
    PCANTP_ISOTP_FORMAT_UNKNOWN = 0xFF,
    PCANTP_ISOTP_FORMAT_NONE = 0x00,
    PCANTP_ISOTP_FORMAT_NORMAL = 0x01,
    PCANTP_ISOTP_FORMAT_FIXED_NORMAL = 0x02,

```

```

PCANTP_ISOTP_FORMAT_EXTENDED = 0x03,
PCANTP_ISOTP_FORMAT_MIXED = 0x04,
PCANTP_ISOTP_FORMAT_ENHANCED = 0x05,
}

```

### C++ / CLR

```

public enum cantp_isotp_format : UInt32
{
    PCANTP_ISOTP_FORMAT_UNKNOWN = 0xFF,
    PCANTP_ISOTP_FORMAT_NONE = 0x00,
    PCANTP_ISOTP_FORMAT_NORMAL = 0x01,
    PCANTP_ISOTP_FORMAT_FIXED_NORMAL = 0x02,
    PCANTP_ISOTP_FORMAT_EXTENDED = 0x03,
    PCANTP_ISOTP_FORMAT_MIXED = 0x04,
    PCANTP_ISOTP_FORMAT_ENHANCED = 0x05,
};

```

### Visual Basic

```

Public Enum cantp_isotp_format As UInt32
    PCANTP_ISOTP_FORMAT_UNKNOWN = &HFF
    PCANTP_ISOTP_FORMAT_NONE = &H0
    PCANTP_ISOTP_FORMAT_NORMAL = &H1
    PCANTP_ISOTP_FORMAT_FIXED_NORMAL = &H2
    PCANTP_ISOTP_FORMAT_EXTENDED = &H3
    PCANTP_ISOTP_FORMAT_MIXED = &H4
    PCANTP_ISOTP_FORMAT_ENHANCED = &H5
End Enum

```

### Values




Name	Value	Description
PCANTP_ISOTP_FORMAT_UNKNOWN	0xFF	Unknown addressing format.
PCANTP_ISOTP_FORMAT_NONE	0x00	Unsegmented CAN frame.
PCANTP_ISOTP_FORMAT_NORMAL	0x01	Normal addressing format from ISO 15765-2.
PCANTP_ISOTP_FORMAT_FIXED_NORMAL	0x02	Fixed normal addressing format from ISO 15765-2.
PCANTP_ISOTP_FORMAT_EXTENDED	0x03	Extended addressing format from ISO 15765-2.
PCANTP_ISOTP_FORMAT_MIXED	0x04	Mixed addressing format from ISO 15765-2.
PCANTP_ISOTP_FORMAT_ENHANCED	0x05	Enhanced addressing format from ISO 15765-3.

**See also:** [cantp\\_msg](#) on page 118, [cantp\\_msgdata\\_isotp](#) on page 129, [cantp\\_netaddrinfo](#) on page 134.







## 3.7 Methods

The methods defined for the classes `UDSApi` and `TUDSApi` are divided into 6 groups of functionality. Note that these methods are static and can be called in the name of the class, without instantiation.








### Connection

	Method	Description
	<code>Initialize_2013</code>	Initializes a PUDS channel based on a PCANTP handle (without CAN FD support).
	<code>InitializeFD_2013</code>	Initializes a PUDS channel based on a PCANTP handle (including CAN FD support).
	<code>Uninitialize_2013</code>	Uninitializes a PUDS channel.





### Configuration

	Method	Description
	<code>SetValue_2013</code>	Sets a configuration or information value within a PUDS channel.
	<code>AddMapping_2013</code>	Adds a mapping between a CAN identifier and a network address information.
	<code>RemoveMappingByCanId_2013</code>	Removes all user defined PUDS mappings corresponding to a CAN identifier.
	<code>RemoveMapping_2013</code>	Removes a user defined PUDS mapping.
	<code>AddCanIdFilter_2013</code>	Adds an entry to the CAN identifier white-list filtering.
	<code>RemoveCanIdFilter_2013</code>	Removes an entry from the CAN identifier white-list filtering.





### Information








	Method	Description
	<code>GetValue_2013</code>	Retrieves information from a PUDS channel.
	<code>GetCanBusStatus_2013</code>	Gets information about the internal BUS status of a PUDS channel.
	<code>GetMapping_2013</code>	Retrieves a mapping matching the given CAN identifier and message type (11bits, 29 bits, FD, etc.).
	<code>GetMappings_2013</code>	Retrieves all the mappings defined for a PUDS channel.
	<code>GetSessionInformation_2013</code>	Gets current ECU session information.
	<code>StatusIsOk_2013</code>	Checks if a PUDS status matches an expected result (default is PUDS_STATUS_OK).
	<code>GetErrorText_2013</code>	Gets a descriptive text for an error code.

### Message handling




	Method	Description
	<code>MsgAlloc_2013</code>	Allocates a PUDS message based using the given configuration.
	<code>MsgFree_2013</code>	Deallocates a PUDS message.
	<code>MsgCopy_2013</code>	Copies a PUDS message to another buffer.
	<code>MsgMove_2013</code>	Moves a PUDS message to another buffer (and cleans the original message structure).

### Communication







	Method	Description
	<code>Read_2013</code>	Reads a CAN message from the receive queue of a PUDS channel.
	<code>Write_2013</code>	Transmits a message using a connected PUDS channel.
	<code>Reset_2013</code>	Resets the receive and transmit queues of a PUDS channel.
	<code>WaitForSingleMessage_2013</code>	Waits for a message (a response or a transmit confirmation) based on a PUDS message request.

	Method	Description
	WaitForFunctionalResponses_2013	Waits for multiple messages (multiple responses from a functional request for instance) based on a PUDS message request.
	WaitForService_2013	Handles the communication workflow for a UDS service expecting a single response.
	WaitForServiceFunctional_2013	Handles the communication workflow for a UDS service expecting multiple responses.
	SvcDiagnosticSessionControl_2013	Writes to the transmit queue a request for UDS service DiagnosticSessionControl.
	SvcECUReset_2013	Writes to the transmit queue a request for UDS service ECUReset.
	SvcSecurityAccess_2013	Writes to the transmit queue a request for UDS service SecurityAccess.
	SvcCommunicationControl_2013	Writes to the transmit queue a request for UDS service CommunicationControl.
	SvcTesterPresent_2013	Writes to the transmit queue a request for UDS service TesterPresent.
	SvcSecuredDataTransmission_2013	Writes to the transmit queue a request for UDS service SecuredDataTransmission(ISO-14229-1:2013).
	SvcSecuredDataTransmission_2020	Writes to the transmit queue a request for UDS service SecuredDataTransmission(ISO-14229-1:2020).
	SvcControlDTCSetting_2013	Writes to the transmit queue a request for UDS service ControlDTCSetting.
	SvcResponseOnEvent_2013	Writes to the transmit queue a request for UDS service ResponseOnEvent.
	SvcLinkControl_2013	Writes to the transmit queue a request for UDS service LinkControl.
	SvcReadDataByIdentifier_2013	Writes to the transmit queue a request for UDS service ReadDataByIdentifier.
	SvcReadMemoryByAddress_2013	Writes to the transmit queue a request for UDS service ReadMemoryByAddress.
	SvcReadScalingDataByIdentifier_2013	Writes to the transmit queue a request for UDS service ReadScalingDataByIdentifier.
	SvcReadDataByPeriodicIdentifier_2013	Writes to the transmit queue a request for UDS service ReadDataByPeriodicIdentifier.
	SvcDynamicallyDefineDataIdentifierDBID_2013	Writes to the transmit queue a request for UDS service DynamicallyDefineDataIdentifier.
	SvcDynamicallyDefineDataIdentifierDBMA_2013	Writes to the transmit queue a request for UDS service DynamicallyDefineDataIdentifier.
	SvcDynamicallyDefineDataIdentifierCDDDI_2013	Writes to the transmit queue a request for UDS service DynamicallyDefineDataIdentifier.
	SvcDynamicallyDefineDataIdentifierClearAllIDDDI_2013	Writes to the transmit queue a request for UDS service DynamicallyDefineDataIdentifier/clearDynamicallyDefinedDataIdentifier subfunction.
	SvcWriteDataByIdentifier_2013	Writes to the transmit queue a request for UDS service WriteDataByIdentifier.
	SvcWriteMemoryByAddress_2013	Writes to the transmit queue a request for UDS service WriteMemoryByAddress.
	SvcClearDiagnosticInformation_2013	Writes to the transmit queue a request for UDS service ClearDiagnosticInformation.
	SvcClearDiagnosticInformation_2020	Writes to the transmit queue a request for UDS service ClearDiagnosticInformation with memory selection parameter (ISO-14229-1:2020).
	SvcReadDTCInformation_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.

	Method	Description
	SvcReadDTCInformationRDTCSBDTC_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	SvcReadDTCInformationRDTCSBRN_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	SvcReadDTCInformationReportExtended_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	SvcReadDTCInformationReportSeverity_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	SvcReadDTCInformationRSIODTC_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	SvcReadDTCInformationNoParam_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	SvcReadDTCInformationRDTCEDBR_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	SvcReadDTCInformationRUDMDTCBSM_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	SvcReadDTCInformationRUDMDTCSSBDTC_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	SvcReadDTCInformationRUDMDTCEDRBDN_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	SvcReadDTCInformationRDTCEdi_2020	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	SvcReadDTCInformationRWWHOBDDTCBMR_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	SvcReadDTCInformationRWWHOBDDTCWPS_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	SvcReadDTCInformationRDTCBRGI_2020	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	SvcInputOutputControlByIdentifier_2013	Writes to the transmit queue a request for UDS service InputOutputControlByIdentifier.
	SvcRoutineControl_2013	Writes to the transmit queue a request for UDS service RoutineControl.
	SvcRequestDownload_2013	Writes to the transmit queue a request for UDS service RequestDownload.
	SvcRequestUpload_2013	Writes to the transmit queue a request for UDS service RequestUpload.
	SvcTransferData_2013	Writes to the transmit queue a request for UDS service TransferData.
	SvcRequestTransferExit_2013	Writes to the transmit queue a request for UDS service RequestTransferExit.
	SvcAccessTimingParameter_2013	Writes to the transmit queue a request for UDS service AccessTimingParameter.
	SvcRequestFileTransfer_2013	Writes to the transmit queue a request for UDS service RequestFileTransfer.
	SvcAuthenticationDA_2020	Writes to the transmit queue a request for UDS service Authentication with deAuthenticate subfunction (ISO-14229-1:2020).
	SvcAuthenticationVCU_2020	Writes to the transmit queue a request for UDS service Authentication with verifyCertificateUnidirectional subfunction (ISO-14229-1:2020).
	SvcAuthenticationVCB_2020	Writes to the transmit queue a request for UDS service Authentication with verifyCertificateBidirectional subfunction (ISO-14229-1:2020).
	SvcAuthenticationPOWN_2020	Writes to the transmit queue a request for UDS service Authentication with proofOfOwnership subfunction (ISO-14229-1:2020).
	SvcAuthenticationRCFA_2020	Writes to the transmit queue a request for UDS service Authentication with requestChallengeForAuthentication subfunction (ISO-14229-1:2020).

	Method	Description
	SvcAuthenticationVPOWNU_2020	Writes to the transmit queue a request for UDS service Authentication with verifyProofOfOwnershipUnidirectional subfunction (ISO-14229-1:2020).
	SvcAuthenticationVPOWNB_2020	Writes to the transmit queue a request for UDS service Authentication with verifyProofOfOwnershipBidirectional subfunction (ISO-14229-1:2020).
	SvcAuthenticationAC_2020	Writes to the transmit queue a request for UDS service Authentication with authenticationConfiguration subfunction (ISO-14229-1:2020).



### Helper (C# and VB specifics methods)

	Method	Description
	GetDataServiceId_2013	Gets PUDS message data service identifier in a safe way.
	SetDataServiceId_2013	Sets PUDS message data service id in a safe way.
	GetDataNrc_2013	Gets PUDS message data negative response code (nrc) in a safe way.
	SetDataNrc_2013	Sets PUDS message data negative response code (nrc) in a safe way.
	GetDataParameter_2013	Gets PUDS message data parameter in a safe way.
	SetDataParameter_2013	Sets PUDS message data parameter in a safe way.

### 3.7.1 Initialize\_2013

Initializes a PUDS channel based on a PCANTP handle (without CAN FD support).

#### Overloads

	Method	Description
	Initialize_2013(cantp_handle, cantp_baudrate)	Initializes a Plug-And-Play PUDS channel based on a PCANTP handle (without CAN FD support).
	Initialize_2013(cantp_handle, cantp_baudrate, cantp_hwtype, UInt32, UInt16)	Initializes a Non-Plug-And-Play PUDS channel based on a PCANTP handle (without CAN FD support).

Plain function version: [UDS\\_Initialize\\_2013](#) on page 624.

### 3.7.2 Initialize\_2013(cantp\_handle, cantp\_baudrate)

Initializes a PUDS channel which represents a Plug & Play PCAN-Device (without CAN FD support).

#### Syntax

##### Pascal OO

```
class function Initialize_2013(
    channel: cantp_handle;
    baudrate: cantp_baudrate
): uds_status; overload;
```

##### C#

```
public static uds_status Initialize_2013(
    cantp_handle channel,
    cantp_baudrate baudrate);
```

##### C++ / CLR

```
static uds_status Initialize_2013(
    cantp_handle channel,
    cantp_baudrate baudrate);
```

## Visual Basic

```
Public Shared Function Initialize_2013(
    ByVal channel As cantp_handle,
    ByVal baudrate As cantp_baudrate) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
baudrate	The speed for the communication (see cantp_baudrate on page 116).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_ALREADY_INITIALIZED	Indicates that the desired PUDS channel is already in use.
PUDS_STATUS_NO_MEMORY	Failed to allocate memory.
PUDS_STATUS_NOT_INITIALIZED	Channel not available.
PUDS_STATUS_FLAG_PCAN_STATUS	This error flag states that the error is composed of a more precise PCAN-Basic error.

## Remarks

As indicated by its name, the `Initialize_2013` method initiates a PUDS channel, preparing it for communication within the CAN bus connected to it. Calls to the other methods will fail if they are used with a channel handle, different than `PCANTP_HANDLE_NONEBUS`, that has not been initialized yet. Each initialized channel should be released when it is not needed anymore.

Initializing a PUDS channel means:

- To reserve the channel for the calling application/process.
- To allocate channel resources, like receive and transmit queues.
- To forward initialization to PCAN-ISO-TP 3.x API and PCAN-Basic API, hence registering/connecting the Hardware denoted by the channel handle.
- To set up the default values of the different parameters (see `SetValue_2013` on page 153).
- To configure default standard ISO-TP mappings (see UDS and ISO-TP Network Addressing Information on page 770):
  - Functional request using 11 bits CAN identifier and normal addressing, from External Test Equipment address (`PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT`) to OBD functional address (`PUDS_ISO_15765_4_ADDR_OBD_FUNCTIONAL`)
  - Physical requests and responses using 11 bits CAN identifier and normal addressing, between the External Test Equipment address (`PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT`) and standard ECU addresses (ECU #1 to #8)
- To configure PCAN-ISO-TP 3.x to filter CAN frames to increase performance (frames that do not match a mapping or a CAN ID in the white-list filter are ignored and discarded).

The initialization process will fail if an application tries to initialize a PUDS channel that has already been initialized within the same process.

Take into consideration that initializing a channel causes a reset of the CAN hardware. In this way errors like BUSOFF, BUSHEAVY, and BUSLIGHT, are removed.

## Example

The following example shows the initialize and uninitialized processes for a Plug-And-Play channel (channel 2 of a PCAN-PCI hardware).

### C#

```
uds_status result;

// The Plug & Play channel (PCAN-PCI) is initialized
result = UDSApi.Initialize_2013(cantp_handle.PCANTP_HANDLE_PCIBUS2,
    cantp_baudrate.PCANTP_BAUDRATE_500K);
if (!UDSApI.StatusIsOk_2013(result))
    MessageBox.Show("Initialization failed", "Error");
else
    MessageBox.Show("PCAN-PCI (Ch-2) was initialized", "Success");

// All initialized channels are released
UDSApI.Uninitialize_2013(cantp_handle.PCANTP_HANDLE_NONEBUS);
```

### C++/CLR

```
uds_status result;

// The Plug & Play channel (PCAN-PCI) is initialized
result = UDSApi::Initialize_2013(PCANTP_HANDLE_PCIBUS2, PCANTP_BAUDRATE_500K);
if (!UDSApI::StatusIsOk_2013(result))
    MessageBox::Show("Initialization failed", "Error");
else
    MessageBox::Show("PCAN-PCI (Ch-2) was initialized", "Success");

// All initialized channels are released
UDSApI::Uninitialize_2013(PCANTP_HANDLE_NONEBUS);
```

### Visual Basic

```
Dim result As uds_status

' The Plug & Play channel (PCAN-PCI) Is initialized
result = UDSApi.Initialize_2013(cantp_handle.PCANTP_HANDLE_PCIBUS2,
    cantp_baudrate.PCANTP_BAUDRATE_500K)
If Not UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Initialization failed", "Error")
Else
    MessageBox.Show("PCAN-PCI (Ch-2) was initialized", "Success")
End If

' All initialized channels are released
UDSApI.Uninitialize_2013(cantp_handle.PCANTP_HANDLE_NONEBUS)
```

### Pascal OO

```
var
    result: uds_status;
begin

    // The Plug & Play channel (PCAN-PCI) is initialized
    result := TUDSApI.Initialize_2013(cantp_handle.PCANTP_HANDLE_PCIBUS2,
        cantp_baudrate.PCANTP_BAUDRATE_500K);
    if not TUDSApI.StatusIsOk_2013(result) then
    begin
        MessageBox(0, 'Initialization failed', 'Error', MB_OK);
    end
    else
    begin
        MessageBox(0, 'PCAN-PCI (Ch-2) was initialized', 'Success', MB_OK);
    end
```



```

end;

// All initialized channels are released
TUDSApi.Uninitialize_2013(cantp_handle.PCANTP_HANDLE_NONEBUS);
end;

```

**See also:** [Uninitialize\\_2013](#) on page 148, [InitializeFD\\_2013](#) on page 148, Using PCAN-UDS 2.x on page 11.  
**Plain function version:** [UDS\\_Initialize\\_2013](#) on page 624.

### 3.7.3 Initialize\_2013(cantp\_handle, cantp\_baudrate, cantp\_hwtype, UInt32, UInt16)

Initializes a PUDS channel which represents a Non-Plug & Play PCAN-Device (without CAN FD support).

#### Syntax

##### Pascal OO

```

class function Initialize_2013(
    channel: cantp_handle;
    baudrate: cantp_baudrate;
    hw_type: cantp_hwtype;
    io_port: UInt32;
    interrupt: UInt16
): uds_status; overload;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_Initialize_2013")]
public static extern uds_status Initialize_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    [MarshalAs(UnmanagedType.U4)]
    cantp_baudrate baudrate,
    [MarshalAs(UnmanagedType.U4)]
    cantp_hwtype hw_type,
    UInt32 io_port,
    UInt16 interrupt);

```

##### C++ / CLR

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_Initialize_2013")]
static uds_status Initialize_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    [MarshalAs(UnmanagedType::U4)]
    cantp_baudrate baudrate,
    [MarshalAs(UnmanagedType::U4)]
    cantp_hwtype hw_type,
    UInt32 io_port,
    UInt16 interrupt);

```

##### Visual Basic

```

<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_Initialize_2013")>
Public Shared Function Initialize_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    <MarshalAs(UnmanagedType.U4)>
    ByVal baudrate As cantp_baudrate,

```

```

<MarshalAs(UnmanagedType.U4)>
ByVal hw_type As cantp_hwtype,
ByVal io_port As UInt32,
ByVal interrupt As UInt16) As uds_status
End Function

```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
baudrate	The speed for the communication (see cantp_baudrate on page 116).
hw_type	Non-plug and play: The type of hardware (see cantp_hwtype on page 113).
io_port	Non-plug and play: The I/O address for the parallel port.
interrupt	Non-plug and play: Interrupt number of the parallel port.

## Returns

The return value is a uds\_status code. PUDS\_STATUS\_OK is returned on success. The typical errors in case of failure are:

PUDS_STATUS_ALREADY_INITIALIZED	Indicates that the desired PUDS channel is already in use.
PUDS_STATUS_NO_MEMORY	Failed to allocate memory.
PUDS_STATUS_NOT_INITIALIZED	Channel not available.
PUDS_STATUS_FLAG_PCAN_STATUS	This error flag states that the error is composed of a more precise PCAN-Basic error.

## Remarks

As indicated by its name, the `Initialize_2013` method initiates a PUDS channel, preparing it for communication within the CAN bus connected to it. Calls to the other methods will fail if they are used with a channel handle, different than `PCANTP_HANDLE_NONEBUS`, that has not been initialized yet. Each initialized channel should be released when it is not needed anymore.

Initializing a PUDS channel means:

- to reserve the channel for the calling application/process
- to allocate channel resources, like receive and transmit queues
- to forward initialization to PCAN-ISO-TP 3.x API and PCAN-Basic API, hence registering/connecting the Hardware denoted by the channel handle
- To set up the default values of the different parameters (see `SetValue_2013` on page 153).
- To configure default standard ISO-TP mappings (see UDS and ISO-TP Network Addressing Information on page 770):
  - Functional request using 11 bits CAN identifier and normal addressing, from External Test Equipment address (`PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT`) to OBD functional address (`PUDS_ISO_15765_4_ADDR_OBD_FUNCTIONAL`) ,
  - Physical requests and responses using 11 bits CAN identifier and normal addressing, between the External Test Equipment address (`PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT`) and standard ECU addresses (ECU #1 to #8)
- To configure PCAN-ISO-TP 3.x to filter CAN frames to increase performance (frames that do not match a mapping or a CAN ID in the white-list filter are ignored and discarded).

The initialization process will fail if an application tries to initialize a PUDS channel that has already been initialized within the same process.

Take into consideration that initializing a channel causes a reset of the CAN hardware. In this way errors like BUSOFF, BUSHEAVY, and BUSLIGHT, are removed.

## Example

The following example shows the initialize and uninitialized processes for a Non-Plug-And-Play channel (channel 1 of the PCAN-DNG).

### C#

```
uds_status result;

// The Plug & Play channel (PCAN-PCI) is initialized
result = UDSApi.Initialize_2013(cantp_handle.PCANTP_HANDLE_DNGBUS1,
    cantp_baudrate.PCANTP_BAUDRATE_500K, cantp_hwtype.PCANTP_HWTYPE_DNG_SJA, 0x378, 7);
if (!UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Initialization failed", "Error");
else
    MessageBox.Show("PCAN-PCI (Ch-2) was initialized", "Success");

// All initialized channels are released
UDSApi.Uninitialize_2013(cantp_handle.PCANTP_HANDLE_NONEBUS);
```

### C++/CLR

```
uds_status result;

// The Plug & Play channel (PCAN-PCI) is initialized
result = UDSApi::Initialize_2013(PCANTP_HANDLE_DNGBUS1, PCANTP_BAUDRATE_500K,
    PCANTP_HWTYPE_DNG_SJA, 0x378, 7);
if (!UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Initialization failed", "Error");
else
    MessageBox::Show("PCAN-PCI (Ch-2) was initialized", "Success");

// All initialized channels are released
UDSApi::Uninitialize_2013(PCANTP_HANDLE_NONEBUS);
```

### Visual Basic

```
Dim result As uds_status

' The Plug & Play channel (PCAN-PCI) Is initialized
result = UDSApi.Initialize_2013(cantp_handle.PCANTP_HANDLE_DNGBUS1,
    cantp_baudrate.PCANTP_BAUDRATE_500K, cantp_hwtype.PCANTP_HWTYPE_DNG_SJA, &H378, 7)
If Not UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Initialization failed", "Error")
Else
    MessageBox.Show("PCAN-PCI (Ch-2) was initialized", "Success")
End If

' All initialized channels are released
UDSApi.Uninitialize_2013(cantp_handle.PCANTP_HANDLE_NONEBUS)
```

### Pascal OO

```
var
    result: uds_status;
begin

    // The Plug & Play channel (PCAN-PCI) is initialized
    result := TUDSApi.Initialize_2013(cantp_handle.PCANTP_HANDLE_DNGBUS1,
        cantp_baudrate.PCANTP_BAUDRATE_500K,
        cantp_hwtype.PCANTP_HWTYPE_DNG_SJA, $378, 7);
    if not TUDSApi.StatusIsOk_2013(result) then
    begin
        MessageBox(0, 'Initialization failed', 'Error', MB_OK);
```

```

end
else
begin
    MessageBox(0, 'PCAN-PCI (Ch-2) was initialized', 'Success', MB_OK);
end;

// All initialized channels are released
TUDSApi.Uninitialize_2013(cantp_handle.PCANTP_HANDLE_NONEBUS);
end;

```

**See also:** [Uninitialize\\_2013](#) on page 148, [InitializeFD\\_2013](#) on page 148, Using PCAN-UDS 2.x on page 11.  
**Plain function version:** [UDS\\_Initialize\\_2013](#) on page 624.

### 3.7.4 InitializeFD\_2013

Initializes a PUDS channel based on a PCANTP handle (including CAN FD support).

#### Syntax

##### Pascal OO

```

class function InitializeFD_2013(
    channel: cantp_handle;
    const bitrate_fd: cantp_bitrate
): uds_status;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_InitializeFD_2013")]
public static extern uds_status InitializeFD_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    cantp_bitrate bitrate_fd);

```

##### C++ / CLR

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_InitializeFD_2013")]
static uds_status InitializeFD_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    cantp_bitrate bitrate_fd);

```

##### Visual Basic

```

<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_InitializeFD_2013")>
Public Shared Function InitializeFD_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal bitrate_fd As cantp_bitrate) As uds_status
End Function

```

#### Parameters

Parameter	Description
channel	The handle of a FD capable PUDS channel (see cantp_handle on page 105).
bitrate_fd	The speed for the communication (see cantp_bitrate on page 101, FD Bit Rate Parameter Definitions on page 102).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_ALREADY_INITIALIZED</code>	Indicates that the desired PUDS channel is already in use.
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory.
<code>PUDS_STATUS_NOT_INITIALIZED</code>	Channel not available.
<code>PUDS_STATUS_FLAG_PCAN_STATUS</code>	This error flag states that the error is composed of a more precise PCAN-Basic error.

## Remarks

The `InitializeFD_2013` method initiates a FD capable PUDS channel, preparing it for communicate within the CAN bus connected to it. Calls to the other methods will fail, if they are used with a channel handle, different than `PCANTP_HANDLE_NONEBUS`, that has not been initialized yet. Each initialized channel should be released when it is not needed anymore.

Initializing a PUDS channel means:

- └ To reserve the channel for the calling application/process.
- └ To allocate channel resources, like receive and transmit queues.
- └ To forward initialization to PCAN-ISO-TP 3.x API and PCAN-Basic API, hence registering/connecting the Hardware denoted by the channel handle.
- └ To set up the default values of the different parameters (see `SetValue_2013` on page 153).
- └ To configure default standard ISO-TP mappings (see UDS and ISO-TP Network Addressing Information on page 770):
  - Functional request using 11 bits CAN identifier and normal addressing, from External Test Equipment address (`PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT`) to OBD functional address (`PUDS_ISO_15765_4_ADDR_OBD_FUNCTIONAL`),
  - Physical requests and responses using 11 bits CAN identifier and normal addressing, between the External Test Equipment address (`PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT`) and standard ECU addresses (ECU #1 to #8)
- └ To configure PCAN-ISO-TP 3.x to filter CAN frames to increase performance (frames that do not match a mapping or a CAN ID in the white-list filter are ignored and discarded).

The initialization process will fail if an application tries to initialize a PUDS channel that has already been initialized within the same process.

Take into consideration, that initializing a channel causes a reset of the CAN hardware. In this way errors like BUSOFF, BUSHEAVY, and BUSLIGHT, are removed.

## Example

The following example shows the initialize and uninitialized processes for a Plug and Play, FD capable channel (channel 2 of a PCAN-USB hardware).

### C#

```
uds_status result;

// The Plug and Play channel (PCAN-USB) is initialized @500kbps/2Mbps.
result = UDSApi.InitializeFD_2013(cantp_handle.PCANTP_HANDLE_USBBUS2, "f_clock=80000000,
nom_brp=10, nom_tseg1=12, nom_tseg2=3, nom_sjw=1, data_brp=4, data_tseg1=7, data_tseg2=2,
data_sjw=1");

if (!UDSApI.StatusIsOk_2013(result))
```

```

        MessageBox.Show("Initialization failed", "Error");
else
    MessageBox.Show("PCAN-USB (Ch-2) was initialized", "Success");

// All initialized channels are released.
UDSApi.Uninitialize_2013(cantp_handle.PCANTP_HANDLE_NONEBUS);

```

### C++ / CLR

```

uds_status result;

// The Plug and Play channel (PCAN-USB) is initialized @500kbps/2Mbps.
result = UDSApi::InitializeFD_2013(PCANTP_HANDLE_USBBUS2, "f_clock=80000000, nom_brp=10,
nom_tseg1=12, nom_tseg2=3, nom_sjw=1, data_brp=4, data_tseg1=7, data_tseg2=2, data_sjw=1");
if (!UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Initialization failed", "Error");
else
    MessageBox::Show("PCAN-USB (Ch-2) was initialized", "Success");

// All initialized channels are released.
UDSApi::Uninitialize_2013(PCANTP_HANDLE_NONEBUS);

```

### Visual Basic

```

Dim result As uds_status

' The Plug And Play channel (PCAN-USB) Is initialized @500kbps/2Mbps.
result = UDSApi.InitializeFD_2013(cantp_handle.PCANTP_HANDLE_USBBUS2, "f_clock=80000000,
nom_brp=10, nom_tseg1=12, nom_tseg2=3, nom_sjw=1, data_brp=4, data_tseg1=7, data_tseg2=2,
data_sjw=1")
If Not UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Initialization failed", "Error")
Else
    MessageBox.Show("PCAN-USB (Ch-2) was initialized", "Success")
End If

' All initialized channels are released.
UDSApi.Uninitialize_2013(cantp_handle.PCANTP_HANDLE_NONEBUS)

```

### Pascal OO

```

var
    result: uds_status;
begin
    // The Plug and Play channel (PCAN-USB) is initialized @500kbps/2Mbps.
    result := TUDSApi.InitializeFD_2013(cantp_handle.PCANTP_HANDLE_USBBUS2,
    'f_clock=80000000, nom_brp=10, nom_tseg1=12, nom_tseg2=3, nom_sjw=1, data_brp=4,
    data_tseg1=7, data_tseg2=2, data_sjw=1');
    if not TUDSApi.StatusIsOk_2013(result) then
        begin
            MessageBox(0, 'Initialization failed', 'Error', MB_OK);
        end
    else
        begin
            MessageBox(0, 'PCAN-USB (Ch-2) was initialized', 'Success', MB_OK);
        end;

    // All initialized channels are released.
    TUDSApi.Uninitialize_2013(cantp_handle.PCANTP_HANDLE_NONEBUS);
end;

```

**See also:** [Uninitialize\\_2013](#) on page 148, Using PCAN-UDS 2.x on page 12, [cantp\\_bitrate](#) on page 101, FD Bit Rate Parameter Definitions on page 102.

**Plain function version:** [UDS\\_InitializeFD\\_2013](#) on page 626.

### 3.7.5 Uninitialize\_2013

Uninitializes a PUDS channel.

#### Syntax

##### Pascal OO

```
class function Uninitialize_2013(
    channel: cantp_handle
): uds_status;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_Uninitialize_2013")]
public static extern uds_status Uninitialize_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel);
```

##### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_Uninitialize_2013")]
static uds_status Uninitialize_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel);
```

#### Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_Uninitialize_2013")>
Public Shared Function Uninitialize_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle) As uds_status
End Function
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <a href="#">cantp_handle</a> on page 105).

#### Returns

The return value is a [uds\\_status](#) code. [PUDS\\_STATUS\\_OK](#) is returned on success. The typical error in case of failure is:

<a href="#">PUDS_STATUS_NOT_INITIALIZED</a>	Indicates that the given PUDS channel cannot be uninitialized because it was not found in the list of reserved channels of the calling application.
---	---

#### Remarks

A PUDS channel can be released using one of these possibilities:

- **Single-Release:** Given a handle of a PUDS channel initialized before with the method [Initialize\\_2013](#). If the given channel cannot be found, then an error is returned.
- **Multiple-Release:** Giving the handle value [PCANTP\\_HANDLE\\_NONEBUS](#) which instructs the API to search for all channels initialized by the calling application and release them all. This option causes no errors if no hardware were uninitialized.

## Example

The following example shows the initialize and uninitialized processes for a Plug-And-Play channel (channel 2 of a PCAN-PCI hardware).

### C#

```
uds_status result;

// The Plug & Play channel (PCAN-PCI) is initialized
result = UDSApi.Initialize_2013(cantp_handle.PCANTP_HANDLE_PCIBUS2,
    cantp_baudrate.PCANTP_BAUDRATE_500K);
if (!UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Initialization failed", "Error");
else
    MessageBox.Show("PCAN-PCI (Ch-2) was initialized", "Success");

// Release channel
result = UDSApi.Uninitialize_2013(cantp_handle.PCANTP_HANDLE_PCIBUS2);
if (!UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Uninitialization failed", "Error");
else
    MessageBox.Show("PCAN-PCI (Ch-2) was released", "Success");
```

### C++/CLR

```
uds_status result;

// The Plug & Play channel (PCAN-PCI) is initialized
result = UDSApi::Initialize_2013(PCANTP_HANDLE_PCIBUS2, PCANTP_BAUDRATE_500K);
if (!UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Initialization failed", "Error");
else
    MessageBox::Show("PCAN-PCI (Ch-2) was initialized", "Success");

// Release channel
result = UDSApi::Uninitialize_2013(PCANTP_HANDLE_PCIBUS2);
if (!UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Uninitialization failed", "Error");
else
    MessageBox::Show("PCAN-PCI (Ch-2) was released", "Success");
```

### Visual Basic

```
Dim result As uds_status

' The Plug & Play channel (PCAN-PCI) Is initialized
result = UDSApi.Initialize_2013(cantp_handle.PCANTP_HANDLE_PCIBUS2,
    cantp_baudrate.PCANTP_BAUDRATE_500K)
If Not UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Initialization failed", "Error")
Else
    MessageBox.Show("PCAN-PCI (Ch-2) was initialized", "Success")
End If

' Release channel
result = UDSApi.Uninitialize_2013(cantp_handle.PCANTP_HANDLE_PCIBUS2)
If Not UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Uninitialization failed", "Error")
```



```
Else
    MessageBox.Show("PCAN-PCI (Ch-2) was released", "Success")
End If
```

## Pascal OO

```
var
    result: uds_status;
begin
    // The Plug & Play channel (PCAN-PCI) is initialized
    result := TUDSApi.Initialize_2013(cantp_handle.PCANTP_HANDLE_PCIBUS2,
        cantp_baudrate.PCANTP_BAUDRATE_500K);
    if not TUDSApi.StatusIsOk_2013(result) then
    begin
        MessageBox(0, 'Initialization failed', 'Error', MB_OK);
    end
    else
    begin
        MessageBox(0, 'PCAN-PCI (Ch-2) was initialized', 'Success', MB_OK);
    end;

    // Release channel
    result := TUDSApi.Uninitialize_2013(cantp_handle.PCANTP_HANDLE_PCIBUS2);
    if not TUDSApi.StatusIsOk_2013(result) then
    begin
        MessageBox(0, 'Uninitialization failed', 'Error', MB_OK);
    end
    else
    begin
        MessageBox(0, 'PCAN-PCI (Ch-2) was released', 'Success', MB_OK);
    end;
end;
```





**See also:** [Initialize\\_2013](#) on page 142, [InitializeFD\\_2013](#) on page 148.

**Plain function version:** [UDS\\_Uninitialize\\_2013](#) on page 628.

## 3.7.6 setValue\_2013

Sets a configuration or information value within a PUDS channel.

### Overloads

	Method	Description
	<a href="#">SetValue_2013(cantp_handle, uds_parameter, UInt32, UInt32)</a>	Sets a configuration or information numeric value within a PUDS channel.
	<a href="#">SetValue_2013(cantp_handle, uds_parameter, String, UInt32)</a>	Sets a configuration or information string value within a PUDS channel.
	<a href="#">SetValue_2013(cantp_handle, uds_parameter, Byte[], UInt32)</a>	Sets a configuration or information with an array of bytes within a PUDS channel.
	<a href="#">SetValue_2013(cantp_handle, uds_parameter, IntPtr, UInt32)</a>	Sets a configuration or information within a PUDS channel.

**Plain function version:** [UDS\\_SetValue\\_2013](#) on page 629.

### 3.7.7 SetValue\_2013(cantp\_handle, uds\_parameter, UInt32, UInt32)

Sets a configuration or information numeric value within a PUDS channel.

#### Syntax

##### Pascal OO

```
class function SetValue_2013(
  channel: cantp_handle;
  parameter: uds_parameter;
  buffer: PLongWord;
  buffer_size: UInt32
): uds_status; overload;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SetValue_2013")]
public static extern uds_status SetValue_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    [MarshalAs(UnmanagedType.U4)]
    uds_parameter parameter,
    ref UInt32 buffer,
    UInt32 buffer_size);
```

##### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SetValue_2013")]
static uds_status SetValue_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    [MarshalAs(UnmanagedType::U4)]
    uds_parameter parameter,
    UInt32 %buffer,
    UInt32 buffer_size);
```

##### Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SetValue_2013")>
Public Shared Function SetValue_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    <MarshalAs(UnmanagedType.U4)>
    ByVal parameter As uds_parameter,
    ByRef buffer As UInt32,
    ByVal buffer_size As UInt32) As uds_status
End Function
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
parameter	The code of the value to be set (see uds_parameter on page 41).
buffer	The buffer containing the numeric value to be set.
buffer_size	The length in bytes of the given buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	Indicates that the parameters passed to the method are invalid. Check the value of the buffer and assert it is compatible with the buffer length.

## Remarks

Use the method `SetValue_2013` to set configuration information or environment values of a PUDS channel.

**Note:** That any calls with non PCAN-UDS 2.x API parameters (i.e. `uds_parameter`) will be forwarded to PCAN-ISO-TP 3.x API or PCAN-Basic API.

More information about the parameters and values that can be set can be found in Detailed Parameters Characteristics on page 45.

Since most of the PCAN-UDS 2.x API parameters require a numeric value (byte or integer) this is the most common and useful override.

## Example

The following example shows the use of the method `SetValue_2013` on the channel `PCANTP_HANDLE_PCIBUS2` to enable debug mode.

**Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
UInt32 buffer;

// Enable error messages
buffer = UDSApi.PUDS_DEBUG_LVL_ERROR;
result = UDSApi.SetValue_2013(cantp_handle.PCANTP_HANDLE_PCIBUS2,
    uds_parameter.PUDS_PARAMETER_DEBUG, ref buffer, sizeof(UInt32));
if (!UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Failed to set value", "Error");
else
    MessageBox.Show("Value changed successfully ", "Success");
```

### C++/CLR

```
uds_status result;
UInt32 buffer;

// Enable error messages
buffer = UDSApi::PUDS_DEBUG_LVL_ERROR;
result = UDSApi::SetValue_2013(PCANTP_HANDLE_PCIBUS2, PUDS_PARAMETER_DEBUG, buffer,
    sizeof(UInt32));
if (!UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Failed to set value", "Error");
else
    MessageBox::Show("Value changed successfully ", "Success");
```

## Visual Basic

```
Dim result As uds_status
Dim buffer As UInt32

' Enable error messages
buffer = UDSApi.PUDS_DEBUG_LVL_ERROR
result = UDSApi.SetValue_2013(cantp_handle.PCANTP_HANDLE_PCIBUS2,
    uds_parameter.PUDS_PARAMETER_DEBUG, buffer, CType(Len(buffer), UInt32))
If Not UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Failed to set value", "Error")
Else
    MessageBox.Show("Value changed successfully ", "Success")
End If
```

## Pascal OO

```
var
    result: uds_status;
    buffer: UInt32;
begin

    // Enable error messages
    buffer := TUDSApi.PUDS_DEBUG_LVL_ERROR;
    result := TUDSApi.SetValue_2013(cantp_handle.PCANTP_HANDLE_PCIBUS2,
        uds_parameter.PUDS_PARAMETER_DEBUG, PLongWord(@buffer),
        UInt32(sizeof(buffer)));
    if not TUDSApi.StatusIsOk_2013(result) then
    begin
        MessageBox(0, 'Failed to set value', 'Error', MB_OK);
    end
    else
    begin
        MessageBox(0, 'Value changed successfully', 'Success', MB_OK);
    end;
end;
```

**See also:** `uds_parameter` on page 41, Detailed Parameters Characteristics on page 45, `GetValue_2013` on page 178.

**Plain function version:** `UDS_SetValue_2013` on page 629.

### 3.7.8 setValue\_2013(cantp\_handle, uds\_parameter, string, UInt32)

Sets a configuration or information string value within a PUDS channel.

## Syntax

### Pascal OO

```
class function SetValue_2013(
    channel: cantp_handle;
    parameter: uds_parameter;
    buffer: PAnsiChar;
    buffer_size: UInt32
): uds_status; overload;
```

### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SetValue_2013")]
public static extern uds_status SetValue_2013(
    [MarshalAs(UnmanagedType.U4)]
```

```
cantp_handle channel,
[MarshalAs(UnmanagedType.U4)]
uds_parameter parameter,
[MarshalAs(UnmanagedType.LPStr, SizeParamIndex = 3)]
String buffer,
UInt32 buffer_size);
```

## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SetValue_2013")]
static uds_status SetValue_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    [MarshalAs(UnmanagedType.U4)]
    uds_parameter parameter,
    [MarshalAs(UnmanagedType.LPStr, SizeParamIndex = 3)]
    String ^buffer,
    UInt32 buffer_size);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SetValue_2013")>
Public Shared Function SetValue_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    <MarshalAs(UnmanagedType.U4)>
    ByVal parameter As uds_parameter,
    <MarshalAs(UnmanagedType.LPStr, SizeParamIndex:=3)>
    ByVal buffer As String,
    ByVal buffer_size As UInt32) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
parameter	The code of the value to be set (see uds_parameter on page 41).
buffer	The buffer containing the string value to be set.
buffer_size	The length in bytes of the given buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	Indicates that the parameters passed to the method are invalid. Check the value of the buffer and assert it is compatible with the buffer length.

## Remarks

This override is only defined for users who wishes to configure PCAN-Basic API through the PCAN-UDS 2.x API.

**See also:** `GetValue_2013` on page 178, `uds_parameter` on page 41, Detailed Parameters Characteristics on page 45.

**Plain function version:** `UDS_SetValue_2013` on page 629.

### 3.7.9 SetValue\_2013(cantp\_handle, uds\_parameter, Byte[], UInt32)

Sets a configuration or information value as a byte array within a PUDS channel.

#### Syntax

##### Pascal OO

```
class function SetValue_2013(
  channel: cantp_handle;
  parameter: uds_parameter;
  buffer: PByte;
  buffer_size: UInt32
): uds_status; overload;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SetValue_2013")]
public static extern uds_status SetValue_2013(
  [MarshalAs(UnmanagedType.U4)]
  cantp_handle channel,
  [MarshalAs(UnmanagedType.U4)]
  uds_parameter parameter,
  [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 3)]
  Byte[] buffer,
  UInt32 buffer_size);
```

##### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SetValue_2013")]
static uds_status SetValue_2013(
  [MarshalAs(UnmanagedType::U4)]
  cantp_handle channel,
  [MarshalAs(UnmanagedType::U4)]
  uds_parameter parameter,
  [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 3)]
  array<Byte> ^buffer,
  UInt32 buffer_size);
```

##### Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SetValue_2013")>
Public Shared Function SetValue_2013(
  <MarshalAs(UnmanagedType.U4)>
  ByVal channel As cantp_handle,
  <MarshalAs(UnmanagedType.U4)>
  ByVal parameter As uds_parameter,
  <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=3)>
  ByVal buffer As Byte(),
  ByVal buffer_size As UInt32) As uds_status
End Function
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
parameter	The code of the value to be set (see uds_parameter on page 41).
buffer	The buffer containing the array value to be set.
buffer_size	The length in bytes of the given buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	Indicates that the parameters passed to the method are invalid. Check the value of the buffer and assert it is compatible with the buffer length.

## Remarks

Use the method `SetValue_2013` to set configuration information or environment values of a PUDS channel.

**Note:** That any calls with non PCAN-UDS 2.x API parameters (i.e. `uds_parameter`) will be forwarded to PCAN-ISO-TP 3.x API or PCAN-Basic API.

More information about the parameters and values that can be set can be found in Detailed Parameters Characteristics on page 45.

## Example

The following example shows the use of the method `SetValue_2013` on the channel `PCANTP_HANDLE_USBBUS1` to set an unlimited block size.

### C#

```
uds_status result;

// Define unlimited blocksize
result = UDSApi.SetValue_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
uds_parameter.PUDS_PARAMETER_BLOCK_SIZE, new byte[] { 0 }, 1);
if (!UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Failed to set value");
else
    MessageBox.Show("Value changed successfully ");
```

### C++/CLR

```
uds_status result;

// Define unlimited blocksize
result = UDSApi::SetValue_2013(PCANTP_HANDLE_USBBUS1, PUDS_PARAMETER_BLOCK_SIZE, gcnew
    array<Byte> { 0 }, 1);
if (!UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Failed to set value");
else
    MessageBox::Show("Value changed successfully ");
```

### Visual Basic

```
Dim result As uds_status
Dim buffer_array(2) As Byte

' Define unlimited blocksize
buffer_array(0) = 0
result = UDSApi.SetValue_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    uds_parameter.PUDS_PARAMETER_BLOCK_SIZE, buffer_array, 1)
If Not UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Failed to set value")
Else
    MessageBox.Show("Value changed successfully ")
```

End If

**Pascal OO**

```

var
  result: uds_status;
  buffer_array: array [0 .. 0] of Byte;
begin

  // Define unlimited blocksize
  buffer_array[0] := 0;
  result := TUDSApi.SetValue_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    uds_parameter.PUDS_PARAMETER_BLOCK_SIZE, PByte(@buffer_array), 1);
  if not TUDSApi.StatusIsOk_2013(result) then
  begin
    MessageBox(0, 'Failed to set value', 'Error', MB_OK);
  end
  else
  begin
    MessageBox(0, 'Value changed successfully', 'Success', MB_OK);
  end;
end;

```

**See also:** `uds_parameter` on page 41, Detailed Parameters Characteristics on page 45, `GetValue_2013` on page 178.

**Plain function version:** `UDS_SetValue_2013` on page 629.

**3.7.10 SetValue\_2013(cantp\_handle, uds\_parameter, IntPtr, UInt32)**

Sets a configuration or information value from pointer within a PUDS channel.

**Syntax****Pascal OO**

```

class function SetValue_2013(
  channel: cantp_handle;
  parameter: uds_parameter;
  buffer: Pointer;
  buffer_size: UInt32
): uds_status; overload;

```

**C#**

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SetValue_2013")]
public static extern uds_status SetValue_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    [MarshalAs(UnmanagedType.U4)]
    uds_parameter parameter,
    IntPtr buffer,
    UInt32 buffer_size);

```

**C++ / CLR**

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SetValue_2013")]
static uds_status SetValue_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    [MarshalAs(UnmanagedType::U4)]

```



```
uds_parameter parameter,
IntPtr buffer,
UInt32 buffer_size);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SetValue_2013")>
Public Shared Function SetValue_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    <MarshalAs(UnmanagedType.U4)>
    ByVal parameter As uds_parameter,
    ByVal buffer As IntPtr,
    ByVal buffer_size As UInt32) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
parameter	The code of the value to be set (see <code>uds_parameter</code> on page 41).
buffer	Pointer on the value to be set.
buffer_size	The length in bytes of the given buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	Indicates that the parameters passed to the method are invalid. Check the value of the buffer and assert it is compatible with the buffer length.

## Remarks

Use the method `SetValue_2013` to set configuration information or environment values of a PUDS channel.

**Note:** That any calls with non PCAN-UDS 2.x API parameters (i.e. `uds_parameter`) will be forwarded to PCAN-ISO-TP 3.x API or PCAN-Basic API.

More information about the parameters and values that can be set can be found in Detailed Parameters Characteristics on page 45.

## Example

The following example shows the use of the method `SetValue_2013` on the channel `PCANTP_HANDLE_USBBUS1` to change the current UDS Session Information.

**Note:** This only affects the API client side ONLY, no communication with any ECUs is made. If a user wants to disable the automatic transmission of TesterPresent requests that keeps alive a non-default diagnostic session, he/she should set the session type to the default diagnostic session (`uds_svc_param_dsc.PUDS_SVC_PARAM_DSC_DS`). It is assumed that the channel was already initialized, and a session exists.

## C#

```
uds_sessioninfo new_sessioninfo;
new_sessioninfo.can_msg_type = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
new_sessioninfo.session_type = (Byte)UDSApi.uds_svc_param_dsc.PUDS_SVC_PARAM_DSC_DS;
```

```

new_sessioninfo.timeout_p2can_server_max = 1;
new_sessioninfo.timeout_enhanced_p2can_server_max = 2;
new_sessioninfo.s3_client_ms = 8;
new_sessioninfo.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
new_sessioninfo.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
new_sessioninfo.nai.source_addr =
    (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
new_sessioninfo.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
new_sessioninfo.nai.extension_addr = 0;

// Get pointer from structure
int session_size = Marshal.SizeOf(new_sessioninfo);
IntPtr session_ptr = Marshal.AllocHGlobal(session_size);
Marshal.StructureToPtr(new_sessioninfo, session_ptr, true);

// Set new session info
uds_status result = UDSApi.SetValue_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    uds_parameter.PUDS_PARAMETER_SESSION_INFO, session_ptr, (UInt32)session_size);
if (!UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Failed to set value");
else
    MessageBox.Show("Value changed successfully ");

// free resource
Marshal.FreeHGlobal(session_ptr);

```

## C++/CLR

```

uds_sessioninfo new_sessioninfo;
new_sessioninfo.can_msg_type = PCANTP_CAN_MSGTYPE_STANDARD;
new_sessioninfo.session_type = (Byte)UDSApi::uds_svc_param_dsc::PUDS_SVC_PARAM_DSC_DS;
new_sessioninfo.timeout_p2can_server_max = 1;
new_sessioninfo.timeout_enhanced_p2can_server_max = 2;
new_sessioninfo.s3_client_ms = 8;
new_sessioninfo.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
new_sessioninfo.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
new_sessioninfo.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
new_sessioninfo.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
new_sessioninfo.nai.extension_addr = 0;

// Get pointer from structure
int session_size = Marshal::SizeOf(new_sessioninfo);
IntPtr session_ptr = Marshal::AllocHGlobal(session_size);
Marshal::StructureToPtr(new_sessioninfo, session_ptr, true);

// Set new session info
uds_status result = UDSApi::SetValue_2013(PCANTP_HANDLE_USBBUS1, PUDS_PARAMETER_SESSION_INFO,
    session_ptr, (UInt32)session_size);
if (!UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Failed to set value");
else
    MessageBox::Show("Value changed successfully ");

// free resource
Marshal::FreeHGlobal(session_ptr);

```

## Visual Basic

```

Dim new_sessioninfo As uds_sessioninfo
new_sessioninfo.can_msg_type = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
new_sessioninfo.session_type = UDSApi.uds_svc_param_dsc.PUDS_SVC_PARAM_DSC_DS
new_sessioninfo.timeout_p2can_server_max = 1

```

```

new_sessioninfo.timeout_enhanced_p2can_server_max = 2
new_sessioninfo.s3_client_ms = 8
new_sessioninfo.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
new_sessioninfo.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
new_sessioninfo.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
new_sessioninfo.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
new_sessioninfo.nai.extension_addr = 0

' Get pointer from structure
Dim session_size As Integer
Dim session_ptr As IntPtr
session_size = Marshal.SizeOf(new_sessioninfo)
session_ptr = Marshal.AllocHGlobal(session_size)
Marshal.StructureToPtr(new_sessioninfo, session_ptr, True)

' Set New session info
Dim result As uds_status
result = UDSApi.SetValue_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    uds_parameter.PUDS_PARAMETER_SESSION_INFO, session_ptr, CType(session_size, UInt32))
If Not UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Failed to set value")
Else
    MessageBox.Show("Value changed successfully ")
End If

' free ressource
Marshal.FreeHGlobal(session_ptr)

```

## Pascal OO

```

var
    result: uds_status;
    new_sessioninfo: uds_sessioninfo;
begin
    new_sessioninfo.can_msg_type := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    new_sessioninfo.session_type := Byte(uds_svc_param_dsc.PUDS_SVC_PARAM_DSC_DS);
    new_sessioninfo.timeout_p2can_server_max := 1;
    new_sessioninfo.timeout_enhanced_p2can_server_max := 2;
    new_sessioninfo.s3_client_ms := 8;
    new_sessioninfo.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    new_sessioninfo.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    new_sessioninfo.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    new_sessioninfo.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    new_sessioninfo.nai.extension_addr := 0;

    // Set new session info
    result := TUDSApi.SetValue_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        uds_parameter.PUDS_PARAMETER_SESSION_INFO, Pointer(@new_sessioninfo),
        UInt32(sizeof(new_sessioninfo)));
    if not TUDSApi.StatusIsOk_2013(result) then
    begin
        MessageBox(0, 'Failed to set value', 'Error', MB_OK);
    end
    else
    begin
        MessageBox(0, 'Value changed successfully', 'Success', MB_OK);
    end;
end;

```

**See also:** [uds\\_parameter](#) on page 41, Detailed Parameters Characteristics on page 45, [GetValue\\_2013](#) on page 178.

**Plain function version:** [UDS\\_SetValue\\_2013](#) on page 629.

### 3.7.11 AddMapping\_2013

Adds a user-defined mapping between a CAN identifier and a network address information. Defining a mapping enables PCANTP communication with 11BITS CAN identifier or with opened Addressing Formats (like [PCANTP\\_ISOTP\\_FORMAT\\_NORMAL](#) or [PCANTP\\_ISOTP\\_FORMAT\\_EXTENDED](#)).

#### Syntax

##### Pascal OO

```
class function AddMapping_2013(
  channel: cantp_handle;
  mapping: Puds_mapping
): uds_status;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_AddMapping_2013")]
public static extern uds_status AddMapping_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    ref uds_mapping mapping);
```

##### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_AddMapping_2013")]
static uds_status AddMapping_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_mapping %mapping);
```

##### Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_AddMapping_2013")>
Public Shared Function AddMapping_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByRef mapping As uds_mapping) As uds_status
End Function
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <a href="#">cantp_handle</a> on page 105).
mapping	Mapping to be added (see <a href="#">uds_mapping</a> on page 25).

#### Remark

By default, some mappings are initialized in the PCAN-UDS 2.x API (see UDS and ISO-TP Network Addressing Information on page 770).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

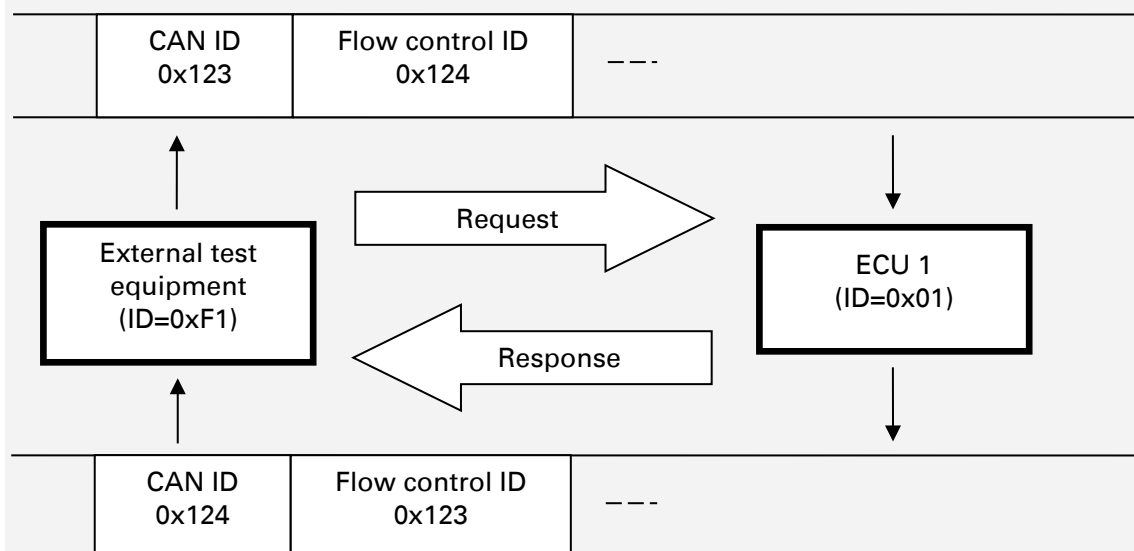
<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	Indicates that the given mapping is null.
<code>PUDS_STATUS_ALREADY_INITIALIZED</code>	A mapping with the same CAN identifier already exists.
<code>PUDS_STATUS_MAPPING_INVALID</code>	Mapping is not valid regarding UDS standard.
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory to define mapping.

## Example

The following example shows the use of the method `AddMapping_2013` on the USB channel 1. It creates mappings to communicate with custom CAN identifiers between test equipment and ECU 1 in ISO15765-2 11bits normal addressing on initialized USB channel 1:

**Note:** It is assumed that the channel was already initialized.

Set CAN identifier = 0x123 and flow control id = 0x124 for request and set CAN identifier = 0x124 and flow control id = 0x123 for response. Test equipment address corresponds to 0xF1 and ECU 1 address corresponds to 0x01. Here is a small scheme of the mapping:



## C#

```
uds_mapping request_mapping = new uds_mapping();
request_mapping.can_id = 0x123;
request_mapping.can_id_flow_ctrl = 0x124;
request_mapping.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
request_mapping.nai.extension_addr = 0;
request_mapping.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
request_mapping.can_tx_dlc = 8;
request_mapping.nai.source_addr =
    (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
request_mapping.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
request_mapping.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;

uds_mapping response_mapping;
response_mapping = request_mapping;
response_mapping.can_id = request_mapping.can_id_flow_ctrl;
```

```

response_mapping.can_id_flow_ctrl = request_mapping.can_id;
response_mapping.nai.source_addr = request_mapping.nai.target_addr;
response_mapping.nai.target_addr = request_mapping.nai.source_addr;

uds_status status;
status = UDSApi.AddMapping_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request_mapping);
if (UDSApi.StatusIsOk_2013(status))
    MessageBox.Show("Add request mapping", "Success");
else
    MessageBox.Show("Failed to add request mapping", "Error");
status = UDSApi.AddMapping_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref response_mapping);
if (UDSApi.StatusIsOk_2013(status))
    MessageBox.Show("Add response mapping", "Success");
else
    MessageBox.Show("Failed to add response mapping", "Error");

```

## C++ / CLR

```

uds_mapping request_mapping = {};
request_mapping.can_id = 0x123;
request_mapping.can_id_flow_ctrl = 0x124;
request_mapping.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
request_mapping.nai.extension_addr = 0;
request_mapping.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
request_mapping.can_tx_dlc = 8;
request_mapping.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
request_mapping.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
request_mapping.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;

uds_mapping response_mapping;
response_mapping = request_mapping;
response_mapping.can_id = request_mapping.can_id_flow_ctrl;
response_mapping.can_id_flow_ctrl = request_mapping.can_id;
response_mapping.nai.source_addr = request_mapping.nai.target_addr;
response_mapping.nai.target_addr = request_mapping.nai.source_addr;

uds_status status;
status = UDSApi::AddMapping_2013(PCANTP_HANDLE_USBBUS1, request_mapping);
if (UDSApi::StatusIsOk_2013(status))
    MessageBox::Show("Add request mapping", "Success");
else
    MessageBox::Show("Failed to add request mapping", "Error");

status = UDSApi::AddMapping_2013(PCANTP_HANDLE_USBBUS1, response_mapping);
if (UDSApi::StatusIsOk_2013(status))
    MessageBox::Show("Add response mapping", "Success");
else
    MessageBox::Show("Failed to add response mapping", "Error");

```

## Visual Basic

```

Dim request_mapping As uds_mapping
request_mapping.can_id = &H123
request_mapping.can_id_flow_ctrl = &H124
request_mapping.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
request_mapping.nai.extension_addr = 0
request_mapping.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
request_mapping.can_tx_dlc = 8
request_mapping.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
request_mapping.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
request_mapping.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL

```

```

Dim response_mapping As uds_mapping
response_mapping = request_mapping
response_mapping.can_id = request_mapping.can_id_flow_ctrl
response_mapping.can_id_flow_ctrl = request_mapping.can_id
response_mapping.nai.source_addr = request_mapping.nai.target_addr
response_mapping.nai.target_addr = request_mapping.nai.source_addr

Dim status As uds_status
status = UDSApi.AddMapping_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request_mapping)
If UDSApi.StatusIsOk_2013(status) Then
    MessageBox.Show("Add request mapping", "Success")
Else
    MessageBox.Show("Failed to add request mapping", "Error")
End If
status = UDSApi.AddMapping_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, response_mapping)
If UDSApi.StatusIsOk_2013(status) Then
    MessageBox.Show("Add response mapping", "Success")
Else
    MessageBox.Show("Failed to add response mapping", "Error")
End If

```

### Pascal OO

```

var
    request_mapping: uds_mapping;
    response_mapping: uds_mapping;
    status: uds_status;
begin
    request_mapping.can_id := $123;
    request_mapping.can_id_flow_ctrl := $124;
    request_mapping.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    request_mapping.nai.extension_addr := 0;
    request_mapping.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    request_mapping.can_tx_dlc := 8;
    request_mapping.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    request_mapping.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    request_mapping.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;

    response_mapping := request_mapping;
    response_mapping.can_id := request_mapping.can_id_flow_ctrl;
    response_mapping.can_id_flow_ctrl := request_mapping.can_id;
    response_mapping.nai.source_addr := request_mapping.nai.target_addr;
    response_mapping.nai.target_addr := request_mapping.nai.source_addr;

    status := TUDSApi.AddMapping_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request_mapping);
    if TUDSApi.StatusIsOk_2013(status) then
        begin
            MessageBox(0, 'Add request mapping', 'Success', MB_OK);
        end
    else
        begin
            MessageBox(0, 'Failed to add request mapping', 'Error', MB_OK);
        end
    end;
    status := TUDSApi.AddMapping_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @response_mapping);
    if TUDSApi.StatusIsOk_2013(status) then
        begin

```

```

    MessageBox(0, 'Add response mapping', 'Success', MB_OK);
end
else
begin
    MessageBox(0, 'Failed to add response mapping', 'Error', MB_OK);
end;
end;

```

**See also:** [RemoveMapping\\_2013](#) on page 168, [RemoveMappingByCanId\\_2013](#) on page 171.

**Plain function version:** [UDS\\_AddMapping\\_2013](#) on page 631.

### 3.7.12 RemoveMapping\_2013

Removes a user defined PUDS mapping.

#### Syntax

##### Pascal OO

```

class function RemoveMapping_2013(
    channel: cantp_handle;
    mapping: uds_mapping
): uds_status;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_RemoveMapping_2013")]
public static extern uds_status RemoveMapping_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_mapping mapping);

```

##### C++ / CLR

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_RemoveMapping_2013")]
static uds_status RemoveMapping_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_mapping mapping);

```

##### Visual Basic

```

<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_RemoveMapping_2013")>
Public Shared Function RemoveMapping_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal mapping As uds_mapping) As uds_status
End Function

```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
mapping	The mapping to remove (see uds_mapping on page 25).



## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The mapping is not a valid mapping.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping is not in the mapping list.

## Example

The following example shows the use of the method `RemoveMapping_2013` on the USB channel 1. It creates a mapping then removes it.



**Note:** It is assumed that the channel was already initialized.

### C#

```
uds_mapping request_mapping = new uds_mapping();
request_mapping.can_id = 0x123;
request_mapping.can_id_flow_ctrl = 0x124;
request_mapping.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
request_mapping.nai.extension_addr = 0;
request_mapping.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
request_mapping.can_tx_dlc = 8;
request_mapping.nai.source_addr =
    (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
request_mapping.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
request_mapping.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;

uds_status status;
status = UDSApi.AddMapping_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request_mapping);
if (UDSApi.StatusIsOk_2013(status))
{
    // Remove the request mapping
    status = UDSApi.RemoveMapping_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request_mapping);
    if (UDSApi.StatusIsOk_2013(status))
    {
        MessageBox.Show("Remove request mapping", "Success");
    }
    else
    {
        MessageBox.Show("Failed to remove request mapping", "Error");
    }
}
else
{
    MessageBox.Show("Failed to add request mapping", "Error");
}
```

### C++ / CLR

```
uds_mapping request_mapping = {};
request_mapping.can_id = 0x123;
request_mapping.can_id_flow_ctrl = 0x124;
request_mapping.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
request_mapping.nai.extension_addr = 0;
request_mapping.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
request_mapping.can_tx_dlc = 8;
request_mapping.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
```

```

request_mapping.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
request_mapping.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;

uds_status status;
status = UDSApi::AddMapping_2013(PCANTP_HANDLE_USBBUS1, request_mapping);
if (UDSApi::StatusIsOk_2013(status))
{
    // Remove the request mapping
    status = UDSApi::RemoveMapping_2013(PCANTP_HANDLE_USBBUS1, request_mapping);
    if (UDSApi::StatusIsOk_2013(status))
    {
        MessageBox::Show("Remove request mapping", "Success");
    }
    else
    {
        MessageBox::Show("Failed to remove request mapping", "Error");
    }
}
else
{
    MessageBox::Show("Failed to add request mapping", "Error");
}

```

### Visual Basic

```

Dim request_mapping As uds_mapping
request_mapping.can_id = &H123
request_mapping.can_id_flow_ctrl = &H124
request_mapping.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
request_mapping.nai.extension_addr = 0
request_mapping.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
request_mapping.can_tx_dlc = 8
request_mapping.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
request_mapping.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
request_mapping.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL

Dim status As uds_status
status = UDSApi.AddMapping_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request_mapping)
If (UDSApi.StatusIsOk_2013(status)) Then

    ' Remove the request mapping
    status = UDSApi.RemoveMapping_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request_mapping)
    If (UDSApi.StatusIsOk_2013(status)) Then
        MessageBox.Show("Remove request mapping", "Success")
    Else
        MessageBox.Show("Failed to remove request mapping", "Error")
    End If
Else
    MessageBox.Show("Failed to add request mapping", "Error")
End If

```

### Pascal OO

```

var
    request_mapping: uds_mapping;
    status: uds_status;
begin
    request_mapping.can_id := $123;
    request_mapping.can_id_flow_ctrl := $124;
    request_mapping.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    request_mapping.nai.extension_addr := 0;

```

```

request_mapping.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
request_mapping.can_tx_dlc := 8;
request_mapping.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
request_mapping.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
request_mapping.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;

status := TUDSApi.AddMapping_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    @request_mapping);
if TUDSApi.StatusIsOk_2013(status) then
begin

    // Remove the request mapping
    status := TUDSApi.RemoveMapping_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        request_mapping);
    if TUDSApi.StatusIsOk_2013(status) then
    begin
        MessageBox(0, 'Remove request mapping', 'Success', MB_OK);
    end
    else
    begin
        MessageBox(0, 'Failed to remove request mapping', 'Error', MB_OK);
    end;
end
else
begin
    MessageBox(0, 'Failed to add request mapping', 'Error', MB_OK);
end;
end;

```

**See also:** [uds\\_mapping](#) on page 25, [RemoveMappingByCanId\\_2013](#) on page 171, [AddMapping\\_2013](#) on page 164.

**Plain function version:** [UDS\\_RemoveMapping\\_2013](#) on page 634.

### 3.7.13 RemoveMappingByCanId\_2013

Removes all user defined PUDS mappings corresponding to a CAN identifier.

#### Syntax

##### Pascal OO

```

class function RemoveMappingByCanId_2013(
    channel: cantp_handle;
    can_id: UInt32
): uds_status;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_RemoveMappingByCanId_2013")]
public static extern uds_status RemoveMappingByCanId_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    UInt32 can_id);

```

##### C++ / CLR

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_RemoveMappingByCanId_2013")]
static uds_status RemoveMappingByCanId_2013(

```

```
[MarshalAs(UnmanagedType::U4)]
cantp_handle channel,
UInt32 can_id);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_RemoveMappingByCanId_2013")>
Public Shared Function RemoveMappingByCanId_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal can_id As UInt32) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
can_id	The mapped CAN identifier to search for that identifies the mappings to remove (see predefined uds_can_id values on page 58).


## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	The CAN identifier to remove is not specified in a mapping.

## Example

The following example shows the use of the method `RemoveMappingByCanId_2013` on the USB channel 1. It creates a mapping then removes it using its CAN identifier on initialized USB channel 1:

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_mapping request_mapping = new uds_mapping();
request_mapping.can_id = 0x123;
request_mapping.can_id_flow_ctrl = 0x124;
request_mapping.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
request_mapping.nai.extension_addr = 0;
request_mapping.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
request_mapping.can_tx_dlc = 8;
request_mapping.nai.source_addr =
    (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
request_mapping.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
request_mapping.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;

uds_status status;
status = UDSApi.AddMapping_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request_mapping);
if (UDSApi.StatusIsOk_2013(status))
{
    // Remove mapping using its can identifier
    status = UDSApi.RemoveMappingByCanId_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, 0x123);
    if (UDSApi.StatusIsOk_2013(status))
    {
        MessageBox.Show("Remove request mapping using its can identifier", "Success");
    }
}
```

```

    else
    {
        MessageBox.Show("Failed to remove request mapping", "Error");
    }
}
else
{
    MessageBox.Show("Failed to add request mapping", "Error");
}

```

## C++ / CLR

```

uds_mapping request_mapping = {};
request_mapping.can_id = 0x123;
request_mapping.can_id_flow_ctrl = 0x124;
request_mapping.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
request_mapping.nai.extension_addr = 0;
request_mapping.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
request_mapping.can_tx_dlc = 8;
request_mapping.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
request_mapping.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
request_mapping.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;

uds_status status;
status = UDSApi::AddMapping_2013(PCANTP_HANDLE_USBBUS1, request_mapping);
if (UDSApi::StatusIsOk_2013(status))
{
    // Remove mapping using its can identifier
    status = UDSApi::RemoveMappingByCanId_2013(PCANTP_HANDLE_USBBUS1, 0x123);
    if (UDSApi::StatusIsOk_2013(status))
    {
        MessageBox::Show("Remove request mapping using its can identifier", "Success");
    }
    else
    {
        MessageBox::Show("Failed to remove request mapping", "Error");
    }
}
else
{
    MessageBox::Show("Failed to add request mapping", "Error");
}

```

## Visual Basic

```

Dim request_mapping As uds_mapping
request_mapping.can_id = &H123
request_mapping.can_id_flow_ctrl = &H124
request_mapping.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
request_mapping.nai.extension_addr = 0
request_mapping.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
request_mapping.can_tx_dlc = 8
request_mapping.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
request_mapping.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
request_mapping.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL

Dim status As uds_status
status = UDSApi.AddMapping_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request_mapping)
If (UDSApi.StatusIsOk_2013(status)) Then
    ' Remove mapping using its can identifier

```

```

status = UDSApi.RemoveMappingByCanId_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, &H123)
If (UDSApI.StatusIsOk_2013(status)) Then
    MessageBox.Show("Remove request mapping using its can identifier", "Success")
Else
    MessageBox.Show("Failed to remove request mapping", "Error")
End If
Else
    MessageBox.Show("Failed to add request mapping", "Error")
End If

```

## Pascal OO

```

var
    request_mapping: uds_mapping;
    status: uds_status;
begin
    request_mapping.can_id := $123;
    request_mapping.can_id_flow_ctrl := $124;
    request_mapping.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    request_mapping.nai.extension_addr := 0;
    request_mapping.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    request_mapping.can_tx_dlc := 8;
    request_mapping.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    request_mapping.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    request_mapping.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;

    status := TUDSApI.AddMapping_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request_mapping);
    if TUDSApI.StatusIsOk_2013(status) then
        begin
            // Remove mapping using its can identifier
            status := TUDSApI.RemoveMappingByCanId_2013
                (cantp_handle.PCANTP_HANDLE_USBBUS1, $123);
            if TUDSApI.StatusIsOk_2013(status) then
                begin
                    MessageBox(0, 'Remove request mapping using its can identifier',
                        'Success', MB_OK);
                end
            else
                begin
                    MessageBox(0, 'Failed to remove request mapping', 'Error', MB_OK);
                end;
            end
        else
            begin
                MessageBox(0, 'Failed to add request mapping', 'Error', MB_OK);
            end;
        end;
    end;
end;

```

**See also:** [uds\\_mapping](#) on page 25, [RemoveMapping\\_2013](#) on page 168, [AddMapping\\_2013](#) on page 164.

**Plain function version:** [UDS\\_RemoveMappingByCanId\\_2013](#) on page 633.

### 3.7.14 AddCanIdFilter\_2013

Adds an entry to the CAN identifier white-list filtering.

#### Syntax

##### Pascal OO

```
class function AddCanIdFilter_2013(
    channel: cantp_handle;
    can_id: UInt32
): uds_status;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_AddCanIdFilter_2013")]
public static extern uds_status AddCanIdFilter_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    UInt32 can_id);
```

##### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_AddCanIdFilter_2013")]
static uds_status AddCanIdFilter_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    UInt32 can_id);
```

##### Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_AddCanIdFilter_2013")>
Public Shared Function AddCanIdFilter_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal can_id As UInt32) As uds_status
End Function
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
can_id	CAN identifier to add in the white-list (see predefined uds_can_id values on page 58).


#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_ALREADY_INITIALIZED	The CAN identifier is already in the white list.
PUDS_STATUS_NO_MEMORY	Memory allocation error when adding the new element in the white list.

#### Example

The following example shows the use of the method `AddCanIdFilter_2013` the channel `PCANTP_HANDLE_USBBUS1`. It adds a filter on 0xD1 CAN identifier.

 **Note:** It is assumed that the channel was already initialized.

##### C#

```
uds_status result;
result = UDSApi.AddCanIdFilter_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, 0xD1);
if (!UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Error adding CAN ID filter.", "Error");
```

#### C++ / CLR

```
uds_status result;
result = UDSApi::AddCanIdFilter_2013(PCANTP_HANDLE_USBBUS1, 0xD1);
if (!UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Error adding CAN ID filter.", "Error");
```

#### Visual Basic

```
Dim result As uds_status
result = UDSApi.AddCanIdFilter_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, &HD1)
If Not UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Error adding CAN ID filter.", "Error")
End If
```

#### Pascal OO

```
var
    result: uds_status;
begin
    result := TUDSApi.AddCanIdFilter_2013
        (cantp_handle.PCANTP_HANDLE_USBBUS1, $D1);
    if not TUDSApi.StatusIsOk_2013(result) then
        begin
            MessageBox(0, 'Error adding CAN ID filter.', 'Error', MB_OK);
        end;
    end;
```

**See also:** [RemoveCanIdFilter\\_2013](#) on page 176, [uds\\_can\\_id](#) on page 58.

**Plain function version:** [UDS\\_AddCanIdFilter\\_2013](#) on page 635.

### 3.7.15 RemoveCanIdFilter\_2013

Removes an entry from the CAN identifier white-list filtering.

#### Syntax

##### Pascal OO

```
class function RemoveCanIdFilter_2013(
    channel: cantp_handle;
    can_id: UInt32
): uds_status;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_RemoveCanIdFilter_2013")]
public static extern uds_status RemoveCanIdFilter_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    UInt32 can_id);
```



## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_RemoveCanIdFilter_2013")]
static uds_status RemoveCanIdFilter_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    UInt32 can_id);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_RemoveCanIdFilter_2013")>
Public Shared Function RemoveCanIdFilter_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal can_id As UInt32) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
can_id	CAN identifier to remove (see predefined uds_can_id values on page 58).


## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical error in case of failure is:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application. Or the CAN identifier is not in the white list.
-----------------------------	--

## Example

The following example shows the use of the method `RemoveCanIdFilter_2013` on the channel `PCANTP_HANDLE_USBBUS1`. It adds a filter on 0xD1 CAN identifier then removes it.

 **Note:** It is assumed that the channel was already initialized.

## C#

```
uds_status result;
result = UDSApi.AddCanIdFilter_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, 0xD1);
if (!UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Error adding CAN ID filter.", "Error");

// Remove previously added can identifier filter
result = UDSApi.RemoveCanIdFilter_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, 0xD1);
if (!UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Error removing CAN ID filter.", "Error");
```

## C++ / CLR

```
uds_status result;
result = UDSApi::AddCanIdFilter_2013(PCANTP_HANDLE_USBBUS1, 0xD1);
if (!UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Error adding CAN ID filter.", "Error");

// Remove previously added can identifier filter
result = UDSApi::RemoveCanIdFilter_2013(PCANTP_HANDLE_USBBUS1, 0xD1);
if (!UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Error removing CAN ID filter.", "Error");
```

## Visual Basic

```
Dim result As uds_status
result = UDSApi.AddCanIdFilter_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, &HD1)
If Not UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Error adding CAN ID filter.", "Error")
End If

' Remove previously added can identifier filter
result = UDSApi.RemoveCanIdFilter_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, &HD1)
If Not UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Error removing CAN ID filter.", "Error")
End If
```

## Pascal OO

```
var
    result: uds_status;
begin
    result := TUDSApi.AddCanIdFilter_2013
        (cantp_handle.PCANTP_HANDLE_USBBUS1, $D1);
    if not TUDSApi.StatusIsOk_2013(result) then
        begin
            MessageBox(0, 'Error adding CAN ID filter.', 'Error', MB_OK);
        end;
    // Remove previously added can identifier filter
    result := TUDSApi.RemoveCanIdFilter_2013
        (cantp_handle.PCANTP_HANDLE_USBBUS1, $D1);
    if not TUDSApi.StatusIsOk_2013(result) then
        begin
            MessageBox(0, 'Error removing CAN ID filter.', 'Error', MB_OK);
        end;
    end;
```





**See also:** [AddCanIdFilter\\_2013](#) on page 175.

**Plain function version:** [UDS\\_RemoveCanIdFilter\\_2013](#) on page 636.

### 3.7.16 GetValue\_2013

Retrieves information from a PUDS channel.

#### overloads

	Method	Description
	GetValue_2013(cantp_handle, uds_parameter, UInt32, UInt32)	Retrieves information from a PUDS channel in numeric form.
	GetValue_2013(cantp_handle, uds_parameter, String, UInt32)	Retrieves information from a PUDS channel in text form.
	GetValue_2013(cantp_handle, uds_parameter, Byte[], UInt32)	Retrieves information from a PUDS channel in byte array form.
	GetValue_2013(cantp_handle, uds_parameter, IntPtr, UInt32)	Retrieves information from a PUDS channel in pointer form.

**Plain function version:** [UDS\\_GetValue\\_2013](#) on page 630.

### 3.7.17 GetValue\_2013(cantp\_handle, uds\_parameter, String, UInt32)

Retrieves information from a PUDS channel in text form.

#### Syntax

##### Pascal OO

```
class function GetValue_2013(
  channel: cantp_handle;
  parameter: uds_parameter;
  buffer: PAnsiChar;
  buffer_size: UInt32
): uds_status; overload;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_GetValue_2013")]
public static extern uds_status GetValue_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    [MarshalAs(UnmanagedType.U4)]
    uds_parameter parameter,
    StringBuilder buffer,
    UInt32 buffer_size);
```

##### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_GetValue_2013")]
static uds_status GetValue_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    [MarshalAs(UnmanagedType::U4)]
    uds_parameter parameter,
    StringBuilder ^buffer,
    UInt32 buffer_size);
```

##### Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_GetValue_2013")>
Public Shared Function GetValue_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    <MarshalAs(UnmanagedType.U4)>
    ByVal parameter As uds_parameter,
    ByVal buffer As StringBuilder,
    ByVal buffer_size As UInt32) As uds_status
End Function
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
parameter	The code of the value to be set (see uds_parameter on page 41).
buffer	The buffer to return the required string value.
buffer_size	The length in bytes of the given buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	Indicates that the parameters passed to the method are invalid. Check the value of the buffer and assert it is compatible with the buffer length.

## Example

The following example shows the use of the method `GetValue_2013` to retrieve the version of the PCAN-UDS API. Depending on the result, a message will be shown to the user.

### C#

```
uds_status result;
StringBuilder buffer;

// Get API version
buffer = new StringBuilder(255);
result = UDSApi.GetValue_2013(cantp_handle.PCANTP_HANDLE_NONEBUS,
    uds_parameter.PUDS_PARAMETER_API_VERSION, buffer, 255);
if (!UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Failed to get value");
else
    MessageBox.Show(buffer.ToString());
```

### C++ / CLR

```
uds_status result;
StringBuilder ^buffer;

// Get API version
buffer = gcnew StringBuilder(255);
result = UDSApi::GetValue_2013(PCANTP_HANDLE_NONEBUS, PUDS_PARAMETER_API_VERSION, buffer,
    255);
if (!UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Failed to get value");
else
    MessageBox::Show(buffer->ToString());
```

### Visual Basic

```
Dim result As uds_status
Dim buffer As StringBuilder

' Get API version
buffer = New StringBuilder(255)
result = UDSApi.GetValue_2013(cantp_handle.PCANTP_HANDLE_NONEBUS,
    uds_parameter.PUDS_PARAMETER_API_VERSION, buffer, 255)
If Not UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Failed to get value")
Else
    MessageBox.Show(buffer.ToString())
End If
```

## Pascal OO

```
var
  result: uds_status;
  buffer: array [0 .. 256] of ansichar;
begin

  // Get API version
  result := TUDSApi.GetValue_2013(cantp_handle.PCANTP_HANDLE_NONEBUS,
    uds_parameter.PUDS_PARAMETER_API_VERSION, PAnsichar(@buffer), 255);
  if not TUDSApi.StatusIsOk_2013(result) then
  begin
    MessageBox(0, 'Failed to get value', 'Error', MB_OK);
  end
  else
  begin
    MessageBox(0, PWideChar(String(buffer)), 'Success', MB_OK);
  end;
end;
```

**See also:** `SetValue_2013` on page 153, `uds_parameter` on page 41, Detailed Parameters Characteristics on page 45.

**Plain function version:** `UDS_GetValue_2013` on page 630.

### 3.7.18 GetValue\_2013(cantp\_handle, uds\_parameter, UInt32, UInt32)

Retrieves information from a PUDS channel in numeric form.

## Syntax

### Pascal OO

```
class function GetValue_2013(
  channel: cantp_handle;
  parameter: uds_parameter;
  buffer: PLongWord;
  buffer_size: UInt32
): uds_status; overload;
```

### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_GetValue_2013")]
public static extern uds_status GetValue_2013(
  [MarshalAs(UnmanagedType.U4)]
  cantp_handle channel,
  [MarshalAs(UnmanagedType.U4)]
  uds_parameter parameter,
  out UInt32 buffer,
  UInt32 buffer_size);
```

### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_GetValue_2013")]
static uds_status GetValue_2013(
  [MarshalAs(UnmanagedType::U4)]
  cantp_handle channel,
  [MarshalAs(UnmanagedType::U4)]
  uds_parameter parameter,
  UInt32 %buffer,
  UInt32 buffer_size);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_GetValue_2013")>
Public Shared Function GetValue_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    <MarshalAs(UnmanagedType.U4)>
    ByVal parameter As uds_parameter,
    ByRef buffer As UInt32,
    ByVal buffer_size As UInt32) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
parameter	The code of the value to be set (see uds_parameter on page 41).
buffer	The buffer to return the required numeric value.
buffer_size	The length in bytes of the given buffer.


## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	Indicates that the parameters passed to the method are invalid. Check the value of the buffer and assert it is compatible with the buffer length.

## Example

The following example shows the use of the method `GetValue_2013` on the channel `PCANTP_HANDLE_USBBUS1` to retrieve the separation time value (STmin). Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
UInt32 buffer = 0;

// Get the value of the Separation Time (STmin) parameter
result = UDSApi.GetValue_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    uds_parameter.PUDS_PARAMETER_SEPARATION_TIME, out buffer, sizeof(UInt32));
if (!UDSApi.StatusIsOk_2013(result))
{
    MessageBox.Show("Failed to get value", "Error");
}
else
{
    MessageBox.Show(buffer.ToString(), "Success");
}
```

### C++ / CLR

```
uds_status result;
UInt32 buffer = 0;

// Get the value of the Separation Time (STmin) parameter
```

```

result = UDSApi::GetValue_2013(PCANTP_HANDLE_USBBUS1, PUDS_PARAMETER_SEPARATION_TIME, buffer,
    sizeof(UInt32));
if (!UDSApi::StatusIsOk_2013(result))
{
    MessageBox::Show("Failed to get value", "Error");
}
else
{
    MessageBox::Show(buffer.ToString(), "Success");
}

```

### Visual Basic

```

Dim result As uds_status
Dim buffer As UInt32 = 0

' Get the value of the Separation Time (STmin) parameter
result = UDSApi.GetValue_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    uds_parameter.PUDS_PARAMETER_SEPARATION_TIME, buffer, CType(Len(buffer), UInt32))
If Not UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Failed to get value", "Error")
Else
    MessageBox.Show(buffer.ToString(), "Success")
End If

```

### Pascal OO

```

var
    result: uds_status;
    buffer: UInt32;
begin
    buffer := 0;

    // Get the value of the Separation Time (STmin) parameter
    result := TUDSApi.GetValue_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        uds_parameter.PUDS_PARAMETER_SEPARATION_TIME, PLongWord(@buffer),
        sizeof(UInt32));
    if not TUDSApi.StatusIsOk_2013(result) then
    begin
        MessageBox(0, 'Failed to get value', 'Error', MB_OK);
    end
    else
    begin
        MessageBox(0, PWideChar(format('%d', [Integer(buffer)])),
            'Success', MB_OK);
    end;
end;

```

**See also:** [SetValue\\_2013](#) on page 153, [uds\\_parameter](#) on page 41, Detailed Parameters Characteristics on page 45.  
**Plain function version:** [UDS\\_GetValue\\_2013](#) on page 630.

### 3.7.19 GetValue\_2013(cantp\_handle, uds\_parameter, Byte[], UInt32)

Retrieves information from a PUDS channel in a byte array.

#### Syntax

##### Pascal OO

```
class function GetValue_2013(
  channel: cantp_handle;
  parameter: uds_parameter;
  buffer: PByte;
  buffer_size: UInt32
): uds_status; overload;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_GetValue_2013")]
public static extern uds_status GetValue_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    [MarshalAs(UnmanagedType.U4)]
    uds_parameter parameter,
    [MarshalAs(UnmanagedType.LPArray)]
    [Out] Byte[] buffer,
    UInt32 buffer_size);
```

##### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_GetValue_2013")]
static uds_status GetValue_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    [MarshalAs(UnmanagedType::U4)]
    uds_parameter parameter,
    [MarshalAs(UnmanagedType::LPArray)]
    [Out] array<Byte> ^buffer,
    UInt32 buffer_size);
```

##### Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_GetValue_2013")>
Public Shared Function GetValue_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    <MarshalAs(UnmanagedType.U4)>
    ByVal parameter As uds_parameter,
    <MarshalAs(UnmanagedType.LPArray)>
    <Out> ByVal buffer As Byte(),
    ByVal buffer_size As UInt32) As uds_status
End Function
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
parameter	The code of the value to be set (see uds_parameter on page 41).
buffer	The buffer containing the array value to retrieve.
buffer_size	The length in bytes of the given buffer.



## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	Indicates that the parameters passed to the method are invalid. Check the value of the buffer and assert it is compatible with the buffer length.

## Example

The following example shows the use of the method `GetValue_2013` on the channel `PCANTP_HANDLE_USBBUS1` to retrieve the separation time value (STmin). Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uint buffer_size = 1;
byte[] byte_buffer = new byte[buffer_size];

// Get the value of the ISO-TP Separation Time (STmin) parameter
result = UDSApi.GetValue_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    uds_parameter.PUDS_PARAMETER_SEPARATION_TIME, byte_buffer, sizeof(byte) * buffer_size);
if (!UDSApi.StatusIsOk_2013(result))
{
    MessageBox.Show("Failed to get value");
}
else
{
    MessageBox.Show(byte_buffer[0].ToString());
}
```

### C++ / CLR

```
uds_status result;
UInt32 buffer_size = 1;
array<Byte>^ byte_buffer = gcnew array<Byte>(buffer_size);

// Get the value of the ISO-TP Separation Time (STmin) parameter
result = UDSApi::GetValue_2013(PCANTP_HANDLE_USBBUS1, PUDS_PARAMETER_SEPARATION_TIME,
    byte_buffer, buffer_size);
if (!UDSApi::StatusIsOk_2013(result))
{
    MessageBox::Show("Failed to get value");
}
else
{
    MessageBox::Show(byte_buffer[0].ToString());
}
```

### Visual Basic

```
Dim result As uds_status
Dim byte_buffer(2) As Byte

' Get the value of the ISO-TP Separation Time (STmin) parameter
result = UDSApi.GetValue_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    uds_parameter.PUDS_PARAMETER_SEPARATION_TIME, byte_buffer, 1)
```

```
If Not UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Failed to get value")
Else
    MessageBox.Show(byte_buffer(0).ToString())
End If
```

### Pascal OO

```
var
    result: uds_status;
    byte_buffer: array [0 .. 0] of Byte;
begin

    // Get the value of the ISO-TP Separation Time (STmin) parameter
    result := TUDSApi.GetValue_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        uds_parameter.PUDS_PARAMETER_SEPARATION_TIME, PByte(@byte_buffer), 1);
    if not TUDSApi.StatusIsOk_2013(result) then
    begin
        MessageBox(0, 'Failed to get value', 'Error', MB_OK);
    end
    else
    begin
        MessageBox(0, PWideChar(format('%d', [Integer(byte_buffer[0])])),
            'Success', MB_OK);
    end;
end;
```

**See also:** [SetValue\\_2013](#) on page 153, [uds\\_parameter](#) on page 41, Detailed Parameters Characteristics on page 45.

**Plain function version:** [UDS\\_GetValue\\_2013](#) on page 630.

## 3.7.20 GetValue\_2013(cantp\_handle, uds\_parameter, IntPtr, UInt32)

Retrieves information from a PUDS channel through a pointer.

### Syntax

#### Pascal OO

```
class function GetValue_2013(
    channel: cantp_handle;
    parameter: uds_parameter;
    buffer: Pointer;
    buffer_size: UInt32
): uds_status; overload;
```

#### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_GetValue_2013")]
public static extern uds_status GetValue_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    [MarshalAs(UnmanagedType.U4)]
    uds_parameter parameter,
    IntPtr buffer,
    UInt32 buffer_size);
```

## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_GetValue_2013")]
static uds_status GetValue_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    [MarshalAs(UnmanagedType::U4)]
    uds_parameter parameter,
    IntPtr buffer,
    UInt32 buffer_size);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_GetValue_2013")>
Public Shared Function GetValue_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    <MarshalAs(UnmanagedType.U4)>
    ByVal parameter As uds_parameter,
    ByVal buffer As IntPtr,
    ByVal buffer_size As UInt32) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
parameter	The code of the value to be set (see uds_parameter on page 41).
buffer	The pointer on the buffer containing the value to retrieve.
buffer_size	The length in bytes of the given buffer.


## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	Indicates that the parameters passed to the method are invalid. Check the value of the buffer and assert it is compatible with the buffer length.

## Example

The following example shows the use of the method `GetValue_2013` on the channel `PCANTP_HANDLE_USBBUS1` to retrieve the UDS Session Information. A console message will be written with the information retrieved.

 **Note:** It is assumed that the channel was already initialized.

## C#

```
uds_status result;
uds_sessioninfo session_info = new uds_sessioninfo();

// Mapping to search
session_info.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
session_info.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
session_info.nai.source_addr =
    (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
session_info.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
session_info.nai.extension_addr = 0;
```

```

int session_size = Marshal.SizeOf(session_info);
IntPtr session_ptr = Marshal.AllocHGlobal(session_size);
Marshal.StructureToPtr(session_info, session_ptr, false);

// Get Session information
result = UDSApi.GetValue_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    uds_parameter.PUDS_PARAMETER_SESSION_INFO, session_ptr, (uint)session_size);
if (UDSApi.StatusIsOk_2013(result))
{
    session_info = (uds_sessioninfo)Marshal.PtrToStructure(session_ptr,
        typeof(uds_sessioninfo));

    Console.WriteLine("Current session info:");
    Console.WriteLine("\t- CAN message type: " + session_info.can_msg_type);
    Console.WriteLine("\t- Extension address: " + session_info.nai.extension_addr);
    Console.WriteLine("\t- Protocol: " + session_info.nai.protocol);
    Console.WriteLine("\t- Source address: " + session_info.nai.source_addr);
    Console.WriteLine("\t- Target address: " + session_info.nai.target_addr);
    Console.WriteLine("\t- Target type: " + session_info.nai.target_type);
    Console.WriteLine("\t- S3 client value: " + session_info.s3_client_ms);
    Console.WriteLine("\t- Session type: " + session_info.session_type);
    Console.WriteLine("\t- P2CAN server max enhanced timeout: " +
        session_info.timeout_enhanced_p2can_server_max);
    Console.WriteLine("\t- P2CAN server max timeout: " +
        session_info.timeout_p2can_server_max);
}
else
{
    Console.WriteLine("Error, cannot get session information.");
}
Marshal.FreeHGlobal(session_ptr);

```

## C++/CLR

```

uds_status result;
uds_sessioninfo session_info = {};

// Mapping to search
session_info.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
session_info.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
session_info.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
session_info.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
session_info.nai.extension_addr = 0;

int session_size = Marshal::SizeOf(session_info);
IntPtr session_ptr = Marshal::AllocHGlobal(session_size);
Marshal::StructureToPtr(session_info, session_ptr, false);

// Get Session information
result = UDSApi::GetValue_2013(PCANTP_HANDLE_USBBUS1, PUDS_PARAMETER_SESSION_INFO, session_ptr,
    session_size);
if (UDSApi::StatusIsOk_2013(result))
{
    session_info = (uds_sessioninfo)Marshal::PtrToStructure(session_ptr,
        uds_sessioninfo::typeid);

    Console::WriteLine("Current session info:");
    Console::WriteLine("\t- CAN message type: {0}", (int)session_info.can_msg_type);
    Console::WriteLine("\t- Extension address: " + session_info.nai.extension_addr);
    Console::WriteLine("\t- Protocol: {0}", (int)session_info.nai.protocol);
    Console::WriteLine("\t- Source address: " + session_info.nai.source_addr);
    Console::WriteLine("\t- Target address: " + session_info.nai.target_addr);
}

```

```

        Console.WriteLine("\t- Target type: {0}", (int)session_info.nai.target_type);
        Console.WriteLine("\t- S3 client value: " + session_info.s3_client_ms);
        Console.WriteLine("\t- Session type: " + session_info.session_type);
        Console.WriteLine("\t- P2CAN server max enhanced timeout: " +
            session_info.timeout_enhanced_p2can_server_max);
        Console.WriteLine("\t- P2CAN server max timeout: " +
            session_info.timeout_p2can_server_max);
    }
    else
    {
        Console.WriteLine("Error, cannot get session information.");
    }
    Marshal::FreeHGlobal(session_ptr);

```

## Visual Basic

```

Dim result As uds_status
Dim session_info As uds_sessioninfo

' Mapping to search
session_info.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
session_info.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
session_info.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
session_info.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
session_info.nai.extension_addr = 0

Dim session_size As Integer
session_size = Marshal.SizeOf(session_info)
Dim session_ptr As IntPtr
session_ptr = Marshal.AllocHGlobal(session_size)
Marshal.StructureToPtr(session_info, session_ptr, False)

' Get Session information
result = UDSApi.GetValue_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    uds_parameter.PUDS_PARAMETER_SESSION_INFO, session_ptr, CType(session_size, UInt32))
If UDSApi.StatusIsOk_2013(result) Then
    session_info = CType(Marshal.PtrToStructure(session_ptr, GetType(uds_sessioninfo)),
        uds_sessioninfo)
    Console.WriteLine("Current session info:")
    Console.WriteLine("    - CAN message type: " + session_info.can_msg_type.ToString())
    Console.WriteLine("    - Extension address: " + session_info.nai.extension_addr.ToString())
    Console.WriteLine("    - Protocol: " + session_info.nai.protocol.ToString())
    Console.WriteLine("    - Source address: " + session_info.nai.source_addr.ToString())
    Console.WriteLine("    - Target address: " + session_info.nai.target_addr.ToString())
    Console.WriteLine("    - Target type: " + session_info.nai.target_type.ToString())
    Console.WriteLine("    - S3 client value: " + session_info.s3_client_ms.ToString())
    Console.WriteLine("    - Session type: " + session_info.session_type.ToString())
    Console.WriteLine("    - P2CAN server max enhanced timeout: " +
        session_info.timeout_enhanced_p2can_server_max.ToString())
    Console.WriteLine("    - P2CAN server max timeout: " +
        session_info.timeout_p2can_server_max.ToString())
Else
    Console.WriteLine("Error, cannot get session information.")
End If
Marshal.FreeHGlobal(session_ptr)

```

## Pascal OO

```

var
    result: uds_status;
    session_info: uds_sessioninfo;
begin

```

```

// Mapping to search
session_info.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
session_info.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
session_info.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
session_info.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
session_info.nai.extension_addr := 0;

// Get Session information
result := TUDSApi.GetValue_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    uds_parameter.PUDS_PARAMETER_SESSION_INFO, Pointer(@session_info),
    UInt32(sizeof(session_info)));
if TUDSApi.StatusIsOk_2013(result) then
begin
    WriteLn('Current session info:');
    WriteLn(format(' - CAN message type: %d',
        [Integer(session_info.can_msg_type)]));
    WriteLn(format(' - Extension address: %d',
        [Integer(session_info.nai.extension_addr)]));
    WriteLn(format(' - Protocol: %d', [Integer(session_info.nai.protocol)]));
    WriteLn(format(' - Source address: %d',
        [Integer(session_info.nai.source_addr)]));
    WriteLn(format(' - Target address: %d',
        [Integer(session_info.nai.target_addr)]));
    WriteLn(format(' - Target type: %d',
        [Integer(session_info.nai.target_type)]));
    WriteLn(format(' - S3 client value: %d',
        [Integer(session_info.s3_client_ms)]));
    WriteLn(format(' - Session type: %d',
        [Integer(session_info.session_type)]));
    WriteLn(format(' - P2CAN server max enhanced timeout: %d',
        [Integer(session_info.timeout_enhanced_p2can_server_max)]));
    WriteLn(format(' - P2CAN server max timeout: %d',
        [Integer(session_info.timeout_p2can_server_max)]));
end
else
begin
    WriteLn('Error, cannot get session information.');
```

**See also:** [SetValue\\_2013](#) on page 153, [uds\\_parameter](#) on page 41, Detailed Parameters Characteristics on page 45.

**Plain function version:** [UDS\\_GetValue\\_2013](#) on page 630.

### 3.7.21 GetCanBusStatus\_2013

Gets information about the internal BUS status of a PUDS channel.

#### Syntax

##### Pascal OO

```

class function GetCanBusStatus_2013(
    channel: cantp_handle
): uds_status;
```

## C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_GetCanBusStatus_2013")]
public static extern uds_status GetCanBusStatus_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel);
```

## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_GetCanBusStatus_2013")]
static uds_status GetCanBusStatus_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_GetCanBusStatus_2013")>
Public Shared Function GetCanBusStatus_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_FLAG_BUS_LIGHT</code>	Indicates a bus error within the given PUDS channel. The hardware is in bus-light status.
<code>PUDS_STATUS_FLAG_BUS_HEAVY</code>	Indicates a bus error within the given PUDS channel. The hardware is in bus-heavy status.
<code>PUDS_STATUS_FLAG_BUS_OFF</code>	Indicates a bus error within the given PUDS channel. The hardware is in bus-off status.
<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.


## Remarks

When the hardware status is bus-off, an application cannot communicate anymore. Consider using the PCAN-Basic property `PCAN_BUSOFF_AUTORESET` which instructs the API to automatically reset the CAN controller when a bus-off state is detected.

Another way to reset errors like bus-off, bus-heavy and bus-light, is to uninitialized and initialize again the channel used. This causes a hardware reset.

## Example

The following example shows the use of the method `GetCanBusStatus_2013` on the channel `PCANTP_HANDLE_PCIBUS1`. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

## C#

```
uds_status result;

// Check the status of the PCI channel
```

```

result = UDSApi.GetCanBusStatus_2013(cantp_handle.PCANTP_HANDLE_PCIBUS1);
switch (result)
{
    case uds_status.PUDS_STATUS_FLAG_BUS_LIGHT:
        MessageBox.Show("PCAN-PCI (Ch-1): Handling a BUS-LIGHT status...", "Success");
        break;
    case uds_status.PUDS_STATUS_FLAG_BUS_HEAVY:
        MessageBox.Show("PCAN-PCI (Ch-1): Handling a BUS-HEAVY status...", "Success");
        break;
    case uds_status.PUDS_STATUS_FLAG_BUS_OFF:
        MessageBox.Show("PCAN-PCI (Ch-1): Handling a BUS-OFF status...", "Success");
        break;
    case uds_status.PUDS_STATUS_OK:
        MessageBox.Show("PCAN-PCI (Ch-1): Status is OK", "Success");
        break;
    default:
        // An error occurred
        MessageBox.Show("Failed to retrieve status", "Error");
        break;
}

```

### C++ / CLR

```

uds_status result;

// Check the status of the PCI channel
result = UDSApi::GetCanBusStatus_2013(PCANTP_HANDLE_PCIBUS1);
switch (result)
{
    case PUDS_STATUS_FLAG_BUS_LIGHT:
        MessageBox::Show("PCAN-PCI (Ch-1): Handling a BUS-LIGHT status...", "Success");
        break;
    case PUDS_STATUS_FLAG_BUS_HEAVY:
        MessageBox::Show("PCAN-PCI (Ch-1): Handling a BUS-HEAVY status...", "Success");
        break;
    case PUDS_STATUS_FLAG_BUS_OFF:
        MessageBox::Show("PCAN-PCI (Ch-1): Handling a BUS-OFF status...", "Success");
        break;
    case PUDS_STATUS_OK:
        MessageBox::Show("PCAN-PCI (Ch-1): Status is OK", "Success");
        break;
    default:
        // An error occurred
        MessageBox::Show("Failed to retrieve status", "Error");
        break;
}

```

### Visual Basic

```

Dim result As uds_status

' Check the status of the PCI channel
result = UDSApi.GetCanBusStatus_2013(cantp_handle.PCANTP_HANDLE_PCIBUS1)
Select Case (result)
    Case uds_status.PUDS_STATUS_FLAG_BUS_LIGHT
        MessageBox.Show("PCAN-PCI (Ch-1): Handling a BUS-LIGHT status...", "Success")
    Case uds_status.PUDS_STATUS_FLAG_BUS_HEAVY
        MessageBox.Show("PCAN-PCI (Ch-1): Handling a BUS-HEAVY status...", "Success")
    Case uds_status.PUDS_STATUS_FLAG_BUS_OFF
        MessageBox.Show("PCAN-PCI (Ch-1): Handling a BUS-OFF status...", "Success")
    Case uds_status.PUDS_STATUS_OK
        MessageBox.Show("PCAN-PCI (Ch-1): Status is OK", "Success")
    Case Else

```



```

        ' An error occurred
        MessageBox.Show("Failed to retrieve status", "Error")
    End Select

```

### Pascal OO

```

var
    result: uds_status;
begin
    // Check the status of the PCI channel
    result := TUDSApi.GetCanBusStatus_2013(cantp_handle.PCANTP_HANDLE_PCIBUS1);
    case result of
        uds_status.PUDS_STATUS_FLAG_BUS_LIGHT:
            MessageBox(0, 'PCAN-PCI (Ch-1): Handling a BUS-LIGHT status...',
                'Success', MB_OK);
        uds_status.PUDS_STATUS_FLAG_BUS_HEAVY:
            MessageBox(0, 'PCAN-PCI (Ch-1): Handling a BUS-HEAVY status...',
                'Success', MB_OK);
        uds_status.PUDS_STATUS_FLAG_BUS_OFF:
            MessageBox(0, 'PCAN-PCI (Ch-1): Handling a BUS-OFF status...',
                'Success', MB_OK);
        uds_status.PUDS_STATUS_OK:
            MessageBox(0, 'PCAN-PCI (Ch-1): Status is OK', 'Success', MB_OK);
    else
        // An error occurred
        MessageBox(0, 'Failed to retrieve status', 'Error', MB_OK);
    end;
end;

```

See also: [uds\\_status](#) on page 32.

Plain function version: [UDS\\_GetCanBusStatus\\_2013](#) on page 642.

## 3.7.22 GetMapping\_2013

Retrieves a mapping matching the given CAN identifier and message type (11bits, 29 bits, FD, etc.).

### Syntax

#### Pascal OO

```

class function GetMapping_2013(
    channel: cantp_handle;
    var buffer: uds_mapping;
    can_id: UInt32;
    can_msgtype: cantp_can_msgtype
): uds_status;

```

#### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_GetMapping_2013")]
public static extern uds_status GetMapping_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    out uds_mapping buffer,
    UInt32 can_id,
    cantp_can_msgtype can_msgtype);

```

#### C++ / CLR

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_GetMapping_2013")]
static uds_status GetMapping_2013(

```

```
[MarshalAs(UnmanagedType::U4)]
cantp_handle channel,
uds_mapping %buffer,
UInt32 can_id,
cantp_can_msgtype can_msgtype);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_GetMapping_2013")>
Public Shared Function GetMapping_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByRef buffer As uds_mapping,
    ByVal can_id As UInt32,
    ByVal can_msgtype As cantp_can_msgtype) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
buffer	Output, buffer to store the searched mapping (see uds_mapping on page 25).
can_id	The CAN identifier to look for (see predefined uds_can_id values on page 58).
can_msgtype	The CAN message type to look for (11bits, 29 bits, FD, etc.). See cantp_can_msgtype on page 121.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical error in case of failure is:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The buffer is invalid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	Indicates that no matching mapping was found in the registered mapping list.

## Example

The following example shows the use of the method `GetMapping_2013` on the channel `PCANTP_HANDLE_USBBUS1`. It gets the mapping for the 0x7E0 CAN identifier then prints it.

**Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_mapping result_mapping;
result = UDSApi.GetMapping_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, out result_mapping,
    (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1,
    cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD);

if (UDSApi.StatusIsOk_2013(result))
{
    Console.WriteLine("Mapping defined for the " + result_mapping.can_id + " can identifier:");
    Console.WriteLine("\t- Flow control identifier: " + result_mapping.can_id_flow_ctrl);
    Console.WriteLine("\t- CAN message type: " + result_mapping.can_msgtype);
    Console.WriteLine("\t- TX DLC: " + result_mapping.can_tx_dlc);
    Console.WriteLine("\t- Extension address: " + result_mapping.nai.extension_addr);
    Console.WriteLine("\t- Protocol: " + result_mapping.nai.protocol);
    Console.WriteLine("\t- Source address: " + result_mapping.nai.source_addr);
    Console.WriteLine("\t- Target address: " + result_mapping.nai.target_addr);
    Console.WriteLine("\t- Target type: " + result_mapping.nai.target_type);
}
```

```
else
{
    Console.WriteLine("Error, cannot get mapping information.");
}
```

### C++ / CLR

```
uds_status result;
uds_mapping result_mapping;
result = UDSApi::GetMapping_2013(PCANTP_HANDLE_USBBUS1, result_mapping,
    PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1, PCANTP_CAN_MSGTYPE_STANDARD);

if (UDSApi::StatusIsOk_2013(result))
{
    Console::WriteLine("Mapping defined for the " + result_mapping.can_id +
        " can identifier:");
    Console::WriteLine("\t- Flow control identifier: " + result_mapping.can_id_flow_ctrl);
    Console::WriteLine("\t- CAN message type: {0}", (int)result_mapping.can_msgtype);
    Console::WriteLine("\t- TX DLC: " + result_mapping.can_tx_dlc);
    Console::WriteLine("\t- Extension address: " + result_mapping.nai.extension_addr);
    Console::WriteLine("\t- Protocol: {0}", (int)result_mapping.nai.protocol);
    Console::WriteLine("\t- Source address: " + result_mapping.nai.source_addr);
    Console::WriteLine("\t- Target address: " + result_mapping.nai.target_addr);
    Console::WriteLine("\t- Target type: {0}", (int)result_mapping.nai.target_type);
}
else
{
    Console::WriteLine("Error, cannot get mapping information.");
}
```

### Visual Basic

```
Dim result As uds_status
Dim result_mapping As uds_mapping
result = UDSApi.GetMapping_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, result_mapping,
    uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1,
    cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD)

If UDSApi.StatusIsOk_2013(result) Then
    Console.WriteLine("Mapping defined for the " + result_mapping.can_id.ToString() +
        " can identifier:")
    Console.WriteLine(" - Flow control identifier: " +
        result_mapping.can_id_flow_ctrl.ToString())
    Console.WriteLine(" - CAN message type: " + result_mapping.can_msgtype.ToString())
    Console.WriteLine(" - TX DLC: " + result_mapping.can_tx_dlc.ToString())
    Console.WriteLine(" - Extension address: " + result_mapping.nai.extension_addr.ToString())
    Console.WriteLine(" - Protocol: " + result_mapping.nai.protocol.ToString())
    Console.WriteLine(" - Source address: " + result_mapping.nai.source_addr.ToString())
    Console.WriteLine(" - Target address: " + result_mapping.nai.target_addr.ToString())
    Console.WriteLine(" - Target type: " + result_mapping.nai.target_type.ToString())
Else
    Console.WriteLine("Error, cannot get mapping information.")
End If
```

### Pascal OO

```
var
    result: uds_status;
    result_mapping: uds_mapping;
begin
    result := TUDSApi.GetMapping_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        result_mapping,
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1),
```

```

    cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD);

if TUDSApi.StatusIsOk_2013(result) then
begin
    WriteLn(format('Mapping defined for the %d can identifier:',
        [Integer(result_mapping.can_id)]));
    WriteLn(format(' - Flow control identifier: %d',
        [Integer(result_mapping.can_id_flow_ctrl)]));
    WriteLn(format(' - CAN message type: %d',
        [Integer(result_mapping.can_msgtype)]));
    WriteLn(format(' - TX DLC: %d', [Integer(result_mapping.can_tx_dlc)]));
    WriteLn(format(' - Extension address: %d',
        [Integer(result_mapping.nai.extension_addr)]));
    WriteLn(format(' - Protocol: %d', [Integer(result_mapping.nai.protocol)]));
    WriteLn(format(' - Source address: %d',
        [Integer(result_mapping.nai.source_addr)]));
    WriteLn(format(' - Target address: %d',
        [Integer(result_mapping.nai.target_addr)]));
    WriteLn(format(' - Target type: %d',
        [Integer(result_mapping.nai.target_type)]));
end
else
begin
    WriteLn('Error, cannot get mapping information.');
```

**See also:** [uds\\_mapping](#) on page 25, [GetMappings\\_2013](#) on page 196.

**Plain function version:** [UDS\\_GetMapping\\_2013](#) on page 637.

### 3.7.23 GetMappings\_2013

Retrieves all the mappings defined for a PUDS channel.

#### Syntax

##### Pascal OO

```

class function GetMappings_2013(
    channel: cantp_handle;
    buffer: Puds_mapping;
    buffer_length: UInt16;
    count: PUInt16
): uds_status;
```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_GetMappings_2013")]
public static extern uds_status GetMappings_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 2)]
    [Out] uds_mapping[] buffer,
    UInt16 buffer_length,
    ref UInt16 count);
```

##### C++ / CLR

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_GetMappings_2013")]
static uds_status GetMappings_2013(
    [MarshalAs(UnmanagedType.U4)]
```

```

cantp_handle channel,
[MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 2)]
[Out] array<uds_mapping> ^buffer,
UInt16 buffer_length,
UInt16 %count);

```

## Visual Basic

```

<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_GetMappings_2013")>
Public Shared Function GetMappings_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=2)>
    <Out> ByVal buffer As uds_mapping(),
    ByVal buffer_length As UInt16,
    ByRef count As UInt16) As uds_status
End Function

```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
buffer	Output, a buffer to store an array of uds_mapping (see uds_mapping on page 25).
buffer_length	The number of uds_mapping elements the buffer can store.
count	Output, the actual number of elements copied in the buffer.

## Remark

By default, some mappings are initialized in the PCAN-UDS 2.x API (see UDS and ISO-TP Network Addressing Information on page 770).


## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_BUFFER_TOO_SMALL	The given buffer is too small to store all mappings.
PUDS_STATUS_PARAM_INVALID_VALUE	The buffer is invalid.

## Example

The following example shows the use of the method `GetMappings_2013` on `PCANTP_HANDLE_USBBUS1`. It displays all mappings added on the channel.

 **Note:** It is assumed that the channel was already initialized.

### C#

```

uds_status result;
UInt16 count = 256;
uds_mapping[] mappings = new uds_mapping[256];
result = UDSApi.GetMappings_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, mappings, count, ref
    count);

if (UDSApi.StatusIsOk_2013(result))
{
    for (int i = 0; i < count; i++)
    {
        Console.WriteLine("mappings[" + i + "]:");
    }
}

```

```

        Console.WriteLine("\t- CAN identifier: " + mappings[i].can_id);
        Console.WriteLine("\t- Flow control identifier: " + mappings[i].can_id_flow_ctrl);
        Console.WriteLine("\t- CAN message type: " + mappings[i].can_msgtype);
        Console.WriteLine("\t- TX DLC: " + mappings[i].can_tx_dlc);
        Console.WriteLine("\t- Extension address: " + mappings[i].nai.extension_addr);
        Console.WriteLine("\t- Protocol: " + mappings[i].nai.protocol);
        Console.WriteLine("\t- Source address: " + mappings[i].nai.source_addr);
        Console.WriteLine("\t- Target address: " + mappings[i].nai.target_addr);
        Console.WriteLine("\t- Target type: " + mappings[i].nai.target_type);
    }
}
else
{
    Console.WriteLine("Error, cannot get mappings.");
}

```

## C++ / CLR

```

uds_status result;
UInt16 count = 256;
array<uds_mapping>^ mappings = gcnew array<uds_mapping>(256);
result = UDSApi::GetMappings_2013(PCANTP_HANDLE_USBBUS1, mappings, count, count);

if (UDSApi::StatusIsOk_2013(result))
{
    for (int i = 0; i < count; i++)
    {
        Console::WriteLine("mappings[" + i + "]:");
        Console::WriteLine("\t- CAN identifier: " + mappings[i].can_id);
        Console::WriteLine("\t- Flow control identifier: " +
            mappings[i].can_id_flow_ctrl);
        Console::WriteLine("\t- CAN message type: {0}", (int)mappings[i].can_msgtype);
        Console::WriteLine("\t- TX DLC: " + mappings[i].can_tx_dlc);
        Console::WriteLine("\t- Extension address: " + mappings[i].nai.extension_addr);
        Console::WriteLine("\t- Protocol: {0}", (int)mappings[i].nai.protocol);
        Console::WriteLine("\t- Source address: " + mappings[i].nai.source_addr);
        Console::WriteLine("\t- Target address: " + mappings[i].nai.target_addr);
        Console::WriteLine("\t- Target type: {0} ", (int)mappings[i].nai.target_type);
    }
}
else
{
    Console::WriteLine("Error, cannot get mappings.");
}

```

## Visual Basic

```

Dim result As uds_status
Dim count As UInt16 = 256
Dim mappings(256) As uds_mapping

result = UDSApi.GetMappings_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, mappings, count, count)
If UDSApi.StatusIsOk_2013(result) Then
    For i As UInt32 = 0 To count - 1
        Console.WriteLine("mappings[" + i.ToString() + "]:")
        Console.WriteLine("  - CAN identifier: " + mappings(i).can_id.ToString())
        Console.WriteLine("  - Flow control identifier: " +
            mappings(i).can_id_flow_ctrl.ToString())
        Console.WriteLine("  - CAN message type: " + mappings(i).can_msgtype.ToString())
        Console.WriteLine("  - TX DLC: " + mappings(i).can_tx_dlc.ToString())
        Console.WriteLine("  - Extension address: " +
            mappings(i).nai.extension_addr.ToString())
    Next
End If

```

```

        Console.WriteLine(" - Protocol: " + mappings(i).nai.protocol.ToString())
        Console.WriteLine(" - Source address: " + mappings(i).nai.source_addr.ToString())
        Console.WriteLine(" - Target address: " + mappings(i).nai.target_addr.ToString())
        Console.WriteLine(" - Target type: " + mappings(i).nai.target_type.ToString())
    Next
Else
    Console.WriteLine("Error, cannot get mappings.")
End If

```

## Pascal OO

```

var
    result: uds_status;
    i: UInt32;
    count: UInt16;
    mappings: array [0 .. 255] of uds_mapping;
begin
    count := 256;
    result := TUDSApi.GetMappings_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @mappings, count, @count);

    if TUDSApi.StatusIsOk_2013(result) then
        begin
            for i := 0 to count - 1 do
                begin
                    WriteLn(format('mappings[%d]:', [Integer(i)]));
                    WriteLn(format(' - CAN identifier: %d', [Integer(mappings[i].can_id)]));
                    WriteLn(format(' - Flow control identifier: %d',
                        [Integer(mappings[i].can_id_flow_ctrl)]));
                    WriteLn(format(' - CAN message type: %d',
                        [Integer(mappings[i].can_msgtype)]));
                    WriteLn(format(' - TX DLC: %d', [Integer(mappings[i].can_tx_dlc)]));
                    WriteLn(format(' - Extension address: %d',
                        [Integer(mappings[i].nai.extension_addr)]));
                    WriteLn(format(' - Protocol: %d', [Integer(mappings[i].nai.protocol)]));
                    WriteLn(format(' - Source address: %d',
                        [Integer(mappings[i].nai.source_addr)]));
                    WriteLn(format(' - Target address: %d',
                        [Integer(mappings[i].nai.target_addr)]));
                    WriteLn(format(' - Target type: %d',
                        [Integer(mappings[i].nai.target_type)]));
                end
            end
        end
    else
        begin
            WriteLn('Error, cannot get mappings.');
```

**See also:** [uds\\_mapping](#) on page 25, [GetMapping\\_2013](#) on page 193.

**Plain function version:** [UDS\\_GetMappings\\_2013](#) on page 638.

### 3.7.24 GetSessionInformation\_2013

Gets current ECU session information.

#### Syntax

##### Pascal OO

```
class function GetSessionInformation_2013(
    channel: cantp_handle;
    var session_info: uds_sessioninfo
): uds_status;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_GetSessionInformation_2013")]
public static extern uds_status GetSessionInformation_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    out uds_sessioninfo session_info);
```

##### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_GetSessionInformation_2013")]
static uds_status GetSessionInformation_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_sessioninfo %session_info);
```

##### Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_GetSessionInformation_2013")>
Public Shared Function GetSessionInformation_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByRef session_info As uds_sessioninfo) As uds_status
End Function
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
session_info	Input, the mapping to search for. Output, the session information filled if an ECU session exists (see uds_sessioninfo on page 22).


#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application. Or the ECU session information is not initialized.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is invalid.

#### Example

The following example shows the use of the method `GetSessionInformation_2013` on the channel `PCANTP_HANDLE_USBBUS1`. It gets the session information for a given mapping and prints it.

 **Note:** It is assumed that the channel was already initialized.



**C#**

```

uds_status result;
uds_sessioninfo session_info;

// Mapping to search
session_info.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
session_info.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
session_info.nai.source_addr =
    (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
session_info.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
session_info.nai.extension_addr = 0;

result = UDSApi.GetSessionInformation_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, out
    session_info);

if (UDSApi.StatusIsOk_2013(result))
{
    Console.WriteLine("Current session info:");
    Console.WriteLine("\t- CAN message type: " + session_info.can_msg_type);
    Console.WriteLine("\t- Extension address: " + session_info.nai.extension_addr);
    Console.WriteLine("\t- Protocol: " + session_info.nai.protocol);
    Console.WriteLine("\t- Source address: " + session_info.nai.source_addr);
    Console.WriteLine("\t- Target address: " + session_info.nai.target_addr);
    Console.WriteLine("\t- Target type: " + session_info.nai.target_type);
    Console.WriteLine("\t- S3 client value: " + session_info.s3_client_ms);
    Console.WriteLine("\t- Session type: " + session_info.session_type);
    Console.WriteLine("\t- P2CAN server max enhanced timeout: " +
        session_info.timeout_enhanced_p2can_server_max);
    Console.WriteLine("\t- P2CAN server max enhanced timeout: " +
        session_info.timeout_p2can_server_max);
}
else
{
    Console.WriteLine("Error, cannot get session information.");
}

```

**C++ / CLR**

```

uds_status result;
uds_sessioninfo session_info;

// Mapping to search
session_info.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
session_info.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
session_info.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
session_info.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
session_info.nai.extension_addr = 0;

result = UDSApi::GetSessionInformation_2013(PCANTP_HANDLE_USBBUS1, session_info);

if (UDSApi::StatusIsOk_2013(result))
{
    Console::WriteLine("Current session info:");
    Console::WriteLine("\t- CAN message type: {0}", (int)session_info.can_msg_type);
    Console::WriteLine("\t- Extension address: " + session_info.nai.extension_addr);
    Console::WriteLine("\t- Protocol: {0}", (int)session_info.nai.protocol);
    Console::WriteLine("\t- Source address: " + session_info.nai.source_addr);
    Console::WriteLine("\t- Target address: " + session_info.nai.target_addr);
    Console::WriteLine("\t- Target type: {0}", (int)session_info.nai.target_type);
    Console::WriteLine("\t- S3 client value: " + session_info.s3_client_ms);
    Console::WriteLine("\t- Session type: " + session_info.session_type);
}

```

```

        Console.WriteLine("\t- P2CAN server max enhanced timeout: " +
            session_info.timeout_enhanced_p2can_server_max);
        Console.WriteLine("\t- P2CAN server max enhanced timeout: " +
            session_info.timeout_p2can_server_max);
    }
    else
    {
        Console.WriteLine("Error, cannot get session information.");
    }
}

```

## Visual Basic

```

Dim result As uds_status
Dim session_info As uds_sessioninfo

' Mapping to search
session_info.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
session_info.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
session_info.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
session_info.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
session_info.nai.extension_addr = 0

result = UDSApi.GetSessionInformation_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, session_info)
If UDSApi.StatusIsOk_2013(result) Then
    Console.WriteLine("Current session info:")
    Console.WriteLine(" - CAN message type: " + session_info.can_msg_type.ToString())
    Console.WriteLine(" - Extension address: " + session_info.nai.extension_addr.ToString())
    Console.WriteLine(" - Protocol: " + session_info.nai.protocol.ToString())
    Console.WriteLine(" - Source address: " + session_info.nai.source_addr.ToString())
    Console.WriteLine(" - Target address: " + session_info.nai.target_addr.ToString())
    Console.WriteLine(" - Target type: " + session_info.nai.target_type.ToString())
    Console.WriteLine(" - S3 client value: " + session_info.s3_client_ms.ToString())
    Console.WriteLine(" - Session type: " + session_info.session_type.ToString())
    Console.WriteLine(" - P2CAN server max enhanced timeout: " +
        session_info.timeout_enhanced_p2can_server_max.ToString())
    Console.WriteLine(" - P2CAN server max enhanced timeout: " +
        session_info.timeout_p2can_server_max.ToString())
Else
    Console.WriteLine("Error, cannot get session information.")
End If

```

## Pascal OO

```

var
    result: uds_status;
    session_info: uds_sessioninfo;
begin

    // Mapping to search
    session_info.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    session_info.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    session_info.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    session_info.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    session_info.nai.extension_addr := 0;

    result := TUDSApi.GetSessionInformation_2013
        (cantp_handle.PCANTP_HANDLE_USBBUS1, session_info);

```

```

if TUDSApi.StatusIsOk_2013(result) then
begin
  WriteLn('Current session info:');
  WriteLn(format(' - CAN message type: %d',
    [Integer(session_info.can_msg_type)]));
  WriteLn(format(' - Extension address: %d',
    [Integer(session_info.nai.extension_addr)]));
  WriteLn(format(' - Protocol: %d', [Integer(session_info.nai.protocol)]));
  WriteLn(format(' - Source address: %d',
    [Integer(session_info.nai.source_addr)]));
  WriteLn(format(' - Target address: %d',
    [Integer(session_info.nai.target_addr)]));
  WriteLn(format(' - Target type: %d',
    [Integer(session_info.nai.target_type)]));
  WriteLn(format(' - S3 client value: %d',
    [Integer(session_info.s3_client_ms)]));
  WriteLn(format(' - Session type: %d',
    [Integer(session_info.session_type)]));
  WriteLn(format(' - P2CAN server max enhanced timeout: %d',
    [Integer(session_info.timeout_enhanced_p2can_server_max)]));
  WriteLn(format(' - P2CAN server max enhanced timeout: %d',
    [Integer(session_info.timeout_p2can_server_max)]));
end
else
begin
  WriteLn('Error, cannot get session information.');
```




**See also:** [uds\\_sessioninfo](#) on page 22, [SetValue\\_2013](#) on page 153, [SvcDiagnosticSessionControl\\_2013](#) on page 258.

**Plain function version:** [UDS\\_GetSessionInformation\\_2013](#) on page 639.

### 3.7.25 StatusIsOk\_2013

Checks if a PUDS status matches an expected result (default is [PUDS\\_STATUS\\_OK](#)).

#### Overloads

	Method	Description
	StatusIsOk_2013(uds_status)	Checks if the uds_status matches PUDS_STATUS_OK in a non-strict mode.
	StatusIsOk_2013(uds_status, uds_status)	Checks if a uds_status matches the expected result in a non-strict mode.
	StatusIsOk_2013(uds_status, uds_status, bool)	Checks if a uds_status matches an expected result.

**Plain function version:** [UDS\\_StatusIsOk\\_2013](#) on page 640.

### 3.7.26 StatusIsOk\_2013(uds\_status)

Checks if the `uds_status` matches `PUDS_STATUS_OK` in a non-strict mode.

#### Syntax

##### Pascal OO

```
class function StatusIsOk_2013(
    status: uds_status
): Boolean; overload;
```

##### C#

```
public static bool StatusIsOk_2013(
    uds_status status);
```

##### C++ / CLR

```
static bool StatusIsOk_2013(
    uds_status status);
```

##### Visual Basic

```
Public Shared Function StatusIsOk_2013(
    ByVal status As uds_status) As Boolean
End Function
```

#### Parameters

Parameter	Description
status	The status to analyze (see <code>uds_status</code> on page 32).

#### Returns

The return value is true if the status matches `PUDS_STATUS_OK` (in non-strict mode)

#### Remarks

When checking a `uds_status`, it is preferred to use `UDS_StatusIsOk_2013` instead of comparing it with the `==` operator because `UDS_StatusIsOk_2013` can remove information flag (in non-strict mode).

#### Example

The following example shows the use of the method `StatusIsOk_2013` after initializing the channel `PCANTP_HANDLE_PCIBUS2`.

##### C#

```
uds_status result;
result = UDSApi.Initialize_2013(cantp_handle.PCANTP_HANDLE_PCIBUS2,
cantp_baudrate.PCANTP_BAUDRATE_500K);
if (!UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Initialization failed", "Error");
else
    MessageBox.Show("PCAN-PCI (Ch-2) was initialized", "Success");
```

**C++ / CLR**

```
uds_status result;
result = UDSApi::Initialize_2013(PCANTP_HANDLE_PCIBUS2, PCANTP_BAUDRATE_500K);
if (!UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Initialization failed", "Error");
else
    MessageBox::Show("PCAN-PCI (Ch-2) was initialized", "Success");
```

**Visual Basic**

```
Dim result As uds_status
result = UDSApi.Initialize_2013(cantp_handle.PCANTP_HANDLE_PCIBUS2,
    cantp_baudrate.PCANTP_BAUDRATE_500K)
If Not UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Initialization failed", "Error")
Else
    MessageBox.Show("PCAN-PCI (Ch-2) was initialized", "Success")
End If
```

**Pascal OO**

```
var
    result: uds_status;
begin
    result := TUDSApi.Initialize_2013(cantp_handle.PCANTP_HANDLE_PCIBUS2,
        cantp_baudrate.PCANTP_BAUDRATE_500K);
    if not TUDSApi.StatusIsOk_2013(result) then
        begin
            MessageBox(0, 'Initialization failed', 'Error', MB_OK);
        end
    else
        begin
            MessageBox(0, 'PCAN-PCI (Ch-2) was initialized', 'Success', MB_OK);
        end;
    end;
end;
```

**See also:** `uds_status` on page 32.

**Plain function version:** `UDS_StatusIsOk_2013` on page 640.

**3.7.27 StatusIsOk\_2013(uds\_status, uds\_status)**

Checks if a `uds_status` matches the expected result in a non-strict mode.

**Syntax****Pascal OO**

```
class function StatusIsOk_2013(
    status: uds_status;
    status_expected: uds_status
): Boolean; overload;
```

**C#**

```
public static bool StatusIsOk_2013(
    uds_status status,
    uds_status status_expected);
```

## C++ / CLR

```
static bool StatusIsOk_2013(
    uds_status status,
    uds_status status_expected);
```

## Visual Basic

```
Public Shared Function StatusIsOk_2013(
    ByVal status As uds_status,
    ByVal status_expected As uds_status) As Boolean
End Function
```

## Parameters

Parameter	Description
status	The status to analyze (see uds_status on page 32).
status_expected	The expected status (see uds_status on page 32). The default value is PUDS_STATUS_OK.

## Returns

The return value is true if the status matches expected parameter (in non-strict mode).

## Remarks

When checking a `uds_status`, it is preferred to use `UDS_StatusIsOk_2013` instead of comparing it with the `==` operator because `UDS_StatusIsOk_2013` can remove information flag (in non-strict mode).

## Example

The following example shows the use of the method `StatusIsOk_2013` after initializing the channel `PCANTP_HANDLE_PCIBUS2`.

### C#

```
uds_status result;
result = UDSApi.Initialize_2013(cantp_handle.PCANTP_HANDLE_PCIBUS2,
    cantp_baudrate.PCANTP_BAUDRATE_500K);
if (!UDSApi.StatusIsOk_2013(result, uds_status.PUDS_STATUS_OK))
    MessageBox.Show("Initialization failed", "Error");
else
    MessageBox.Show("PCAN-PCI (Ch-2) was initialized", "Success");
```

### C++ / CLR

```
uds_status result;
result = UDSApi::Initialize_2013(PCANTP_HANDLE_PCIBUS2, PCANTP_BAUDRATE_500K);
if (!UDSApi::StatusIsOk_2013(result, PUDS_STATUS_OK))
    MessageBox::Show("Initialization failed", "Error");
else
    MessageBox::Show("PCAN-PCI (Ch-2) was initialized", "Success");
```

## Visual Basic

```
Dim result As uds_status
result = UDSApi.Initialize_2013(cantp_handle.PCANTP_HANDLE_PCIBUS2,
    cantp_baudrate.PCANTP_BAUDRATE_500K)
If Not UDSApi.StatusIsOk_2013(result, uds_status.PUDS_STATUS_OK) Then
    MessageBox.Show("Initialization failed", "Error")
Else
    MessageBox.Show("PCAN-PCI (Ch-2) was initialized", "Success")
End If
```

## Pascal OO

```
var
  result: uds_status;
begin
  result := TUDSApi.Initialize_2013(cantp_handle.PCANTP_HANDLE_PCIBUS2,
    cantp_baudrate.PCANTP_BAUDRATE_500K);
  if not TUDSApi.StatusIsOk_2013(result, uds_status.PUDS_STATUS_OK) then
  begin
    MessageBox(0, 'Initialization failed', 'Error', MB_OK);
  end
  else
  begin
    MessageBox(0, 'PCAN-PCI (Ch-2) was initialized', 'Success', MB_OK);
  end;
end;
```

See also: `uds_status` on page 32.

Plain function version: `UDS_StatusIsOk_2013` on page 640.

### 3.7.28 StatusIsOk\_2013(uds\_status, uds\_status, bool)

Checks if a `uds_status` matches an expected result.

## Syntax

### Pascal OO

```
class function StatusIsOk_2013(
  status: uds_status;
  status_expected: uds_status;
  strict_mode: Boolean
): Boolean; overload;
```

### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_StatusIsOk_2013")]
public static extern bool StatusIsOk_2013(
  [MarshalAs(UnmanagedType.U4)]
  uds_status status,
  [MarshalAs(UnmanagedType.U4)]
  uds_status status_expected,
  [MarshalAs(UnmanagedType.I1)]
  bool strict_mode);
```

### C++ / CLR

```
static bool StatusIsOk_2013(
  uds_status status,
  uds_status status_expected,
  bool strict_mode);
```

### Visual Basic

```
Public Shared Function StatusIsOk_2013(
  ByVal status As uds_status,
  ByVal status_expected As uds_status,
  ByVal strict_mode As Boolean) As Boolean
End Function
```

## Parameters

Parameter	Description
status	The status to analyze (see uds_status on page 32).
status_expected	The expected status (see uds_status on page 32). The default value is PUDS_STATUS_OK.
strict_mode	Enable strict mode (default is false). Strict mode ensures that bus or extra information are the same.

## Returns

The return value is true if the status matches expected parameter.

## Remarks

When checking a `uds_status`, it is preferred to use `UDS_StatusIsOk_2013` instead of comparing it with the `==` operator because `UDS_StatusIsOk_2013` can remove information flag (in non-strict mode).

## Example

The following example shows the use of the method `StatusIsOk_2013` after initializing the channel `PCANTP_HANDLE_PCIBUS2`.

### C#

```
uds_status result;
result = UDSApi.Initialize_2013(cantp_handle.PCANTP_HANDLE_PCIBUS2,
    cantp_baudrate.PCANTP_BAUDRATE_500K);
if (!UDSApi.StatusIsOk_2013(result, uds_status.PUDS_STATUS_OK, false))
    MessageBox.Show("Initialization failed", "Error");
else
    MessageBox.Show("PCAN-PCI (Ch-2) was initialized", "Success");
```

### C++ / CLR

```
uds_status result;
result = UDSApi::Initialize_2013(PCANTP_HANDLE_PCIBUS2, PCANTP_BAUDRATE_500K);
if (!UDSApi::StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    MessageBox::Show("Initialization failed", "Error");
else
    MessageBox::Show("PCAN-PCI (Ch-2) was initialized", "Success");
```

### Visual Basic

```
Dim result As uds_status
result = UDSApi.Initialize_2013(cantp_handle.PCANTP_HANDLE_PCIBUS2,
    cantp_baudrate.PCANTP_BAUDRATE_500K)
If Not UDSApi.StatusIsOk_2013(result, uds_status.PUDS_STATUS_OK, False) Then
    MessageBox.Show("Initialization failed", "Error")
Else
    MessageBox.Show("PCAN-PCI (Ch-2) was initialized", "Success")
End If
```

### Pascal OO

```
var
    result: uds_status;
begin
    result := TUDSApi.Initialize_2013(cantp_handle.PCANTP_HANDLE_PCIBUS2,
        cantp_baudrate.PCANTP_BAUDRATE_500K);
    if not TUDSApi.StatusIsOk_2013(result, uds_status.PUDS_STATUS_OK, false) then
        begin
            MessageBox(0, 'Initialization failed', 'Error', MB_OK);
        end
    else
```



```
begin
    MessageBox(0, 'PCAN-PCI (Ch-2) was initialized', 'Success', MB_OK);
end;
end;
```

See also: `uds_status` on page 32.

Plain function version: `UDS_StatusIsOk_2013` on page 640.

### 3.7.29 GetErrorText\_2013

Gets a descriptive text for a PUDS error code.

#### Syntax

##### Pascal OO

```
class function GetErrorText_2013(
    error_code: uds_status;
    language: UInt16;
    buffer: PAnsiChar;
    buffer_size: UInt32
): uds_status;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_GetErrorText_2013")]
public static extern uds_status GetErrorText_2013(
    [MarshalAs(UnmanagedType.U4)]
    uds_status error_code,
    UInt16 language,
    StringBuilder buffer,
    UInt32 buffer_size);
```

##### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_GetErrorText_2013")]
static uds_status GetErrorText_2013(
    [MarshalAs(UnmanagedType.U4)]
    uds_status error_code,
    UInt16 language,
    StringBuilder ^buffer,
    UInt32 buffer_size);
```

##### Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_GetErrorText_2013")>
Public Shared Function GetErrorText_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal error_code As uds_status,
    ByVal language As UInt16,
    ByVal buffer As StringBuilder,
    ByVal buffer_size As UInt32) As uds_status
End Function
```

#### Parameters

Parameter	Description
error_code	The <code>uds_status</code> error code (see <code>uds_status</code> on page 32).
language	The current languages available for translation are: Neutral (0x00), German (0x07), English (0x09), Spanish (0x0A), Italian (0x10) and French (0x0C).

Parameter	Description
buffer	A buffer for a null-terminated char array.
buffer_size	Buffer length in bytes.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical error in case of failure is:

<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	Indicates that the parameters passed to the method are invalid. Check the parameter 'buffer'; it should point to a char array, big enough to allocate the text for the given error code.
--	--

## Remarks

The Primary Language IDs are codes used by Windows OS from Microsoft, to identify a human language. The PCAN-Basic API currently supports the following languages:

Language	Primary Language ID
Neutral (System dependent)	00h (0)
English	09h (9)
German	07h (7)
French	0Ch (12)
Italian	10h (16)
Spanish	0Ah (10)

**Note:** If the buffer is too small for the resulting text, the error `0x80008000` (`PUDS_STATUS_MASK_PCAN|PCAN_ERROR_ILLPARAMVAL`) is returned. Even when only short texts are being currently returned, a text within this method can have a maximum of 255 characters. For this reason, it is recommended to use a buffer with a length of at least 256 bytes.

## Example

The following example shows the use of the method `GetErrorText_2013` to get the description of an error. The language of the description's text will be the same used by the operating system (if its language is supported; otherwise English is used).

**Note:** It is assumed that the channel was NOT initialized (to generate an error).

### C#

```
StringBuilder str_msg = new StringBuilder(256);
uds_status result;
uds_status error_result;
error_result = UDSApi.Uninitialize_2013(cantp_handle.PCANTP_HANDLE_USBBUS1);
result = UDSApi.GetErrorText_2013(error_result, 0x0, str_msg, 256);
if (UDSApi.StatusIsOk_2013(result) && !UDSApi.StatusIsOk_2013(error_result))
    MessageBox.Show(str_msg.ToString(), "Error on uninitialized");
```

### C++ / CLR

```
StringBuilder^ str_msg = gcnew StringBuilder(256);
uds_status result;
uds_status error_result;
error_result = UDSApi::Uninitialize_2013(PCANTP_HANDLE_USBBUS1);
result = UDSApi::GetErrorText_2013(error_result, 0x0, str_msg, 256);
if (UDSApi::StatusIsOk_2013(result) && !UDSApi::StatusIsOk_2013(error_result))
    MessageBox::Show(str_msg->ToString(), "Error on uninitialized");
```

## Visual Basic

```
Dim str_msg As StringBuilder
str_msg = New StringBuilder(256)
Dim result As uds_status
Dim error_result As uds_status
error_result = UDSApi.Uninitialize_2013(cantp_handle.PCANTP_HANDLE_USBBUS1)
result = UDSApi.GetErrorText_2013(error_result, &H0, str_msg, 256)
If UDSApi.StatusIsOk_2013(result) And Not UDSApi.StatusIsOk_2013(error_result) Then
    MessageBox.Show(str_msg.ToString(), "Error on uninitialized")
End If
```

## Pascal OO

```
var
    result: uds_status;
    error_result: uds_status;
    str_msg: array [0 .. 255] of ansichar;
begin
    error_result := TUDSApi.Uninitialize_2013(cantp_handle.PCANTP_HANDLE_USBBUS1);
    result := TUDSApi.GetErrorText_2013(error_result, $0,
        PAnsichar(@str_msg), 256);
    if TUDSApi.StatusIsOk_2013(result) and not TUDSApi.StatusIsOk_2013
        (error_result) then
        begin
            MessageBox(0, PWideChar(String(str_msg)), 'Error on uninitialized', MB_OK);
        end;
end;
```

See also: [uds\\_status](#) on page 32.

Plain function version: [UDS\\_GetErrorText\\_2013](#) on page 641.

### 3.7.30 MsgAlloc\_2013

Allocates a PUDS message using the given configuration.

## Syntax

### Pascal OO

```
class function MsgAlloc_2013(
    var msg_buffer: uds_msg;
    msg_configuration: uds_msgconfig;
    msg_data_length: UInt32
): uds_status;
```

### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_MsgAlloc_2013")]
public static extern uds_status MsgAlloc_2013(
    out uds_msg msg_buffer,
    uds_msgconfig msg_configuration,
    UInt32 msg_data_length);
```

## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_MsgAlloc_2013")]
static uds_status MsgAlloc_2013(
    uds_msg %msg_buffer,
    uds_msgconfig msg_configuration,
    UInt32 msg_data_length);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_MsgAlloc_2013")>
Public Shared Function MsgAlloc_2013(
    ByRef msg_buffer As uds_msg,
    ByVal msg_configuration As uds_msgconfig,
    ByVal msg_data_length As UInt32) As uds_status
End Function
```

## Parameters

Parameter	Description
msg_buffer	A uds_msg structure buffer. It will be freed if required (see uds_msg on page 21).
msg_configuration	Configuration of the message to allocate (see uds_msgconfig on page 25).
msg_data_length	Size of the message data.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_PARAM_INVALID_VALUE	One of the parameters is not valid.
PUDS_STATUS_CAUTION_INPUT_MODIFIED	Extra information, the message has been modified by the API.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

The `uds_msg` structure is automatically initialized and allocated by the PCAN-UDS 2.x API using:

- `MsgAlloc_2013` method
- UDS services method (suffixed `Svc`)
- `Read_2013` method
- `WaitFor` methods

Once processed, the `uds_msg` structure should be released using `MsgFree_2013` method.

## Example

The following example shows the use of the method `MsgAlloc_2013`. It allocates a ClearDiagnosticInformation service positive response (fixed length of one byte), with a physical configuration between ECU 1 and test equipment using in ISO15765-2 11bits normal addressing.

## C#

```
uds_msgconfig config_physical = new uds_msgconfig();
config_physical.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_1;
config_physical.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config_physical.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config_physical.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config_physical.type = uds_msgtype.PUDS_MSGTYPE_USDT;
```

```

config_physical.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config_physical.nai.target_addr =
    (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config_physical.nai.extension_addr = 0;

uds_msg response_msg = new uds_msg();
uds_status status = UDSApi.MsgAlloc_2013(out response_msg, config_physical, 1);
if (UDSApi.StatusIsOk_2013(status, uds_status.PUDS_STATUS_OK, false))
    MessageBox.Show("Allocate ClearDiagnosticInformation response.", "Success");
else
    MessageBox.Show("Message allocation failed.", "Error");

```

## C++ / CLR

```

uds_msgconfig config_physical = {};
config_physical.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_1;
config_physical.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config_physical.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config_physical.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config_physical.type = PUDS_MSGTYPE_USDT;
config_physical.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config_physical.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config_physical.nai.extension_addr = 0;

uds_msg response_msg = {};
uds_status status = UDSApi::MsgAlloc_2013(response_msg, config_physical, 1);
if (UDSApi::StatusIsOk_2013(status, PUDS_STATUS_OK, false))
    MessageBox::Show("Allocate ClearDiagnosticInformation response.", "Success");
else
    MessageBox::Show("Message allocation failed.", "Error");

```

## Visual Basic

```

Dim config_physical As uds_msgconfig = New uds_msgconfig()
config_physical.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_1
config_physical.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config_physical.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config_physical.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config_physical.type = uds_msgtype.PUDS_MSGTYPE_USDT
config_physical.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config_physical.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config_physical.nai.extension_addr = 0

Dim response_msg As uds_msg = New uds_msg()
Dim status As uds_status
status = UDSApi.MsgAlloc_2013(response_msg, config_physical, 1)
If UDSApi.StatusIsOk_2013(status, uds_status.PUDS_STATUS_OK, False) Then
    MessageBox.Show("Allocate ClearDiagnosticInformation response.", "Success")
Else
    MessageBox.Show("Message allocation failed.", "Error")
End If

```

## Pascal OO

```

var
    config_physical: uds_msgconfig;
    response_msg: uds_msg;
    status: uds_status;
begin
    FillChar(config_physical, sizeof(config_physical), 0);
    config_physical.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_1);
    config_physical.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;

```

```

config_physical.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config_physical.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config_physical.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;
config_physical.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config_physical.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
config_physical.nai.extension_addr := 0;

FillChar(response_msg, sizeof(response_msg), 0);
status := TUDSApi.MsgAlloc_2013(response_msg, config_physical, 1);
if TUDSApi.StatusIsOk_2013(status, uds_status.PUDS_STATUS_OK, false) then
begin
    MessageBox(0, 'Allocate ClearDiagnosticInformation response.',
        'Success', MB_OK);
end
else
begin
    MessageBox(0, 'Message allocation failed.', 'Error', MB_OK);
end;
end;

```

See also: [MsgFree\\_2013](#) on page 214.

Plain function version: [UDS\\_MsgAlloc\\_2013](#) on page 643.

### 3.7.31 MsgFree\_2013

Deallocates a PUDS message.

#### Syntax

##### Pascal OO

```

class function MsgFree_2013(
    var msg_buffer: uds_msg
): uds_status;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_MsgFree_2013")]
public static extern uds_status MsgFree_2013(
    ref uds_msg msg_buffer);

```

##### C++ / CLR

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_MsgFree_2013")]
static uds_status MsgFree_2013(
    uds_msg %msg_buffer);

```

##### Visual Basic

```

Public Shared Function MsgFree_2013(
    ByRef msg_buffer As uds_msg) As uds_status
End Function

```

## Parameters

Parameter	Description
msg_buffer	An allocated uds_msg structure buffer.


## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The uds_msg structure is invalid.
<code>PUDS_STATUS_CAUTION_BUFFER_IN_USE</code>	The message structure is currently in use. It cannot be deleted.

## Example

The following example shows the use of the method `MsgFree_2013`. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the message was already allocated.

### C#

```
uds_status result;
result = UDSApi.MsgFree_2013(ref msg);
if (!UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Free message error", "Error");
else
    MessageBox.Show("Message released", "Success");
```

### C++ / CLR

```
uds_status result;
result = UDSApi::MsgFree_2013(msg);
if (!UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Free message error", "Error");
else
    MessageBox::Show("Message released", "Success");
```

### Visual Basic

```
Dim result As uds_status
result = UDSApi.MsgFree_2013(msg)
If Not UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Free message error", "Error")
Else
    MessageBox.Show("Message released", "Success")
End If
```

### Pascal OO

```
var
    result: uds_status;
begin
    result := TUDSApi.MsgFree_2013(msg);
    if not TUDSApi.StatusIsOk_2013(result) then
    begin
        MessageBox(0, 'Free message error', 'Error', MB_OK);
    end
    else
    begin
        MessageBox(0, 'Message released', 'Success', MB_OK);
    end;
end;
```

See also: [uds\\_msg](#) on page 21, [MsgAlloc\\_2013](#) on page 211.

Plain function version: [UDS\\_MsgFree\\_2013](#) on page 645.

### 3.7.32 MsgCopy\_2013

Copies a PUDS message to another buffer.

#### Syntax

##### Pascal OO

```
class function MsgCopy_2013(
    var msg_buffer_dst: uds_msg;
    const msg_buffer_src: Puds_msg
): uds_status;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_MsgCopy_2013")]
public static extern uds_status MsgCopy_2013(
    out uds_msg msg_buffer_dst,
    [In]ref uds_msg msg_buffer_src
);
```

##### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_MsgCopy_2013")]
static uds_status MsgCopy_2013(
    uds_msg %msg_buffer_dst,
    [In] uds_msg %msg_buffer_src
);
```

##### Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_MsgCopy_2013")>
Public Shared Function MsgCopy_2013(
    ByRef msg_buffer_dst As uds_msg,
    ByRef msg_buffer_src As uds_msg) As uds_status
End Function
```

#### Parameters

Parameter	Description
msg_buffer_dst	A uds_msg structure buffer to store the copied message.
msg_buffer_src	The uds_msg structure to copy.

#### Returns

The return value is a [uds\\_status](#) code. [PUDS\\_STATUS\\_OK](#) is returned on success. The typical errors in case of failure are:

PUDS_STATUS_PARAM_INVALID_VALUE	One of the uds_msg structure is invalid.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <a href="#">MsgFree_2013</a> on page 214).

#### Remarks

When a message is copied, a new buffer is allocated. Once processed, user has to release the source and the destination messages (see [MsgFree\\_2013](#) on page 214).



## Example

The following example shows the use of the method `MsgCopy_2013`. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the source message was already allocated.

### C#

```
uds_msg destination = new uds_msg();
uds_status result = UDSApi.MsgCopy_2013(out destination, ref source);
if (!UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Copy error", "Error");
else
    MessageBox.Show("Message copied", "Success");
```

### C++ / CLR

```
uds_msg destination = {};
uds_status result = UDSApi::MsgCopy_2013(destination, source);
if (!UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Copy error", "Error");
else
    MessageBox::Show("Message copied", "Success");
```

### Visual Basic

```
Dim destination As uds_msg = New uds_msg()
Dim result As uds_status = UDSApi.MsgCopy_2013(destination, source)
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Message copied", "Success")
Else
    MessageBox.Show("Copy error", "Error")
End If
```

### Pascal OO

```
var
    destination: uds_msg;
    result: uds_status;
begin
    FillChar(destination, sizeof(destination), 0);
    result := TUDSApi.MsgCopy_2013(destination, @source);
    if TUDSApi.StatusIsOk_2013(result) then
    begin
        MessageBox(0, 'Message copied', 'Success', MB_OK);
    end
    else
    begin
        MessageBox(0, 'Copy error', 'Error', MB_OK);
    end;
end;
```

**See also:** `uds_msg` on page 21.

**Plain function version:** `UDS_MsgCopy_2013` on page 645.

### 3.7.33 MsgMove\_2013

Moves a PUDS message to another buffer (and cleans the original message structure).

#### Syntax

##### Pascal OO

```
class function MsgMove_2013(
    var msg_buffer_dst: uds_msg;
    var msg_buffer_src: uds_msg
): uds_status;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_MsgMove_2013")]
public static extern uds_status MsgMove_2013(
    out uds_msg msg_buffer_dst,
    ref uds_msg msg_buffer_src
);
```

##### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_MsgMove_2013")]
static uds_status MsgMove_2013(
    uds_msg %msg_buffer_dst,
    uds_msg %msg_buffer_src
);
```

##### Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_MsgMove_2013")>
Public Shared Function MsgMove_2013(
    ByRef msg_buffer_dst As uds_msg,
    ByRef msg_buffer_src As uds_msg) As uds_status
End Function
```

#### Parameters

Parameter	Description
msg_buffer_dst	A uds_msg structure buffer to store the message.
msg_buffer_src	The uds_msg structure buffer used as the source (will be cleaned).

#### Remarks

When a message is moved, the source buffer is cleaned: once processed, user only has to release the destination message (see [MsgFree\\_2013](#) on page 214).


#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_PARAM_INVALID_VALUE	One of the uds_msg structure is invalid.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <a href="#">MsgFree_2013</a> on page 214).

#### Example

The following example shows the use of the method [MsgMove\\_2013](#). Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the source message was already allocated.

### C#

```
uds_msg destination = new uds_msg();
uds_status result = UDSApi.MsgMove_2013(out destination, ref source);
if (!UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Move error", "Error");
else
    MessageBox.Show("Message moved", "Success");
```

### C++ / CLR

```
uds_msg destination = {};
uds_status result = UDSApi::MsgMove_2013(destination, source);
if (!UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Move error", "Error");
else
    MessageBox::Show("Message moved", "Success");
```

### Visual Basic

```
Dim destination As uds_msg = New uds_msg()
Dim result As uds_status = UDSApi.MsgMove_2013(destination, source)
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Message moved", "Success")
Else
    MessageBox.Show("Move error", "Error")
End If
```

### Pascal OO

```
var
    destination: uds_msg;
    result: uds_status;
begin
    FillChar(destination, sizeof(destination), 0);
    result := TUDSApi.MsgMove_2013(destination, source);
    if TUDSApi.StatusIsOk_2013(result) then
        begin
            MessageBox(0, 'Message moved', 'Success', MB_OK);
        end
    else
        begin
            MessageBox(0, 'Move error', 'Error', MB_OK);
        end;
end;
```


**See also:** [uds\\_msg](#) on page 21.



**Plain function version:** [UDS\\_MsgMove\\_2013](#) on page 646.

## 3.7.34 Read\_2013

Reads a CAN UDS message from the receive queue of a PUDS channel.

### Overloads

	Method	Description
	<a href="#">Read_2013</a> (cantp_handle, uds_msg)	Reads a CAN UDS message from the receive queue of a PUDS channel.

	Read_2013(cantp_handle, uds_msg, uds_msg)	Reads a CAN UDS response (matching the request message) from the receive queue of a PUDS channel.
	Read_2013(cantp_handle, uds_msg, uds_msg, cantp_timestamp)	Reads a CAN UDS response (matching the request message) and its timestamp from the receive queue of a PUDS channel.

Plain function version: `UDS_Read_2013` on page 648.

### 3.7.35 Read\_2013(cantp\_handle, uds\_msg)

Reads a CAN UDS message from the receive queue of a PUDS channel.

#### Syntax

##### Pascal OO

```
class function Read_2013(
  channel: cantp_handle;
  var out_msg_buffer: uds_msg
): uds_status; overload;
```

##### C#

```
public static uds_status Read_2013(
  [MarshalAs(UnmanagedType.U4)]
  cantp_handle channel,
  out uds_msg out_msg_buffer);
```

##### C++ / CLR

```
static uds_status Read_2013(
  [MarshalAs(UnmanagedType::U4)]
  cantp_handle channel,
  uds_msg %out_msg_buffer);
```

##### Visual Basic

```
Public Shared Function Read_2013(
  <MarshalAs(UnmanagedType.U4)>
  ByVal channel As cantp_handle,
  ByRef out_msg_buffer As uds_msg) As uds_status
End Function
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
out_msg_buffer	A uds_msg buffer to store the received message (see uds_msg on page 21).

#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NO_MESSAGE	Indicates that the receive queue of the channel is empty.
PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see MsgFree_2013 on page 214).

## Remarks

- In addition to checking `uds_status` code, the `cantp_netstatus` should be checked as it contains the network status of the message (see field `msg.msgdata.any->netstatus` in `uds_msg` on page 21).
- In case of ISO-TP message, the message type contained in the message `cantp_netaddrinfo` which indicates if the message is a complete ISO-TP message (without pending message flag) should be checked too (see field `msg.msgdata.isotp->netaddrinfo` in `uds_msg` on page 21).
- The message structure is automatically allocated and initialized in `Read_2013` method. So once the message processed, the structure must be released (see `MsgFree_2013` on page 214).

**Note:** That higher level methods like `WaitForService_2013` or `WaitForServiceFunctional_2013` should be preferred in cases where a client just has to read the response from a service request.

## Example

The following example shows the use of the method `Read_2013` on the channel `PCANTP_HANDLE_USBBUS1`. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized. This example is basic, the preferred way to read UDS messages is Using Events (see on page 777).

### C#

```
uds_status result;
uds_msg msg = new uds_msg();
bool stop = false;

do
{
    // Read the first message in the queue
    result = UDSApi.Read_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, out msg);
    if (UDSApi.StatusIsOk_2013(result))
    {
        MessageBox.Show("A message was received", "Success");

        // Process the received message
        // ProcessMessage(msg);

        result = UDSApi.MsgFree_2013(ref msg);
        if (!UDSApi.StatusIsOk_2013(result))
            MessageBox.Show("Message free error", "Error");
    }
    else
    {
        // An error occurred
        MessageBox.Show("An error occurred", "Error");
        // Here can be decided if the loop must be terminated
        // stop = HandleReadError(result);
    }
} while (!stop);
```

### C++ / CLR

```
uds_status result;
uds_msg msg = {};
bool stop = false;

do
{
    // Read the first message in the queue
```

```

result = UDSApi::Read_2013(PCANTP_HANDLE_USBBUS1, msg);
if (UDSApi::StatusIsOk_2013(result))
{
    MessageBox::Show("A message was received", "Success");

    // Process the received message
    // ProcessMessage(msg);

    result = UDSApi::MsgFree_2013(msg);
    if (!UDSApi::StatusIsOk_2013(result))
        MessageBox::Show("Message free error", "Error");
}
else
{
    // An error occurred
    MessageBox::Show("An error occurred", "Error");
    // Here can be decided if the loop has must terminated
    // stop = HandleReadError(result);
}
} while (!stop);

```

### Visual Basic

```

Dim result As uds_status
Dim msg As uds_msg = New uds_msg()
Dim stop_loop As Boolean = False

Do

    ' Read the first message in the queue
    result = UDSApi.Read_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, msg)
    If UDSApi.StatusIsOk_2013(result) Then
        MessageBox.Show("A message was received", "Success")

        ' Process the received message
        ' ProcessMessage(msg)

        result = UDSApi.MsgFree_2013(msg)
        If Not UDSApi.StatusIsOk_2013(result) Then
            MessageBox.Show("Message free error", "Error")
        End If
    Else

        ' An error occurred
        MessageBox.Show("An error occurred", "Error")
        ' Here can be decided if the loop has must terminated
        ' stop_loop = HandleReadError(result)
    End If
Loop While Not stop_loop

```

### Pascal OO

```

var
    result: uds_status;
    msg: uds_msg;
    stop: bool;
begin
    FillChar(msg, sizeof(msg), 0);
    stop := false;
    repeat

        // Read the first message in the queue

```

```

result := TUDSApi.Read_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, msg);
if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'A message was received', 'Success', MB_OK);

    // Process the received message
    // ProcessMessage(msg);

    result := TUDSApi.MsgFree_2013(msg);
    if not TUDSApi.StatusIsOk_2013(result) then
    begin
        MessageBox(0, 'Message free error', 'Error', MB_OK);
    end;
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);

    // Here can be decided if the loop has must terminated
    // stop := HandleReadError(result);
end;
until stop;
end;

```

**See also:** [Write\\_2013](#) on page 229, [uds\\_msg](#) on page 21, [UUDT Read/Write Example](#) on page 775.

**Plain function version:** [UDS\\_Read\\_2013](#) on page 648.

### 3.7.36 Read\_2013(cantp\_handle, uds\_msg, uds\_msg)

Reads a CAN UDS response (matching the given request message) from the receive queue of a PUDS channel.

#### Syntax

##### Pascal OO

```

class function Read_2013(
    channel: cantp_handle;
    var out_msg_buffer: uds_msg;
    in_msg_request: Puds_msg
): uds_status; overload;

```

##### C#

```

public static uds_status Read_2013(
    cantp_handle channel,
    out uds_msg out_msg_buffer,
    ref uds_msg in_msg_request);

```

##### C++ / CLR

```

static uds_status Read_2013(
    cantp_handle channel,
    uds_msg %out_msg_buffer,
    uds_msg %in_msg_request);

```

## Visual Basic

```
Public Shared Function Read_2013(  
    ByVal channel As cantp_handle,  
    ByRef out_msg_buffer As uds_msg,  
    ByRef in_msg_request As uds_msg) As uds_status  
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
out_msg_buffer	A uds_msg buffer to store the received message (see uds_msg on page 21).
in_msg_request	Optional, request message which contains the network address information to filter in order to read the response (see uds_msg on page 21).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NO_MESSAGE</code>	Indicates that the receive queue of the channel is empty.
<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

- In addition to checking `uds_status` code, the `cantp_netstatus` should be checked as it contains the network status of the message (see field `msg.msgdata.any->netstatus` in `uds_msg` on page 21).
- In case of ISO-TP message, the message type contained in the message `cantp_netaddrinfo` which indicates if the message is a complete ISO-TP message (no pending message flag) should be checked too (see field `msg.msgdata.isotp->netaddrinfo` in `uds_msg` on page 21).
- The message structure is automatically allocated and initialized in `Read_2013` method. So once the message processed, the structure must be released (see `MsgFree_2013` on page 214).

**Note:** That higher level methods like `WaitForService_2013` or `WaitForServiceFunctional_2013` should be preferred in cases where a client just has to read the response from a service request.

## Example

The following example shows the use of the method `Read_2013` on the channel `PCANTP_HANDLE_USBBUS1`. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized, and a request message has been sent.

## C#

```
uds_status result;  
uds_msg msg = new uds_msg();  
bool stop = false;  
  
do  
{  
    // Read the first message in the queue  
    result = UDSApi.Read_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, out msg, ref request_msg);  
    if (UDSApi.StatusIsOk_2013(result))  
    {  
        MessageBox.Show("A message was received", "Success");  
    }  
}
```



```

        result = UDSApi.MsgFree_2013(ref msg);
        if (!UDSApi.StatusIsOk_2013(result))
            MessageBox.Show("Message free error", "Error");
    }
    else
    {
        // Here can be decided if the loop must be terminated
        // stop = HandleReadError(result);
    }
} while (!stop);

```

### C++ / CLR

```

uds_status result;
uds_msg msg = {};
bool stop = false;

do
{
    // Read the first message in the queue
    result = UDSApi::Read_2013(PCANTP_HANDLE_USBBUS1, msg, request_msg);
    if (UDSApi::StatusIsOk_2013(result))
    {
        MessageBox::Show("A message was received", "Success");
        result = UDSApi::MsgFree_2013(msg);
        if (!UDSApi::StatusIsOk_2013(result))
            MessageBox::Show("Message free error", "Error");
    }
    else
    {
        // Here can be decided if the loop has must terminated
        // stop = HandleReadError(result);
    }
} while (!stop);

```

### Visual Basic

```

Dim result As uds_status
Dim msg As uds_msg = New uds_msg()
Dim stop_loop As Boolean = False

Do

    ' Read the first message in the queue
    result = UDSApi.Read_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, msg, request_msg)
    If UDSApi.StatusIsOk_2013(result) Then
        MessageBox.Show("A message was received", "Success")
        result = UDSApi.MsgFree_2013(msg)
        If Not UDSApi.StatusIsOk_2013(result) Then
            MessageBox.Show("Message free error", "Error")
        End If
    Else
        ' Here can be decided if the loop has must terminated
        ' stop_loop = HandleReadError(result)
    End If
Loop While Not stop_loop

```

### Pascal OO

```

var
    result: uds_status;
    msg: uds_msg;
    stop_loop: bool;

```

```

begin
  FillChar(msg, sizeof(msg), 0);
  stop_loop := false;
  repeat
    // Read the first message in the queue
    result := TUDSApi.Read_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, msg,
      @request_msg);
    if TUDSApi.StatusIsOk_2013(result) then
      begin
        MessageBox(0, 'A message was received', 'Success', MB_OK);
        result := TUDSApi.MsgFree_2013(msg);
        if not TUDSApi.StatusIsOk_2013(result) then
          begin
            MessageBox(0, 'Message free error', 'Error', MB_OK);
          end;
        end;
      else
        begin
          // Here can be decided if the loop has must terminated
          // stop_loop := HandleReadError(result);
        end;
      until stop_loop;
    end;
  end;
end;

```

See also: [Write\\_2013](#) on page 229, [uds\\_msg](#) on page 21, UUDT Read/Write Example on page 775.

Plain function version: [UDS\\_Read\\_2013](#) on page 648.

### 3.7.37 Read\_2013(cantp\_handle, uds\_msg, uds\_msg, cantp\_timestamp)

Reads a CAN UDS response (matching the given request message) and its timestamp from the receive queue of a PUDS channel.

#### Syntax

##### Pascal OO

```

class function Read_2013(
  channel: cantp_handle;
  var out_msg_buffer: uds_msg;
  in_msg_request: Puds_msg;
  out_timestamp: Pcantp_timestamp
): uds_status; overload;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_Read_2013")]
public static extern uds_status Read_2013(
  [MarshalAs(UnmanagedType.U4)]
  cantp_handle channel,
  out uds_msg out_msg_buffer,
  [In] ref uds_msg in_msg_request,
  out cantp_timestamp out_timestamp);

```

##### C++ / CLR

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_Read_2013")]
static uds_status Read_2013(
  [MarshalAs(UnmanagedType.U4)]
  cantp_handle channel,
  uds_msg %out_msg_buffer,
  [In] uds_msg %in_msg_request,

```

```
cantp_timestamp %out_timestamp);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_Read_2013")>
Public Shared Function Read_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByRef out_msg_buffer As uds_msg,
    ByRef in_msg_request As uds_msg,
    ByRef out_timestamp As cantp_timestamp) As uds_status
End Function
```

## Parameters

Parameter	Description
Channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
out_msg_buffer	A <code>uds_msg</code> buffer to store the received message (see <code>uds_msg</code> on page 21).
in_msg_request	Optional, request message which contains the network address information to filter in order to read the response (see <code>uds_msg</code> on page 21).
out_timestamp	A <code>cantp_timestamp</code> structure buffer to get the reception time of the message. If this value is not desired, this parameter should be passed as NULL (see <code>cantp_timestamp</code> on page 104).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NO_MESSAGE</code>	Indicates that the receive queue of the channel is empty.
<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

- In addition to checking `uds_status` code, the `cantp_netstatus` should be checked as it contains the network status of the message (see field `msg.msgdata.any->netstatus` in `uds_msg` on page 21).
- In case of ISO-TP message, the message type contained in the message `cantp_netaddrinfo` which indicates if the message is a complete ISO-TP message (no pending message flag) should be checked too (see field `msg.msgdata.isotp->netaddrinfo` in `uds_msg` on page 21).
- Specifying the value of `NULL` for the parameter `out_timestamp` causes reading a message without timestamp when the reception time is not desired.
- The message structure is automatically allocated and initialized in `Read_2013` method. So once the message processed, the structure must be uninitialized (see `MsgFree_2013` on page 214).

**Note:** Higher level methods like `WaitForService_2013` or `WaitForServiceFunctional_2013` should be preferred in cases where a client just has to read the response from a service request.

## Example

The following example shows the use of the method `Read_2013` on the channel `PCANTP_HANDLE_USBBUS1`. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized, and a request message has been sent.

C#

```
uds_status result;
```

```

uds_msg msg = new uds_msg();
bool stop = false;
cantp_timestamp timestamp;
do
{
    // Read the first message in the queue

    result = UDSApi.Read_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, out msg, ref request_msg, out
        timestamp);
    if (UDSApi.StatusIsOk_2013(result))
    {
        MessageBox.Show("A message was received at t=" + timestamp, "Success");
        result = UDSApi.MsgFree_2013(ref msg);
        if (!UDSApi.StatusIsOk_2013(result))
            MessageBox.Show("Message free error", "Error");
    }
    else
    {
        // Here can be decided if the loop must be terminated
        // stop = HandleReadError(result);
    }
} while (!stop);

```

### C++ / CLR

```

uds_status result;
uds_msg msg = {};
bool stop = false;
cantp_timestamp timestamp;
do
{
    // Read the first message in the queue

    result = UDSApi::Read_2013(PCANTP_HANDLE_USBBUS1, msg, request_msg, timestamp);
    if (UDSApi::StatusIsOk_2013(result))
    {
        MessageBox::Show("A message was received at t=" + timestamp, "Success");
        result = UDSApi::MsgFree_2013(msg);
        if (!UDSApi::StatusIsOk_2013(result))
            MessageBox::Show("Message free error", "Error");
    }
    else
    {
        // Here can be decided if the loop must be terminated
        // stop = HandleReadError(result);
    }
} while (!stop);

```

### Visual Basic

```

Dim result As uds_status
Dim msg As uds_msg = New uds_msg()
Dim stop_loop As Boolean = False
Dim timestamp As cantp_timestamp
Do
    ' Read the first message in the queue
    result = UDSApi.Read_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, msg, request_msg, timestamp)
    If UDSApi.StatusIsOk_2013(result) Then
        MessageBox.Show("A message was received at t=" + timestamp.ToString(), "Success")
        result = UDSApi.MsgFree_2013(msg)
        If Not UDSApi.StatusIsOk_2013(result) Then
            MessageBox.Show("Message free error", "Error")
        End If
    End If

```

```

        End If
    Else
        ' Here can be decided if the loop must be terminated
        ' stop_loop = HandleReadError(result)
    End If
Loop While Not stop_loop

```

### Pascal OO

```

var
    result: uds_status;
    msg: uds_msg;
    stop_loop: bool;
    timestamp: cantp_timestamp;
begin
    FillChar(msg, sizeof(msg), 0);
    stop_loop := false;
    repeat

        // Read the first message in the queue
        result := TUDSApi.Read_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, msg,
            @request_msg, @timestamp);
        if TUDSApi.StatusIsOk_2013(result) then
            begin
                MessageBox(0, PWideChar(format('A message was received at t=%d',
                    [UInt64(timestamp)])), 'Success', MB_OK);
                result := TUDSApi.MsgFree_2013(msg);
                if not TUDSApi.StatusIsOk_2013(result) then
                    begin
                        MessageBox(0, 'Message free error', 'Error', MB_OK);
                    end;
                end
            else
                begin
                    // Here can be decided if the loop must be terminated
                    // stop_loop := HandleReadError(result);
                end;
            until stop_loop;
        end;
end;

```

See also: [Write\\_2013](#) on page 229, [uds\\_msg](#) on page 21, UUDT Read/Write Example on page 775.  
 Plain function version: [UDS\\_Read\\_2013](#) on page 648.

### 3.7.38 write\_2013

Transmits a PUDS message using a connected PUDS channel.

#### Syntax

##### Pascal OO

```

class function Write_2013(
    channel: cantp_handle;
    msg_buffer: Puds_msg
): uds_status;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_Write_2013")]
public static extern uds_status Write_2013(
    [MarshalAs(UnmanagedType.U4)]

```

```
cantp_handle channel,
ref uds_msg msg_buffer);
```

## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_Write_2013")]
static uds_status Write_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msg %msg_buffer);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_Write_2013")>
Public Shared Function Write_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByRef msg_buffer As uds_msg) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
msg_buffer	A uds_msg containing the message to be sent (see uds_msg on page 21).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of initialized channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The message is not a valid PUDS message.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with Reset_2013 (see Reset_2013 on page 234).
PUDS_STATUS_PARAM_INVALID_TYPE	The message type is not valid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	The mapping is unknown.

## Remarks

The `Write_2013` method does not actually send the UDS message, the transmission is asynchronous. Should a message fail to be transmitted, it will be added to the reception queue with a specific network error code in the `msg.msgdata.isotp->netaddrinfo` field of the `uds_msg`.

**Note:** To transmit a standard UDS service request, it is recommended to use the corresponding API Service method starting with `Svc` (like `SvcDiagnosticSessionControl_2013`).

## Example

The following example shows the use of the method `Write_2013` on the channel `PCANTP_HANDLE_USBBUS1`. It adds to the transmit queue a UDS request then waits until a confirmation message is received. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized, mapping, message configuration and receive event were configured, the content of the `data` field is not initialized in the example.

## C#

```
uds_status result;
```

```

uds_msg request_msg = new uds_msg();
uds_msg loopback_msg = new uds_msg();
bool wait_result;

// Allocate and initialize message structure
result = UDSApi.MsgAlloc_2013(out request_msg, config, 4095);
if (!UDSApI.StatusIsOk_2013(result))
{
    MessageBox.Show("Message initialization error: " + result, "Error");
}
else
{
    // The message is sent using the PCAN-USB.
    result = UDSApi.Write_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request_msg);
    if (UDSApI.StatusIsOk_2013(result))
    {
        // Read the transmission confirmation.
        wait_result = receive_event.WaitOne(5000);
        if (wait_result)
        {
            result = UDSApi.Read_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, out loopback_msg);
            if (UDSApI.StatusIsOk_2013(result))
            {
                MessageBox.Show("Read = " + result + ", type=" + loopback_msg.type +
                    ", netstatus=" + loopback_msg.msg.Msgdata_any_Copy.netstatus, "Read");
                UDSApi.MsgFree_2013(ref loopback_msg);
            }
            else
            {
                MessageBox.Show("Read error: " + result, "Error");
            }
        }
        UDSApi.MsgFree_2013(ref request_msg);
    }
    else
    {
        MessageBox.Show("Write error: " + result, "Error");
    }
}
}

```

**C++ / CLR**

```

uds_status result;
uds_msg request_msg = {};
uds_msg loopback_msg = {};
bool wait_result;

// Allocate and initialize message structure
result = UDSApi::MsgAlloc_2013(request_msg, config, 4095);
if (!UDSApI::StatusIsOk_2013(result))
{
    MessageBox::Show(String::Format("Message initialization error: {0}", (int)result),
        "Error");
}
else
{
    // The message is sent using the PCAN-USB.
    result = UDSApi::Write_2013(PCANTP_HANDLE_USBBUS1, request_msg);
    if (UDSApI::StatusIsOk_2013(result))
    {
        // Read the transmission confirmation.
        wait_result = receive_event.WaitOne(5000);
    }
}

```

```

    if (wait_result)
    {
        result = UDSApi::Read_2013(PCANTP_HANDLE_USBBUS1, loopback_msg);
        if (UDSApi::StatusIsOk_2013(result))
        {
            MessageBox::Show(String::Format(
                "Read = {0}, type={1}, netstatus={2}", (int)result,
                (int)loopback_msg.type,
                (int)loopback_msg.msg.msgdata.any->netstatus), "Read");
            UDSApi::MsgFree_2013(loopback_msg);
        }
        else
        {
            MessageBox::Show(String::Format("Read error: {0}", (int)result),
                "Error");
        }
    }
    UDSApi::MsgFree_2013(request_msg);
}
else
{
    MessageBox::Show(String::Format("Write error: {0}", (int)result), "Error");
}
}

```

### Visual Basic

```

Dim result As uds_status
Dim request_msg As uds_msg = New uds_msg()
Dim loopback_msg As uds_msg = New uds_msg()
Dim wait_result As Boolean

' Allocate and initialize message structure
result = UDSApi.MsgAlloc_2013(request_msg, config, 4095)
If Not UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Message initialization error: " + result.ToString(), "Error")
Else
    ' The message is sent using the PCAN-USB.
    result = UDSApi.Write_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request_msg)
    If UDSApi.StatusIsOk_2013(result) Then
        ' Read the transmission confirmation.
        wait_result = receive_event.WaitOne(5000)
        If wait_result Then
            result = UDSApi.Read_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, loopback_msg)
            If UDSApi.StatusIsOk_2013(result) Then
                MessageBox.Show("Read = " + result.ToString() + ", type=" +
                    loopback_msg.type.ToString() + ", netstatus=" +
                    loopback_msg.msg.Msgdata_any_Copy.netstatus.ToString(), "Read")
                UDSApi.MsgFree_2013(loopback_msg)
            Else
                MessageBox.Show("Read error: " + result.ToString(), "Error")
            End If
        End If
        UDSApi.MsgFree_2013(request_msg)
    Else
        MessageBox.Show("Write error: " + result.ToString(), "Error")
    End If
End If

```

### Pascal OO

```

var

```



```

result: uds_status;
request_msg: uds_msg;
loopback_msg: uds_msg;
wait_result: UInt32;
begin
  FillChar(request_msg, sizeof(request_msg), 0);
  FillChar(loopback_msg, sizeof(loopback_msg), 0);

  // Allocate and initialize message structure
  result := TUDSApi.MsgAlloc_2013(request_msg, config, 4095);
  if not TUDSApi.StatusIsOk_2013(result) then
    begin
      MessageBox(0, PWideChar(format('Message initialization error: %d',
        [Integer(result)])), 'Error', MB_OK);
    end
  else
    begin

      // The message is sent using the PCAN-USB.
      result := TUDSApi.Write_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request_msg);
      if TUDSApi.StatusIsOk_2013(result) then
        begin

          // Read the transmission confirmation.
          wait_result := WaitForSingleObject(receive_event, 5000);
          if wait_result = WAIT_OBJECT_0 then
            begin
              result := TUDSApi.Read_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
                loopback_msg);
              if TUDSApi.StatusIsOk_2013(result) then
                begin
                  MessageBox(0, PWideChar(format('Read=%d, type=%d, netstatus=%d',
                    [Integer(result), Integer(loopback_msg.typem),
                    Integer(loopback_msg.msg.msgdata_any.netstatus)])), 'Read', MB_OK);
                  TUDSApi.MsgFree_2013(loopback_msg);
                end
              else
                begin
                  MessageBox(0, PWideChar(format('Read error: %d', [Integer(result)])),
                    'Error', MB_OK);
                end;
            end;
          end;
          TUDSApi.MsgFree_2013(request_msg);
        end
      else
        begin
          MessageBox(0, PWideChar(format('Write error: %d', [Integer(result)])),
            'Error', MB_OK);
        end;
      end;
    end;
  end;
end;

```

**See also:** [Read\\_2013](#) on page 219, UUDT Read/Write Example on page 775.  
**Plain function version:** [UDS\\_Write\\_2013](#) on page 649.

### 3.7.39 Reset\_2013

Resets the receive and transmit queues of a PUDS channel.

#### Syntax

##### Pascal OO

```
class function Reset_2013(
    channel: cantp_handle
): uds_status;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_Reset_2013")]
public static extern uds_status Reset_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel);
```

##### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_Reset_2013")]
static uds_status Reset_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel);
```

##### Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_Reset_2013")>
Public Shared Function Reset_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle) As uds_status
End Function
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).

#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical error in case of failure is:


PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of initialized channels of the calling application.
-----------------------------	---

#### Remarks

Calling this method ONLY clear the queues of a channel. A reset of the CAN controller does not take place.

#### Example

The following example shows the use of the method `Reset_2013` on the channel `PCANTP_HANDLE_PCIBUS1`. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

**C#**

```
uds_status result;

result = UDSApi.Reset_2013(cantp_handle.PCANTP_HANDLE_PCIBUS1);
if (!UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("An error occurred", "Error");
else
    MessageBox.Show("PCAN-PCI (Ch-1) was reset", "Success");
```

**C++ / CLR**

```
uds_status result;

result = UDSApi::Reset_2013(PCANTP_HANDLE_PCIBUS1);
if (!UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("An error occurred", "Error");
else
    MessageBox::Show("PCAN-PCI (Ch-1) was reset", "Success");
```

**Visual Basic**

```
Dim result As uds_status

result = UDSApi.Reset_2013(cantp_handle.PCANTP_HANDLE_PCIBUS1)
If Not UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("An error occurred", "Error")
Else
    MessageBox.Show("PCAN-PCI (Ch-1) was reset", "Success")
End If
```

**Pascal OO**

```
var
    result: uds_status;
begin
    result := TUDSApi.Reset_2013(cantp_handle.PCANTP_HANDLE_PCIBUS1);
    if not TUDSApi.StatusIsOk_2013(result) then
        begin
            MessageBox(0, 'An error occurred', 'Error', MB_OK);
        end
    else
        begin
            MessageBox(0, 'PCAN-PCI (Ch-1) was reset', 'Success', MB_OK);
        end;
end;
```

See also: [Uninitialize\\_2013](#) on page 151.

Plain function version: [UDS\\_Reset\\_2013](#) on page 651.

**3.7.40 WaitForSingleMessage\_2013**

Waits for a message (a response or a transmit confirmation) based on a PUDS message request.

**Syntax****Pascal OO**

```
class function WaitForSingleMessage_2013(
    channel: cantp_handle;
    msg_request: Puds_msg;
```

```
is_waiting_for_tx: Boolean;
timeout: UInt32;
timeout_enhanced: UInt32;
var out_msg_response: uds_msg
): uds_status;
```

## C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_WaitForSingleMessage_2013")]
public static extern uds_status WaitForSingleMessage_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    [In] ref uds_msg msg_request,
    [MarshalAs(UnmanagedType.U1)]
    bool is_waiting_for_tx,
    UInt32 timeout,
    UInt32 timeout_enhanced,
    out uds_msg out_msg_response);
```

## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_WaitForSingleMessage_2013")]
static uds_status WaitForSingleMessage_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    [In] uds_msg %msg_request,
    [MarshalAs(UnmanagedType::U1)]
    bool is_waiting_for_tx,
    UInt32 timeout,
    UInt32 timeout_enhanced,
    uds_msg %out_msg_response);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_WaitForSingleMessage_2013")>
Public Shared Function WaitForSingleMessage_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByRef msg_request As uds_msg,
    <MarshalAs(UnmanagedType.U1)>
    ByVal is_waiting_for_tx As Boolean,
    ByVal timeout As UInt32,
    ByVal timeout_enhanced As UInt32,
    ByRef out_msg_response As uds_msg) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
msg_request	A uds_msg buffer containing the PUDS message request that was previously sent (see uds_msg on page 21).
is_waiting_for_tx	States whether the message to wait for is a transmit confirmation or not.
timeout	Maximum time to wait (in milliseconds) for a message indication corresponding to the message request. <b>Note:</b> A zero value means unlimited time.
timeout_enhanced	Maximum time to wait (in milliseconds) for a message to be complete if server (ECU) ask more time.
out_msg_response	A uds_msg buffer to store the PUDS response message (see uds_msg on page 21).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of initialized channels of the calling application.
<code>PUDS_STATUS_SERVICE_TIMEOUT_CONFIRMATION</code>	Timeout while waiting for request confirmation (request message loopback).
<code>PUDS_STATUS_SERVICE_TIMEOUT_RESPONSE</code>	Timeout while waiting for response message.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is invalid.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks


The criteria to identify if a response matches the message request is based only on the network addressing information and the UDS service identifier: if the same service is requested multiple times with different parameters (like service `ReadDataByIdentifier` with different Data IDs), the user will have to ensure that the extra content matches the original request.

The timeout parameter is ignored once a message indication matching the request is received (i.e. the first frame of the message), the timeout enhanced is then used.

The parameters of `WaitFor*_2013` methods have a new order. They do not keep the order of the previous version.

## Example

The following example shows the use of the method `WaitForSingleMessage_2013` on the channel `PCANTP_HANDLE_USBBUS1`. It writes a UDS message on the CAN Bus and waits for the confirmation of the transmission. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel and the mapping were already initialized.

### C#

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg confirmation = new uds_msg();

// Prepare an 11bit CAN ID, physically addressed UDS message containing 4 Bytes of data
uds_msgconfig config = new uds_msgconfig();
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

result = UDSApi.MsgAlloc_2013(out request, config, 4);
if (!UDSApi.StatusIsOk_2013(result))
{
    MessageBox.Show("Error occurred while allocating request message.", "Error");
}
else
{
    // The message is sent using the PCAN-USB
    result = UDSApi.Write_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request);
}

```

```

if (UDSApi.StatusIsOk_2013(result))
{
    // Wait for the transmit confirmation
    result = UDSApi.WaitForSingleMessage_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref
        request, true, 10, 100, out confirmation);
    if (UDSApi.StatusIsOk_2013(result))
    {
        MessageBox.Show("Message was transmitted.", "Success");
        UDSApi.MsgFree_2013(ref confirmation);
    }
    else
    {
        // An error occurred
        MessageBox.Show("Error occurred while waiting for transmit confirmation.",
            "Error");
    }
    UDSApi.MsgFree_2013(ref request);
}
else
{
    // An error occurred
    MessageBox.Show("An error occurred", "Error");
}
}

```

**C++/CLR**

```

uds_status result;
uds_msg request = {};
uds_msg confirmation = {};

// Prepare an 11bit CAN ID, physically addressed UDS message containing 4 Bytes of data
uds_msgconfig config = {};
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

result = UDSApi::MsgAlloc_2013(request, config, 4);
if (!UDSApi::StatusIsOk_2013(result))
{
    MessageBox::Show("Error occurred while allocating request message.", "Error");
}
else
{
    // The message is sent using the PCAN-USB
    result = UDSApi::Write_2013(PCANTP_HANDLE_USBBUS1, request);
    if (UDSApi::StatusIsOk_2013(result))
    {
        // Wait for the transmit confirmation
        result = UDSApi::WaitForSingleMessage_2013(PCANTP_HANDLE_USBBUS1, request, true,
            10, 100, confirmation);
        if (UDSApi::StatusIsOk_2013(result))
        {
            MessageBox::Show("Message was transmitted.", "Success");
            UDSApi::MsgFree_2013(confirmation);
        }
        else
    }
}

```

```

        {
            // An error occurred
            MessageBox::Show("Error occurred while waiting for transmit confirmation.",
                            "Error");
        }
        UDSApi::MsgFree_2013(request);
    }
else
{
    // An error occurred
    MessageBox::Show("An error occurred", "Error");
}
}

```

### Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim confirmation As uds_msg = New uds_msg()

' Prepare an 11bit CAN ID, physically addressed UDS message containing 4 Bytes of data
Dim config As uds_msgconfig = New uds_msgconfig()
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = 0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

result = UDSApi.MsgAlloc_2013(request, config, 4)
If Not UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Error occurred while allocating request message.", "Error")
Else
    ' The message is sent using the PCAN-USB
    result = UDSApi.Write_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request)
    If UDSApi.StatusIsOk_2013(result) Then
        ' Wait for the transmit confirmation
        result = UDSApi.WaitForSingleMessage_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request,
            True, 10, 100, confirmation)
        If UDSApi.StatusIsOk_2013(result) Then
            MessageBox.Show("Message was transmitted.", "Success")
            UDSApi.MsgFree_2013(confirmation)
        Else
            ' An error occurred
            MessageBox.Show("Error occurred while waiting for transmit confirmation.", "Error")
        End If
        UDSApi.MsgFree_2013(request)
    Else
        ' An error occurred
        MessageBox.Show("An error occurred", "Error")
    End If
End If

```

### Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    confirmation: uds_msg;
    config: uds_msgconfig;

```

```

begin
  FillChar(request, sizeof(request), 0);
  FillChar(confirmation, sizeof(confirmation), 0);

  // Prepare an 11bit CAN ID, physically addressed UDS message containing 4 Bytes of data
  FillChar(config, sizeof(config), 0);
  config.can_id :=
    UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
  config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
  config.nai.extension_addr := 0;
  config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
  config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
  config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
  config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
  config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

  result := TUDSApi.MsgAlloc_2013(request, config, 4);
  if not TUDSApi.StatusIsOk_2013(result) then
    begin
      MessageBox(0, 'Error occurred while allocating request message.',
        'Error', MB_OK);
    end
  else
    begin
      // The message is sent using the PCAN-USB
      result := TUDSApi.Write_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, @request);
      if TUDSApi.StatusIsOk_2013(result) then
        begin
          // Wait for the transmit confirmation
          result := TUDSApi.WaitForSingleMessage_2013
            (cantp_handle.PCANTP_HANDLE_USBBUS1, @request, true, 10, 100,
              confirmation);
          if TUDSApi.StatusIsOk_2013(result) then
            begin
              MessageBox(0, 'Message was transmitted.', 'Success', MB_OK);
              TUDSApi.MsgFree_2013(confirmation);
            end
          else
            begin
              // An error occurred
              MessageBox(0, 'Error occurred while waiting for transmit confirmation.',
                'Error', MB_OK);
            end;
            TUDSApi.MsgFree_2013(request);
          end
        else
          begin
            // An error occurred
            MessageBox(0, 'An error occurred', 'Error', MB_OK);
          end;
        end;
      end;
    end;
  end;
end;

```

**See also:** [WaitForService\\_2013](#) on page 248, [WaitForServiceFunctional\\_2013](#) on page 252,  
[WaitForFunctionalResponses\\_2013](#) on page 241.

**Plain function version:** [UDS\\_WaitForSingleMessage\\_2013](#) on page 652.



### 3.7.41 WaitForFunctionalResponses\_2013

Waits for multiple messages (multiple responses from a functional request for instance) based on a PUDS message request.

#### Syntax

##### Pascal OO

```
class function WaitForFunctionalResponses_2013(
  channel: cantp_handle;
  msg_request: Puds_msg;
  timeout: UInt32;
  timeout_enhanced: UInt32;
  wait_until_timeout: Boolean;
  max_msg_count: UInt32;
  out_msg_responses: Puds_msg;
  var out_msg_count: UInt32
): uds_status;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_WaitForFunctionalResponses_2013")]
public static extern uds_status WaitForFunctionalResponses_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    [In] ref uds_msg msg_request,
    UInt32 timeout,
    UInt32 timeout_enhanced,
    [MarshalAs(UnmanagedType.U1)]
    bool wait_until_timeout,
    UInt32 max_msg_count,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex=5)]
    [Out] uds_msg[] out_msg_responses,
    out UInt32 out_msg_count
);
```

##### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_WaitForFunctionalResponses_2013")]
static uds_status WaitForFunctionalResponses_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    [In] uds_msg %msg_request,
    UInt32 timeout,
    UInt32 timeout_enhanced,
    [MarshalAs(UnmanagedType::U1)]
    bool wait_until_timeout,
    UInt32 max_msg_count,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 5)]
    [Out] array<uds_msg> ^out_msg_responses,
    UInt32 %out_msg_count);
```

##### Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_WaitForFunctionalResponses_2013")>
Public Shared Function WaitForFunctionalResponses_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByRef msg_request As uds_msg,
    ByVal timeout As UInt32,
    ByVal timeout_enhanced As UInt32,
```

```

<MarshalAs(UnmanagedType.U1)>
ByVal wait_until_timeout As Boolean,
ByVal max_msg_count As UInt32,
<MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=5)>
<Out> ByVal out_msg_responses As uds_msg(),
ByRef out_msg_count As UInt32) As uds_status
End Function

```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>can_tp_handle</code> on page 105).
msg_request	A <code>uds_msg</code> containing the PUDS message request that was previously sent (see <code>uds_msg</code> on page 21).
timeout	Maximum time to wait (in milliseconds) for a message indication corresponding to the message request. <b>Note:</b> A zero value means unlimited time.
timeout_enhanced	Maximum time to wait (in milliseconds) for a message to be complete if server/ECU ask more time.
wait_until_timeout	If false the method is interrupted if <code>out_msg_count</code> reaches <code>max_msg_count</code> .
max_msg_count	Size of the responses buffer array (maximum messages that can be received).
out_msg_responses	A <code>uds_msg</code> buffer array to store the PUDS response message (see <code>uds_msg</code> on page 21).
out_msg_count	Output, number of read messages.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of initialized channels of the calling application.
<code>PUDS_STATUS_NO_MESSAGE</code>	Indicates that no matching message was received in the given time.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is invalid.
<code>PUDS_STATUS_SERVICE_RX_OVERFLOW</code>	Service received more messages than input buffer expected.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks


The criteria to identify if a response matches the message request is based only on the network addressing information and the UDS service identifier: if the same service is requested multiple times with different parameters (like service `ReadDataByIdentifier` with different data identifiers), the user will have to ensure that the extra content matches the original request.

The timeout parameter is ignored once a message indication matching the request is received (i.e. the first frame of the message), the timeout enhanced is then used.

The parameters of `WaitFor*_2013` methods have a new order. They do not keep the order of the previous version.

## Example

The following example shows the use of the method `WaitForFunctionalResponses_2013` on the channel `PCANTP_HANDLE_USBBUS1`. It writes a PUDS functional request on the CAN Bus, waits for the confirmation of the transmission, and then waits to receive responses from ECUs until a timeout occurs. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

**C#**

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg confirmation = new uds_msg();
UInt32 response_array_length = 5;
uds_msg[] response_array = new uds_msg[5];
UInt32 count;

// prepare an 11bit CAN ID, functionally addressed UDS message
uds_msgconfig config = new uds_msgconfig();
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_OBD_FUNCTIONAL;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_FUNCTIONAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

result = UDSApi.MsgAlloc_2013(out request, config, 4);
if (!UDSApi.StatusIsOk_2013(result))
{
    MessageBox.Show("Error occurred while allocating request message.", "Error");
}
else
{
    // [...] fill data (functional message is limited to 1 CAN frame)

    // The message is sent using the PCAN-USB
    result = UDSApi.Write_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request);
    if (UDSApi.StatusIsOk_2013(result))
    {
        // Wait for the transmit confirmation
        result = UDSApi.WaitForSingleMessage_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref
            request, true, 10, 100, out confirmation);
        if (UDSApi.StatusIsOk_2013(result) && confirmation.msg.Msgdata_any_Copy.netstatus ==
            cantp_netstatus.PCANTP_NETSTATUS_OK)
        {
            MessageBox.Show("Message was transmitted.", "Success");
            // wait for the responses
            result = UDSApi.WaitForFunctionalResponses_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
                ref request, 10, 100, true, response_array_length, response_array, out count);
            if (count > 0)
            {
                MessageBox.Show("Responses were received", "Success");
                for (int i = 0; i < count; i++)
                {
                    UDSApi.MsgFree_2013(ref response_array[i]);
                }
            }
            else
            {
                MessageBox.Show("No response was received", "Error");
            }
            UDSApi.MsgFree_2013(ref confirmation);
        }
        else
        {
            // An error occurred
            MessageBox.Show("Error occurred while waiting for transmit confirmation.",
                "Error");
        }
    }
}

```

```

        UDSApi.MsgFree_2013(ref request);
    }
    else
    {
        // An error occurred
        MessageBox.Show("An error occurred", "Error");
    }
}

```

## C++ / CLR

```

uds_status result;
uds_msg request = {};
uds_msg confirmation = {};
UInt32 response_array_length = 5;
array<uds_msg>^ response_array = gcnew array<uds_msg>(5);
UInt32 count;

// prepare an 11bit CAN ID, functionally addressed UDS message
uds_msgconfig config = {};
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_OBD_FUNCTIONAL;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_FUNCTIONAL;
config.type = PUDS_MSGTYPE_USDT;

result = UDSApi::MsgAlloc_2013(request, config, 4);
if (!UDSApi::StatusIsOk_2013(result))
{
    MessageBox::Show("Error occurred while allocating request message.", "Error");
}
else
{
    // [...] fill data (functional message is limited to 1 CAN frame)

    // The message is sent using the PCAN-USB
    result = UDSApi::Write_2013(PCANTP_HANDLE_USBBUS1, request);
    if (UDSApi::StatusIsOk_2013(result))
    {
        // Wait for the transmit confirmation
        result = UDSApi::WaitForSingleMessage_2013(PCANTP_HANDLE_USBBUS1, request, true,
            10, 100, confirmation);
        if (UDSApi::StatusIsOk_2013(result) && confirmation.msg.msgdata.any->netstatus ==
            PCANTP_NETSTATUS_OK)
        {
            MessageBox::Show("Message was transmitted.", "Success");
            // wait for the responses
            result = UDSApi::WaitForFunctionalResponses_2013(PCANTP_HANDLE_USBBUS1,
                request, 10, 100, true, response_array_length, response_array,
                count);
            if (count > 0)
            {
                MessageBox::Show("Responses were received", "Success");
                for (UInt32 i = 0; i < count; i++)
                {
                    UDSApi::MsgFree_2013(response_array[i]);
                }
            }
            else
            {

```

```

        MessageBox::Show("No response was received", "Error");
    }
    UDSApi::MsgFree_2013(confirmation);
}
else
{
    // An error occurred
    MessageBox::Show("Error occurred while waiting for transmit confirmation.",
        "Error");
}
    UDSApi::MsgFree_2013(request);
}
else
{
    // An error occurred
    MessageBox::Show("An error occurred", "Error");
}
}

```

### Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim confirmation As uds_msg = New uds_msg()
Dim response_array_length As UInt32 = 5
Dim response_array(5) As uds_msg
Dim count As UInt32

' prepare an 11bit CAN ID, functionally addressed UDS message
Dim config As uds_msgconfig = New uds_msgconfig()
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = 0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_OBD_FUNCTIONAL
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_FUNCTIONAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

result = UDSApi.MsgAlloc_2013(request, config, 4)
If Not UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Error occurred while allocating request message.", "Error")
Else

    ' [...] fill data (functional message is limited to 1 CAN frame)

    ' The message is sent using the PCAN-USB
    result = UDSApi.Write_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request)
    If UDSApi.StatusIsOk_2013(result) Then

        ' Wait for the transmit confirmation
        result = UDSApi.WaitForSingleMessage_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request,
            True, 10, 100, confirmation)
        If UDSApi.StatusIsOk_2013(result) And confirmation.msg.Msgdata_any_Copy.netstatus =
            cantp_netstatus.PCANTP_NETSTATUS_OK Then
            MessageBox.Show("Message was transmitted.", "Success")

            ' wait for the responses
            result = UDSApi.WaitForFunctionalResponses_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
                request, 10, 100, True, response_array_length, response_array, count)
            If count > 0 Then
                MessageBox.Show("Responses were received", "Success")
                For i As UInt32 = 0 To count - 1

```

```

        UDSApi.MsgFree_2013(response_array(i))
    Next
Else
    MessageBox.Show("No response was received", "Error")
End If
UDSApi.MsgFree_2013(confirmation)
Else
    ' An error occurred
    MessageBox.Show("Error occurred while waiting for transmit confirmation.", "Error")
End If
UDSApi.MsgFree_2013(request)
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If
End If

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    confirmation: uds_msg;
    response_array_length: UInt32;
    response_array: array [0 .. 4] of uds_msg;
    count: UInt32;
    config: uds_msgconfig;
    i: UInt32;
begin
    response_array_length := 5;
    FillChar(request, sizeof(request), 0);
    FillChar(confirmation, sizeof(confirmation), 0);
    FillChar(response_array, sizeof(uds_msg) * response_array_length, 0);

    // prepare an 11bit CAN ID, functionally addressed UDS message
    FillChar(config, sizeof(config), 0);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := 0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_OBD_FUNCTIONAL);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_FUNCTIONAL;
    config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

    result := TUDSApi.MsgAlloc_2013(request, config, 4);
    if not TUDSApi.StatusIsOk_2013(result) then
    begin
        MessageBox(0, 'Error occurred while allocating request message.',
            'Error', MB_OK);
    end
    else
    begin

        // [...] fill data (functional message is limited to 1 CAN frame)

        // The message is sent using the PCAN-USB
        result := TUDSApi.Write_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, @request);
        if TUDSApi.StatusIsOk_2013(result) then

```

```

begin

    // Wait for the transmit confirmation
    result := TUDSApi.WaitForSingleMessage_2013
        (cantp_handle.PCANTP_HANDLE_USBBUS1, @request, true, 10, 100,
        confirmation);
    if TUDSApi.StatusIsOk_2013(result) and
        (confirmation.msg.msgdata_any.netstatus = cantp_netstatus.
        PCANTP_NETSTATUS_OK) then
    begin
        MessageBox(0, 'Message was transmitted.', 'Success', MB_OK);
        // wait for the responses
        result := TUDSApi.WaitForFunctionalResponses_2013
            (cantp_handle.PCANTP_HANDLE_USBBUS1, @request, 10, 100, true,
            response_array_length, @response_array, count);
        if count > 0 then
        begin
            MessageBox(0, 'Responses were received', 'Success', MB_OK);
            for i := 0 to count - 1 do
            begin
                TUDSApi.MsgFree_2013(response_array[i]);
            end;
        end
        else
        begin
            MessageBox(0, 'No response was received', 'Error', MB_OK);
        end;
        TUDSApi.MsgFree_2013(confirmation);
    end
    else
    begin
        // An error occurred
        MessageBox(0, 'Error occurred while waiting for transmit confirmation.',
            'Error', MB_OK);
    end;
    TUDSApi.MsgFree_2013(request);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;
end;
end;
end;

```

**See also:** `uds_msg` on page 21, `WaitForSingleMessage_2013` on page 235, `WaitForService_2013` on page 248, `WaitForServiceFunctional_2013` on page 252.

**Plain function version:** `UDS_WaitForFunctionalResponses_2013` on page 654.

### 3.7.42 WaitForService\_2013

Handles the communication workflow for a UDS service expecting a single response. The method waits for a transmit confirmation then for a message response. Even if the `PUDS_MSGTYPE_FLAG_NO_POSITIVE_RESPONSE` flag is set, the method will still wait.

#### Syntax

##### Pascal OO

```
class function WaitForService_2013(
  channel: cantp_handle;
  msg_request: Puds_msg;
  var out_msg_response: uds_msg;
  out_msg_request_confirmation: Puds_msg
): uds_status; overload;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_WaitForService_2013")]
public static extern uds_status WaitForService_2013(
  [MarshalAs(UnmanagedType.U4)]
  cantp_handle channel,
  [In] ref uds_msg msg_request,
  out uds_msg out_msg_response,
  out uds_msg out_msg_request_confirmation);
```

##### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_WaitForService_2013")]
static uds_status WaitForService_2013(
  [MarshalAs(UnmanagedType.U4)]
  cantp_handle channel,
  [In] uds_msg %msg_request,
  uds_msg %out_msg_response,
  uds_msg %out_msg_request_confirmation);
```

##### Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_WaitForService_2013")>
Public Shared Function WaitForService_2013(
  <MarshalAs(UnmanagedType.U4)>
  ByVal channel As cantp_handle,
  ByRef msg_request As uds_msg,
  ByRef out_msg_response As uds_msg,
  ByRef out_msg_request_confirmation As uds_msg) As uds_status
End Function
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
msg_request	A <code>uds_msg</code> containing the PUDS request message that was previously sent (see <code>uds_msg</code> on page 21).
out_msg_response	A <code>uds_msg</code> buffer to store the PUDS response message (see <code>uds_msg</code> on page 21).
out_msg_request_confirmation	A <code>uds_msg</code> buffer to store the PUDS request confirmation message also known as loopback message (see <code>uds_msg</code> on page 21).



## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of initialized channels of the calling application.
<code>PUDS_STATUS_SERVICE_TIMEOUT_CONFIRMATION</code>	Timeout while waiting for request confirmation (request message loopback).
<code>PUDS_STATUS_SERVICE_TIMEOUT_RESPONSE</code>	Timeout while waiting for response message.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is invalid.
<code>PUDS_STATUS_NO_MESSAGE</code>	Indicates that no matching message was received in the given time.
<code>PUDS_STATUS_NETWORK_ERROR</code>	A network error occurred.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

The `WaitForService_2013` method is a utility method that calls other PCAN-UDS 2.x API methods to simplify UDS communication workflow


1. The method gets the defined timeouts (global API request and response timeouts and timeouts defined by the current session information with the ECU),
2. Waits for the confirmation of request's transmission,
3. On success, waits for the response.
4. If a negative response code is received stating that the ECU requires extended timing (`PUDS_NRC_EXTENDED_TIMING`, 0x78), the method switches to the enhanced timeout (enhanced P2CAN server max timeout, see `uds_sessioninfo` on page 22) and waits for another response.
5. Fill the output message with response data.

Even if the `PUDS_MSGTYPE_FLAG_NO_POSITIVE_RESPONSE` flag is set in the PUDS request, the method will still wait for an eventual Negative Response. If no error message is received the method will return `PUDS_STATUS_NO_MESSAGE`, although in this case it must not be considered as an error. Moreover, if a negative response code `PUDS_NRC_EXTENDED_TIMING` is received the `PUDS_MSGTYPE_FLAG_NO_POSITIVE_RESPONSE` flag is ignored as stated in ISO-14229-1.

The parameters of `WaitFor*_2013` methods have a new order. They do not keep the order of the previous version.

## Example

The following example shows the use of the method `WaitForService_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted (service `ECUReset`), and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel and the mapping were already initialized.

**C#**

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
```

```

config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ECUReset message
result = UDSApI.SvcECUReset_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out request,
    UDSApI.uds_svc_param_er.PUDS_SVC_PARAM_ER_SR);
if (UDSApI.StatusIsOk_2013(result))
{
    result = UDSApI.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
    if (UDSApI.StatusIsOk_2013(result))
    {
        MessageBox.Show("Response was received", "Success");
        UDSApI.MsgFree_2013(ref response);
        UDSApI.MsgFree_2013(ref request_confirmation);
    }
    else
    {
        MessageBox.Show("An error occurred", "Error");
    }
    UDSApI.MsgFree_2013(ref request);
}
else
{
    MessageBox.Show("An error occurred, while sending the request.", "Error");
}
}

```

**C++/CLR**

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response {};
uds_msgconfig config = {};

config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ECUReset message
result = UDSApI::SvcECUReset_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApI::uds_svc_param_er::PUDS_SVC_PARAM_ER_SR);
if (UDSApI::StatusIsOk_2013(result))
{
    result = UDSApI::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
    if (UDSApI::StatusIsOk_2013(result))
    {
        MessageBox::Show("Response was received", "Success");
        UDSApI::MsgFree_2013(response);
        UDSApI::MsgFree_2013(request_confirmation);
    }
    else
    {
        MessageBox::Show("An error occurred", "Error");
    }
}

```

```

    }
    UDSApi::MsgFree_2013(request);
}
else
{
    MessageBox::Show("An error occurred, while sending the request.", "Error");
}

```

### Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical ECUReset message
result = UDSApi.SvcECUReset_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi.uds_svc_param_er.PUDS_SVC_PARAM_ER_SR)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
    If UDSApi.StatusIsOk_2013(result) Then
        MessageBox.Show("Response was received", "Success")
        UDSApi.MsgFree_2013(response)
        UDSApi.MsgFree_2013(request_confirmation)
    Else
        MessageBox.Show("An error occurred", "Error")
    End If
    UDSApi.MsgFree_2013(request)
Else
    MessageBox.Show("An error occurred, while sending the request.", "Error")
End If

```

### Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;

```

```

config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ECUReset message
result := TUDSApi.SvcECUReset_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, uds_svc_param_er.PUDS_SVC_PARAM_ER_SR);
if TUDSApi.StatusIsOk_2013(result) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
    if TUDSApi.StatusIsOk_2013(result) then
    begin
        MessageBox(0, 'Response was received', 'Success', MB_OK);
        TUDSApi.MsgFree_2013(response);
        TUDSApi.MsgFree_2013(request_confirmation);
    end
    else
    begin
        MessageBox(0, 'An error occurred', 'Error', MB_OK);
    end;
    TUDSApi.MsgFree_2013(request);
end
else
begin
    MessageBox(0, 'An error occurred, while sending the request.',
        'Error', MB_OK);
end;
end;

```

See also: [WaitForServiceFunctional\\_2013](#) on page 252.

Plain function version: [UDS\\_WaitForService\\_2013](#) on page 656.

### 3.7.43 waitForServiceFunctional\_2013

Handles the communication workflow for a UDS service requested with functional addressing, i.e. multiple responses can be expected. The method waits for a transmit confirmation then for responses.

#### Syntax

##### Pascal OO

```

class function WaitForServiceFunctional_2013(
    channel: cantp_handle;
    msg_request: Puds_msg;
    max_msg_count: UInt32;
    wait_until_timeout: Boolean;
    out_msg_responses: Puds_msg;
    var out_msg_count: UInt32;
    out_msg_request_confirmation: Puds_msg
): uds_status; overload;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_WaitForServiceFunctional_2013")]
public static extern uds_status WaitForServiceFunctional_2013(
    [MarshalAs(UnmanagedType.U4)]

```

```

cantp_handle channel,
ref uds_msg msg_request,
UInt32 max_msg_count,
[MarshalAs(UnmanagedType.U1)]
bool wait_until_timeout,
[MarshalAs(UnmanagedType.LPArray, SizeParamIndex=2)]
[Out] uds_msg[] out_msg_responses,
out UInt32 out_msg_count,
out uds_msg out_msg_request_confirmation);

```

## C++ / CLR

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_WaitForServiceFunctional_2013")]
static uds_status WaitForServiceFunctional_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msg %msg_request,
    UInt32 max_msg_count,
    [MarshalAs(UnmanagedType.U1)]
    bool wait_until_timeout,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 2)]
    [Out] array<uds_msg> ^out_msg_responses,
    UInt32 %out_msg_count,
    uds_msg %out_msg_request_confirmation);

```

## Visual Basic

```

<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_WaitForServiceFunctional_2013")>
Public Shared Function WaitForServiceFunctional_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByRef msg_request As uds_msg,
    ByVal max_msg_count As UInt32,
    <MarshalAs(UnmanagedType.U1)>
    ByVal wait_until_timeout As Boolean,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=2)>
    <Out> ByVal out_msg_responses As uds_msg(),
    ByRef out_msg_count As UInt32) As uds_status,
    ByRef out_msg_request_confirmation As uds_msg
End Function

```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
msg_request	A uds_msg containing the PUDS request message that was previously sent (see uds_msg on page 21).
max_msg_count	Size of the responses buffer array (maximum messages that can be received).
wait_until_timeout	If false, the method is interrupted if out_msg_count reaches max_msg_count.
out_msg_responses	A uds_msg buffer array to store the PUDS response message (see uds_msg on page 21).
out_msg_count	Output, number of read messages.
out_msg_request_confirmation	A uds_msg buffer to store the PUDS request confirmation message also known as loopback message (see uds_msg on page 21).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of initialized channels of the calling application.
PUDS_STATUS_OVERFLOW	Output responses buffer is too small.
PUDS_STATUS_SERVICE_TX_ERROR	An error occurred while transmitting the request.
PUDS_STATUS_SERVICE_TIMEOUT_CONFIRMATION	Timeout while waiting for request confirmation (request message loopback).
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is invalid.
PUDS_STATUS_NO_MESSAGE	Indicates that no matching message was received in the given time.
PUDS_STATUS_NETWORK_ERROR	A network error occurred.
PUDS_STATUS_SERVICE_RX_OVERFLOW	Service received more messages than input buffer expected.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks


The `WaitForServiceFunctional_2013` method is a utility function that calls other PCAN-UDS 2.x API methods to simplify UDS communication workflow when requests involve functional addressing:

1. The method gets the defined timeouts (global API request and response timeouts and timeouts defined by the current session information with the ECU),
2. Waits for the confirmation of request's transmission,
3. On success, it waits for the responses.
4. The method fills the output messages array with received responses.

The parameters of `WaitFor*_2013` methods have a new order. They do not keep the order of the previous version.

## Example

The following example shows the use of the method `WaitForServiceFunctional_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS functional service request is transmitted (service `ECUReset`), and the `WaitForServiceFunctional_2013` method is called to get the responses. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
UInt32 response_array_length = 5;
uds_msg[] response_array = new uds_msg[5];
UInt32 count = 0;
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_OBD_FUNCTIONAL;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_FUNCTIONAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ECUReset message

```

```

result = UDSApi.SvcECUReset_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out request,
    UDSApi.uds_svc_param_er.PUDS_SVC_PARAM_ER_SR);
if (UDSApi.StatusIsOk_2013(result))
{
    result = UDSApi.WaitForServiceFunctional_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref
        request, response_array_length, true, response_array, out count,
        out request_confirmation);
    if (UDSApi.StatusIsOk_2013(result))
    {
        if (count > 0)
        {
            MessageBox.Show("Responses were received", "Success");
            for (UInt32 i = 0; i < count; i++)
            {
                UDSApi.MsgFree_2013(ref response_array[i]);
            }
        }
        else
        {
            MessageBox.Show("No response was received", "Error");
        }
        UDSApi.MsgFree_2013(ref request_confirmation);
    }
    else
    {
        MessageBox.Show("An error occurred", "Error");
    }
    UDSApi.MsgFree_2013(ref request);
}
else
{
    MessageBox.Show("An error occurred, while sending the request.", "Error");
}
}

```

## C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
UInt32 response_array_length = 5;
array<uds_msg>^ response_array = gcnew array<uds_msg>(5);
UInt32 count = 0;
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_OBD_FUNCTIONAL;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_FUNCTIONAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ECUReset message
result = UDSApi::SvcECUReset_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_er::PUDS_SVC_PARAM_ER_SR);
if (UDSApi::StatusIsOk_2013(result))
{
    result = UDSApi::WaitForServiceFunctional_2013(PCANTP_HANDLE_USBBUS1, request,
        response_array_length, true, response_array, count, request_confirmation);
    if (UDSApi::StatusIsOk_2013(result))
    {

```



```

    {
        if (count > 0)
        {
            MessageBox::Show("Responses were received", "Success");
            for (int i = 0; i < count; i++)
            {
                UDSApi::MsgFree_2013(response_array[i]);
            }
        }
        else
        {
            MessageBox::Show("No response was received", "Error");
        }
        UDSApi::MsgFree_2013(request_confirmation);
    }
    else
    {
        MessageBox::Show("An error occurred", "Error");
    }
    UDSApi::MsgFree_2013(request);
}
else
{
    MessageBox::Show("An error occurred, while sending the request.", "Error");
}
}

```

### Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response_array_length As UInt32 = 5
Dim response_array(5) As uds_msg
Dim count As UInt32 = 0
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_OBD_FUNCTIONAL
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_FUNCTIONAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical ECUReset message
result = UDSApi.SvcECUReset_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi.uds_svc_param_er.PUDS_SVC_PARAM_ER_SR)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForServiceFunctional_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request,
        response_array_length, True, response_array, count, request_confirmation)
    If UDSApi.StatusIsOk_2013(result) Then
        If count > 0 Then
            MessageBox.Show("Responses were received", "Success")
            For i As UInt32 = 0 To count - 1
                UDSApi.MsgFree_2013(response_array(i))
            Next
        Else
            MessageBox.Show("No response was received", "Error")
        End If
        UDSApi.MsgFree_2013(request_confirmation)
    End If
End If

```



```

Else
    MessageBox.Show("An error occurred", "Error")
End If
UDSApi.MsgFree_2013(request)
Else
    MessageBox.Show("An error occurred, while sending the request.", "Error")
End If

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response_array_length: UInt32;
    response_array: array [0 .. 4] of uds_msg;
    count: UInt32;
    config: uds_msgconfig;
    i: UInt32;
begin
    response_array_length := 5;
    count := 0;
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response_array, sizeof(uds_msg) * response_array_length, 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_OBD_FUNCTIONAL);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_FUNCTIONAL;
    config.typem := uds_msgtype.PUDS_MSGTYPE_USDT;

    // Sends a physical ECUReset message
    result := TUDSApi.SvcECUReset_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
        request, uds_svc_param_er.PUDS_SVC_PARAM_ER_SR);
    if TUDSApi.StatusIsOk_2013(result) then
    begin
        result := TUDSApi.WaitForServiceFunctional_2013
            (cantp_handle.PCANTP_HANDLE_USBBUS1, @request, response_array_length, true,
            @response_array, count, @request_confirmation);
        if TUDSApi.StatusIsOk_2013(result) then
        begin
            if count > 0 then
            begin
                MessageBox(0, 'Responses were received', 'Success', MB_OK);
                for i := 0 to count - 1 do
                begin
                    TUDSApi.MsgFree_2013(response_array[i]);
                end;
            end
        else
        begin

```

```

        MessageBox(0, 'No response was received', 'Error', MB_OK);
    end;
    TUDSApi.MsgFree_2013(request_confirmation);
end
else
begin
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;
    TUDSApi.MsgFree_2013(request);
end
else
begin
    MessageBox(0, 'An error occurred, while sending the request.',
        'Error', MB_OK);
end;
end;

```

**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function Version:** [UDS\\_WaitForServiceFunctional\\_2013](#) on page 659.

### 3.7.44 SvcDiagnosticSessionControl\_2013

Writes a UDS request according to the DiagnosticSessionControl service's specifications. The DiagnosticSessionControl service is used to enable different diagnostic sessions in the server.

#### Syntax

##### Pascal OO

```

class function SvcDiagnosticSessionControl_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    session_type: uds_svc_param_dsc
): uds_status;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcDiagnosticSessionControl_2013")]
public static extern uds_status SvcDiagnosticSessionControl_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    [MarshalAs(UnmanagedType.U1)]
    uds_svc_param_dsc session_type);

```

##### C++ / CLR

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcDiagnosticSessionControl_2013")]
static uds_status SvcDiagnosticSessionControl_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType.U1)]
    uds_svc_param_dsc session_type);

```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcDiagnosticSessionControl_2013")>
Public Shared Function SvcDiagnosticSessionControl_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.U1)>
    ByVal session_type As uds_svc_param_dsc) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
session_type	Subfunction parameter: type of the session (see uds_svc_param_dsc on page 71).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The request configuration is not valid (see uds_msgconfig on page 27), or the given message buffer is null.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

If this service is called with the `PUDS_MSGTYPE_FLAG_NO_POSITIVE_RESPONSE` parameter set to ignore responses, the API will automatically change the current session to the new one. Else the session information will be updated when the response is received (only if `WaitForService_2013` or `WaitForServiceFunctional_2013` is used).

## Example

The following example shows the use of the service method `SvcDiagnosticSessionControl_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.



**Note:** It is assumed that the channel was already initialized.

**C#**

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical DiagnosticSessionControl message
result = UDSApi.SvcDiagnosticSessionControl_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    out request, UDSApi.uds_svc_param_dsc.PUDS_SVC_PARAM_DSC_DS);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

**C++/CLR**

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical DiagnosticSessionControl message
result = UDSApi::SvcDiagnosticSessionControl_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_dsc::PUDS_SVC_PARAM_DSC_DS);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else

```

```
// An error occurred
MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);
```

## Visual Basic

```
Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical DiagnosticSessionControl message
result = UDSApi.SvcDiagnosticSessionControl_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, UDSApi.uds_svc_param_dsc.PUDS_SVC_PARAM_DSC_DS)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)
```

## Pascal OO

```
var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
```

```

config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr := $0;
config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical DiagnosticSessionControl message
result := TUDSApi.SvcDiagnosticSessionControl_2013
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    uds_svc_param_dsc.PUDS_SVC_PARAM_DSC_DS);
if TUDSApi.StatusIsOk_2013(result) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** `WaitForService_2013` on page 248.

**Plain function version:** `UDS_SvcDiagnosticSessionControl_2013` on page 661.

### 3.7.45 SvcECUReset\_2013

Writes a UDS request according to the ECUReset service's specifications. The ECUReset service is used by the client to request a server (ECU) reset.

#### Syntax

##### Pascal OO

```

class function SvcECUReset_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    reset_type: uds_svc_param_er
): uds_status;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcECUReset_2013")]
public static extern uds_status SvcECUReset_2013(
    [MarshalAs(UnmanagedType.U4)]

```

```
cantp_handle channel,
uds_msgconfig request_config,
out uds_msg out_msg_request,
[MarshalAs(UnmanagedType.U1)]
uds_svc_param_er reset_type);
```

## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcECUReset_2013")]
static uds_status SvcECUReset_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType.U1)]
    uds_svc_param_er reset_type);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcECUReset_2013")>
Public Shared Function SvcECUReset_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.U1)>
    ByVal reset_type As uds_svc_param_er) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
reset_type	Subfunction parameter: type of reset (see uds_svc_param_er on page 72).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The request configuration is not valid (see uds_msgconfig on page 27), or the given message buffer is null.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with Reset_2013 (see Reset_2013 on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see MsgFree_2013 on page 214).


## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

After receiving a positive response to UDS request `ECUReset` with the help of function `UDS_WaitForService_2013`, the API will revert the session information of that ECU to the default diagnostic session.

## Example

The following example shows the use of the service method `SvcECUReset_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ECUReset message
result = UDSApi.SvcECUReset_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out request,
    UDSApi.uds_svc_param_er.PUDS_SVC_PARAM_ER_SR);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

### C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
```



```

config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ECUReset message
result = UDSApi::SvcECUReset_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_er::PUDS_SVC_PARAM_ER_SR);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

### Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical ECUReset message
result = UDSApi.SvcECUReset_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi.uds_svc_param_er.PUDS_SVC_PARAM_ER_SR)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

### Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;

```

```

response: uds_msg;
config: uds_msgconfig;
begin
  FillChar(request, sizeof(request), 0);
  FillChar(request_confirmation, sizeof(request_confirmation), 0);
  FillChar(response, sizeof(response), 0);

  // Set request message configuration
  FillChar(config, sizeof(config), 0);
  config.can_id :=
    UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
  config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
  config.nai.extension_addr := $0;
  config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
  config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
  config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
  config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
  config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

  // Sends a physical ECUReset message
  result := TUDSApi.SvcECUReset_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, uds_svc_param_er.PUDS_SVC_PARAM_ER_SR);
  if TUDSApi.StatusIsOk_2013(result) then
  begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
      @request, response, @request_confirmation);
  end;
  if TUDSApi.StatusIsOk_2013(result) then
  begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
  end
  else
  begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
  end;

  // Free structures
  TUDSApi.MsgFree_2013(request);
  TUDSApi.MsgFree_2013(response);
  TUDSApi.MsgFree_2013(request_confirmation);
end;
```



**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function version:** [UDS\\_SvcECUReset\\_2013](#) on page 663.

### 3.7.46 SvcSecurityAccess\_2013

Writes a UDS request according to the SecurityAccess service's specifications. SecurityAccess service provides a mean to access data and/or diagnostic services which have restricted access for security, emissions, or safety reasons.

#### Overloads

	Method	Description
	SvcSecurityAccess_2013(cantp_handle, uds_msgconfig, uds_msg, Byte)	Writes to the transmit queue a request for UDS service SecurityAccess. Without optional data.
	SvcSecurityAccess_2013(cantp_handle, uds_msgconfig, uds_msg, Byte, Byte[], UInt32)	Writes to the transmit queue a request for UDS service SecurityAccess.

Plain function version: `UDS_SvcSecurityAccess_2013` on page 664.

### 3.7.47 SvcSecurityAccess\_2013(cantp\_handle, uds\_msgconfig, uds\_msg, Byte)

Writes a UDS request according to the SecurityAccess service's specifications, without optional data. SecurityAccess service provides a mean to access data and/or diagnostic services which have restricted access for security, emissions, or safety reasons.

#### Syntax

##### Pascal OO

```
class function SvcSecurityAccess_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    security_access_type: Byte
): uds_status; overload;
```

##### C#

```
public static uds_status SvcSecurityAccess_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    Byte security_access_type);
```

##### C++ / CLR

```
static uds_status SvcSecurityAccess_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    Byte security_access_type);
```

##### Visual Basic

```
Public Shared Function SvcSecurityAccess_2013(
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal security_access_type As Byte) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>canotp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).
security_access_type	Subfunction parameter: type of SecurityAccess (see SecurityAccess Type Definitions on page 765).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcSecurityAccess_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = canotp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = canotp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical SecurityAccess message
result = UDSApi.SvcSecurityAccess_2013(canotp_handle.PCANTP_HANDLE_USBBUS1, config, out request,
    UDSApi.PUDS_SVC_PARAM_SA_RSD_3);
```

```

if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

## C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical SecurityAccess message
result = UDSApi::SvcSecurityAccess_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::PUDS_SVC_PARAM_SA_RSD_3);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT

```

```

config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical SecurityAccess message
result = UDSApi.SvcSecurityAccess_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi.PUDS_SVC_PARAM_SA_RSD_3)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.type := uds_msgtype.PUDS_MSGTYPE_USDT;

    // Sends a physical SecurityAccess message
    result := TUDSApi.SvcSecurityAccess_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        config, request, TUDSApi.PUDS_SVC_PARAM_SA_RSD_3);
    if TUDSApi.StatusIsOk_2013(result) then
        begin
            result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
                @request, response, @request_confirmation);
        end;
    if TUDSApi.StatusIsOk_2013(result) then
        begin
            MessageBox(0, 'Response was received', 'Success', MB_OK);
        end;
    end;
end;

```

```

end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248, [SecurityAccess](#) Type Definitions on page 765.

**Plain function version:** [UDS\\_SvcSecurityAccess\\_2013](#) on page 664.

### 3.7.48 `svcSecurityAccess_2013(cantp_handle, uds_msgconfig, uds_msg, Byte, Byte[], UInt32)`

Writes a UDS request according to the SecurityAccess service's specifications. SecurityAccess service provides a mean to access data and/or diagnostic services which have restricted access for security, emissions, or safety reasons.

#### Syntax

##### Pascal OO

```

class function SvcSecurityAccess_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    security_access_type: Byte;
    security_access_data: PByte;
    security_access_data_size: UInt32
): uds_status; overload;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcSecurityAccess_2013")]
public static extern uds_status SvcSecurityAccess_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    Byte security_access_type,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 5)]
    Byte[] security_access_data,
    UInt32 security_access_data_size);

```

##### C++ / CLR

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcSecurityAccess_2013")]
static uds_status SvcSecurityAccess_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    Byte security_access_type,

```

```
[MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 5)]
array<Byte> ^ security_access_data,
UInt32 security_access_data_size);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcSecurityAccess_2013")>
Public Shared Function SvcSecurityAccess_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal security_access_type As Byte,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=5)>
    ByVal security_access_data As Byte(),
    ByVal security_access_data_size As UInt32) As uds_status
End Function
```

## Parameters

Parameter	Description
Channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
security_access_type	Subfunction parameter: type of SecurityAccess (see SecurityAccess Type Definitions on page 765)
security_access_data	If Requesting Seed, buffer is the optional data to transmit to a server/ECU (like identification). If Sending Key, data holds the value generated by the security algorithm corresponding to a specific "seed" value.
security_access_data_size	Size in bytes of the buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is not valid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	The mapping given in the message configuration is unknown.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with Reset_2013 (see Reset_2013 on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_OVERFLOW	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data length.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see MsgFree_2013 on page 214).


## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).



## Example

The following example shows the use of the service method `SvcSecurityAccess_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical SecurityAccess message
Byte[] data = { 0x42 };
result = UDSApi.SvcSecurityAccess_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out request,
    UDSApi.PUDS_SVC_PARAM_SA_RSD_3, data, 1);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

### C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;
```

```
// Sends a physical SecurityAccess message
array<Byte>^ data = { 0x42 };
result = UDSApi::SvcSecurityAccess_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::PUDS_SVC_PARAM_SA_RSD_3, data, 1);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);
```

### Visual Basic

```
Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical SecurityAccess message
Dim data As Byte() = {&H42}
result = UDSApi.SvcSecurityAccess_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi.PUDS_SVC_PARAM_SA_RSD_3, data, 1)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)
```

### Pascal OO

```
var
    result: uds_status;
    data: array [0 .. 0] of Byte;
    request: uds_msg;
```

```

request_confirmation: uds_msg;
response: uds_msg;
config: uds_msgconfig;
begin
  FillChar(request, sizeof(request), 0);
  FillChar(request_confirmation, sizeof(request_confirmation), 0);
  FillChar(response, sizeof(response), 0);

  // Set request message configuration
  FillChar(config, sizeof(config), 0);
  config.can_id :=
    UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
  config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
  config.nai.extension_addr := $0;
  config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
  config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
  config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
  config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
  config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

  // Sends a physical SecurityAccess message
  data[0] := $42;
  result := TUDSApi.SvcSecurityAccess_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, request, TUDSApi.PUDS_SVC_PARAM_SA_RSD_3, @data, 1);
  if TUDSApi.StatusIsOk_2013(result) then
  begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
      @request, response, @request_confirmation);
  end;
  if TUDSApi.StatusIsOk_2013(result) then
  begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
  end
  else
  begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
  end;

  // Free structures
  TUDSApi.MsgFree_2013(request);
  TUDSApi.MsgFree_2013(response);
  TUDSApi.MsgFree_2013(request_confirmation);
end;
```



**See also:** [WaitForService\\_2013](#) on page 248, [SecurityAccess Type Definitions](#) on page 765.

**Plain function version:** [UDS\\_SvcSecurityAccess\\_2013](#) on page 664.

### 3.7.49 SvcCommunicationControl\_2013

Writes a UDS request according to the CommunicationControl service's specifications. CommunicationControl service's purpose is to switch on/off the transmission and/or the reception of certain messages of (a) server(s)/ECU(s).

#### Overloads

	Method	Description
	SvcCommunicationControl_2013(cantp_handle, uds_msgconfig, uds_msg, uds_svc_param_cc, Byte)	Writes to the transmit queue a request for UDS service CommunicationControl.
	SvcCommunicationControl_2013(cantp_handle, uds_msgconfig, uds_msg, uds_svc_param_cc, Byte, UInt16)	Writes to the transmit queue a request for UDS service CommunicationControl with node identification number optional data.

Plain function version: `UDS_SvcCommunicationControl_2013` on page 666.

### 3.7.50 SvcCommunicationControl\_2013(cantp\_handle, uds\_msgconfig, uds\_msg, uds\_svc\_param\_cc, Byte)

Writes a UDS request according to the CommunicationControl service's specifications. CommunicationControl service's purpose is to switch on/off the transmission and/or the reception of certain messages of (a) server(s)/ECU(s).

#### Syntax

##### Pascal OO

```
class function SvcCommunicationControl_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    control_type: uds_svc_param_cc;
    communication_type: Byte
): uds_status; overload;
```

##### C#

```
public static uds_status SvcCommunicationControl_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    uds_svc_param_cc control_type,
    Byte communication_type);
```

##### C++ / CLR

```
static uds_status SvcCommunicationControl_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    uds_svc_param_cc control_type,
    Byte communication_type);
```

##### Visual Basic

```
Public Shared Function SvcCommunicationControl_2013(
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
```

```

ByVal control_type As uds_svc_param_cc,
ByVal communication_type As Byte) As uds_status
End Function

```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).
control_type	Subfunction parameter: type of <code>CommunicationControl</code> (see <code>uds_svc_param_cc</code> on page 74).
communication_type	A bit-code value to reference the kind of communication to be controlled (see <code>CommunicationControl Communication Type Definitions</code> on page 766).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcCommunicationControl_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

```

```
// Sends a physical CommunicationControl message
result = UDSApi.SvcCommunicationControl_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, UDSApi.uds_svc_param_cc.PUDS_SVC_PARAM_CC_ERXTX,
    UDSApi.PUDS_SVC_PARAM_CC_FLAG_APPL | UDSApi.PUDS_SVC_PARAM_CC_FLAG_NWM |
    UDSApi.PUDS_SVC_PARAM_CC_FLAG_DENWRIRO);
if (UDSApI.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApI.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApI.MsgFree_2013(ref request);
UDSApI.MsgFree_2013(ref response);
UDSApI.MsgFree_2013(ref request_confirmation);
```

### C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical CommunicationControl message
result = UDSApi::SvcCommunicationControl_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_cc::PUDS_SVC_PARAM_CC_ERXTX,
    UDSApi::PUDS_SVC_PARAM_CC_FLAG_APPL | UDSApi::PUDS_SVC_PARAM_CC_FLAG_NWM |
    UDSApi::PUDS_SVC_PARAM_CC_FLAG_DENWRIRO);
if (UDSApI::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApI::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApI::MsgFree_2013(request);
UDSApI::MsgFree_2013(response);
UDSApI::MsgFree_2013(request_confirmation);
```

### Visual Basic

```
Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
```

```

Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical CommunicationControl message
result = UDSApi.SvcCommunicationControl_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, UDSApi.uds_svc_param_cc.PUDS_SVC_PARAM_CC_ERXTX,
    UDSApi.PUDS_SVC_PARAM_CC_FLAG_APPL Or UDSApi.PUDS_SVC_PARAM_CC_FLAG_NWM Or
    UDSApi.PUDS_SVC_PARAM_CC_FLAG_DENWRIRO)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.type := uds_msgtype.PUDS_MSGTYPE_USDT;

```



```
// Sends a physical CommunicationControl message
result := TUDSApi.SvcCommunicationControl_2013
  (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
   uds_svc_param_cc.PUDS_SVC_PARAM_CC_ERCTX,
   TUDSApi.PUDS_SVC_PARAM_CC_FLAG_APPL Or TUDSApi.PUDS_SVC_PARAM_CC_FLAG_NWM Or
   TUDSApi.PUDS_SVC_PARAM_CC_FLAG_DENWRIRO);
if TUDSApi.StatusIsOk_2013(result) then
begin
  result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
  MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
  // An error occurred
  MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;
```

**See also:** [WaitForService\\_2013](#) on page 248, [CommunicationControl](#) Communication Type Definitions on page 766.

**Plain function version:** [UDS\\_SvcCommunicationControl\\_2013](#) on page 666.

### 3.7.51 [SvcCommunicationControl\\_2013](#)(cantp\_handle, uds\_msgconfig, uds\_msg, uds\_svc\_param\_cc, Byte, UInt16)

Writes a UDS request according to the CommunicationControl service's specifications. CommunicationControl service's purpose is to switch on/off the transmission and/or the reception of certain messages of (a) server(s)/ECU(s). This overloaded function only works with [PUDS\\_SVC\\_PARAM\\_CC\\_ERXTXWEAI](#) or [PUDS\\_SVC\\_PARAM\\_CC\\_ERXTXWEAI](#) control type (see [uds\\_svc\\_param\\_cc](#) on page 74).

#### Syntax

##### Pascal OO

```
class function SvcCommunicationControl_2013(
  channel: cantp_handle;
  request_config: uds_msgconfig;
  var out_msg_request: uds_msg;
  control_type: uds_svc_param_cc;
  communication_type: Byte;
  node_identification_number: UInt16
): uds_status; overload;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcCommunicationControl_2013")]
public static extern uds_status SvcCommunicationControl_2013(
  [MarshalAs(UnmanagedType.U4)]
  cantp_handle channel,
```



```
uds_msgconfig request_config,
out uds_msg out_msg_request,
[MarshalAs(UnmanagedType.U1)]
uds_svc_param_cc control_type,
Byte communication_type,
UInt16 node_identification_number);
```

## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcCommunicationControl_2013")]
static uds_status SvcCommunicationControl_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType.U1)]
    uds_svc_param_cc control_type,
    Byte communication_type,
    UInt16 node_identification_number);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcCommunicationControl_2013")>
Public Shared Function SvcCommunicationControl_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.U1)>
    ByVal control_type As uds_svc_param_cc,
    ByVal communication_type As Byte,
    ByVal node_identification_number As UInt16) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
control_type	Subfunction parameter: type of CommunicationControl (see uds_svc_param_cc on page 74).
communication_type	A bit-code value to reference the kind of communication to be controlled (see CommunicationControl Communication Type Definitions on page 766).
node_identification_number	A two bytes value, identify a node on a sub-network, only used with PUDS_SVC_PARAM_CC_ERXDTXWEAI or PUDS_SVC_PARAM_CC_ERXTXWEAI control type).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is not valid.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcCommunicationControl_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical CommunicationControl message
result = UDSApi.SvcCommunicationControl_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, UDSApi.uds_svc_param_cc.PUDS_SVC_PARAM_CC_ERXDTXWEAI, 0x1, 0x000A);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

**C++/CLR**

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical CommunicationControl message
result = UDSApi::SvcCommunicationControl_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_cc::PUDS_SVC_PARAM_CC_ERXDTXWEAI, 0x1, 0x000A);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

**Visual Basic**

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical CommunicationControl message
result = UDSApi.SvcCommunicationControl_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, UDSApi.uds_svc_param_cc.PUDS_SVC_PARAM_CC_ERXDTXWEAI, &H1, &HA)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")

```

```

Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

    // Sends a physical CommunicationControl message
    result := TUDSApi.SvcCommunicationControl_2013
        (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
        uds_svc_param_cc.PUDS_SVC_PARAM_CC_ERXDTXWEAI, $1, $000A);
    if TUDSApi.StatusIsOk_2013(result) then
        begin
            result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
            @request, response, @request_confirmation);
        end;
    if TUDSApi.StatusIsOk_2013(result) then
        begin
            MessageBox(0, 'Response was received', 'Success', MB_OK);
        end
    else
        begin
            // An error occurred
            MessageBox(0, 'An error occurred', 'Error', MB_OK);
        end;

    // Free structures
    TUDSApi.MsgFree_2013(request);

```

```
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;
```



**See also:** [WaitForService\\_2013](#) on page 248, [CommunicationControl](#) Communication Type Definitions on page 766.

**Plain function version:** [UDS\\_SvcCommunicationControl\\_2013](#) on page 666.

### 3.7.52 SvcTesterPresent\_2013

Writes a UDS request according to the TesterPresent service's specifications. TesterPresent service indicates to the server(s)/ECU(s) that a client is still connected to the vehicle and that certain diagnostic services and/or communications that have been previously activated are to remain active.

#### Overloads

	Method	Description
	<a href="#">SvcTesterPresent_2013(cantp_handle, uds_msgconfig, uds_msg)</a>	Writes to the transmit queue a request for UDS service TesterPresent (with zero subfunction parameter).
	<a href="#">SvcTesterPresent_2013(cantp_handle, uds_msgconfig, uds_msg, uds_svc_param_tp)</a>	Writes to the transmit queue a request for UDS service TesterPresent.

**Plain function version:** [UDS\\_SvcTesterPresent\\_2013](#) on page 668.

### 3.7.53 SvcTesterPresent\_2013(cantp\_handle, uds\_msgconfig, uds\_msg)

Writes a UDS request according to the TesterPresent service's specifications (with zero subfunction parameter). TesterPresent service indicates to a server(s)/ECU(s) that a client is still connected to the vehicle and that certain diagnostic services and/or communications that have been previously activated are to remain active.

#### Syntax

##### Pascal OO

```
class function SvcTesterPresent_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg
): uds_status; overload;
```

##### C#

```
public static uds_status SvcTesterPresent_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request);
```

##### C++ / CLR

```
static uds_status SvcTesterPresent_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request);
```

## Visual Basic

```
Public Shared Function SvcTesterPresent_2013(
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The request configuration is not valid (see uds_msgconfig on page 27), or the given message buffer is null.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcTesterPresent_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

## C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
```

```

config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;

// Sends a physical TesterPresent message with no positive response
config.type = uds_msgtype.PUDS_MSGTYPE_USDT |
    uds_msgtype.PUDS_MSGTYPE_FLAG_NO_POSITIVE_RESPONSE;
result = UDSApi.SvcTesterPresent_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out request);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Error");
else if (UDSApi.StatusIsOk_2013(result, uds_status.PUDS_STATUS_NO_MESSAGE))
    MessageBox.Show("No error response", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

### C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;

// Sends a physical TesterPresent message with no positive response
config.type = PUDS_MSGTYPE_USDT | PUDS_MSGTYPE_FLAG_NO_POSITIVE_RESPONSE;
result = UDSApi::SvcTesterPresent_2013(PCANTP_HANDLE_USBBUS1, config, request);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Error");
else if (UDSApi::StatusIsOk_2013(result, PUDS_STATUS_NO_MESSAGE))
    MessageBox::Show("No error response", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

### Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()

```



```

Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL

' Sends a physical TesterPresent message with no positive response
config.type = uds_msgtype.PUDS_MSGTYPE_USDT Or
    uds_msgtype.PUDS_MSGTYPE_FLAG_NO_POSITIVE_RESPONSE
result = UDSApI.SvcTesterPresent_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request)
If UDSApI.StatusIsOk_2013(result) Then
    result = UDSApI.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApI.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Error")
ElseIf UDSApI.StatusIsOk_2013(result, uds_status.PUDS_STATUS_NO_MESSAGE) Then
    MessageBox.Show("No error response", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApI.MsgFree_2013(request)
UDSApI.MsgFree_2013(response)
UDSApI.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;

```



```
// Sends a physical TesterPresent message with no positive response
config.typeem := uds_msgtype(Byte(uds_msgtype.PUDS_MSGTYPE_USDT) Or
    Byte(uds_msgtype.PUDS_MSGTYPE_FLAG_NO_POSITIVE_RESPONSE));
result := TUDSApi.SvcTesterPresent_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, request);
if TUDSApi.StatusIsOk_2013(result) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Error', MB_OK);
end
else if TUDSApi.StatusIsOk_2013(result, uds_status.PUDS_STATUS_NO_MESSAGE) then
begin
    MessageBox(0, 'No error response', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;
```

**See also:** [WaitForService\\_2013](#) on page 248, [uds\\_svc\\_param\\_tp](#) on page 75.

**Plain function version:** [UDS\\_SvcTesterPresent\\_2013](#) on page 668.

### 3.7.54 SvcTesterPresent\_2013(cantp\_handle, uds\_msgconfig, uds\_msg, uds\_svc\_param\_tp)

Writes a UDS request according to the TesterPresent service's specifications. TesterPresent service indicates to the server(s)/ECU(s) that a client is still connected to the vehicle and that certain diagnostic services and/or communications that have been previously activated are to remain active.

#### Syntax

##### Pascal OO

```
class function SvcTesterPresent_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    testerpresent_type: uds_svc_param_tp
): uds_status; overload;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcTesterPresent_2013")]
public static extern uds_status SvcTesterPresent_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    [MarshalAs(UnmanagedType.U1)]
    uds_svc_param_tp testerpresent_type);
```

## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcTesterPresent_2013")]
static uds_status SvcTesterPresent_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType::U1)]
    uds_svc_param_tp testerpresent_type);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcTesterPresent_2013")>
Public Shared Function SvcTesterPresent_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.U1)>
    ByVal testerpresent_type As uds_svc_param_tp) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).
testerpresent_type	Tester present type, no Subfunction parameter by default (see <code>uds_svc_param_tp</code> on page 75).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcTesterPresent_2013` on the channel `PCANTP_HANDLE_USBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

**C#**

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical TesterPresent message with no positive response
result = UDSApi.SvcTesterPresent_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out request,
    UDSApi.uds_svc_param_tp.PUDS_SVC_PARAM_TP_ZSUBF);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Error");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

**C++/CLR**

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical TesterPresent message with no positive response
result = UDSApi::SvcTesterPresent_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_tp::PUDS_SVC_PARAM_TP_ZSUBF);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Error");
else

```

```
// An error occurred
MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);
```

## Visual Basic

```
Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical TesterPresent message with no positive response
result = UDSApi.SvcTesterPresent_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi.uds_svc_param_tp.PUDS_SVC_PARAM_TP_ZSUBF)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Error")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)
```

## Pascal OO

```
var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
```

```

config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr := $0;
config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical TesterPresent message with no positive response
result := TUDSApi.SvcTesterPresent_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, request, uds_svc_param_tp.PUDS_SVC_PARAM_TP_ZSUBF);
if TUDSApi.StatusIsOk_2013(result) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Error', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248, [uds\\_svc\\_param\\_tp](#) on page 75.

**Plain function version:** [UDS\\_SvcTesterPresent\\_2013](#) on page 668.

### 3.7.55 SvcSecuredDataTransmission\_2013

Writes a UDS request according to the SecuredDataTransmission service's specifications(ISO-14229-1:2013). SecuredDataTransmission service's purpose is to transmit data that are protected against attacks from third parties, which could endanger data security.

#### Syntax

##### Pascal OO

```

class function SvcSecuredDataTransmission_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    security_data_request_record: PByte;
    security_data_request_record_size: UInt32
): uds_status;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcSecuredDataTransmission_2013")]
public static extern uds_status SvcSecuredDataTransmission_2013(

```

```
[MarshalAs(UnmanagedType.U4)]
cantp_handle channel,
uds_msgconfig request_config,
out uds_msg out_msg_request,
[MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 4)]
Byte[] security_data_request_record,
UInt32 security_data_request_record_size);
```

## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcSecuredDataTransmission_2013")]
static uds_status SvcSecuredDataTransmission_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 4)]
    array<Byte> ^security_data_request_record,
    UInt32 security_data_request_record_size);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcSecuredDataTransmission_2013")>
Public Shared Function SvcSecuredDataTransmission_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=4)>
    ByVal security_data_request_record As Byte(),
    ByVal security_data_request_record_size As UInt32) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
security_data_request_record	Buffer containing the data as processed by the Security Sub-Layer (See ISO-15764).
security_data_request_record_size	Size in bytes of the buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is not valid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	The mapping given in the message configuration is unknown.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with Reset_2013 (see Reset_2013 on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_OVERFLOW	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data length.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see MsgFree_2013 on page 214).


## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see [MsgFree\\_2013](#) on page 214).

When using SecuredDataTransmission service, user may need to construct a [security\\_data\\_request\\_record](#) that is equal to another UDS service request definition. That is why [UDS\\_Svc\\*](#) functions can be called with [PUDS\\_ONLY\\_PREPARE\\_REQUEST](#) as channel identifier (instead of using [cantp\\_handle](#)): it prepares the [uds\\_msg](#) structure without sending it.

## Example

The following example shows the use of the service method [SvcSecuredDataTransmission\\_2013](#) on the channel [PCANTP\\_HANDLE\\_USBBUS1](#). A UDS physical service request is transmitted, and the [WaitForService\\_2013](#) method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

Byte[] buffer = { 0xF0, 0xA1, 0xB2, 0xC3 };

// Sends a physical SecuredDataTransmission message
result = UDSApi.SvcSecuredDataTransmission_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, buffer, 4);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

### C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
```



```

uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

array<Byte>^ buffer = { 0xF0, 0xA1, 0xB2, 0xC3 };

// Sends a physical SecuredDataTransmission message
result = UDSApi::SvcSecuredDataTransmission_2013(PCANTP_HANDLE_USBBUS1, config, request,
    buffer, 4);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

Dim buffer As Byte() = {&HF0, &HA1, &HB2, &HC3}

' Sends a physical SecuredDataTransmission message
result = UDSApi.SvcSecuredDataTransmission_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, buffer, 4)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred

```



```

    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    buffer: array [0 .. 3] of Byte;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

    buffer[0] := $F0;
    buffer[1] := $A1;
    buffer[2] := $B2;
    buffer[3] := $C3;

    // Sends a physical SecuredDataTransmission message
    result := TUDSApi.SvcSecuredDataTransmission_2013
        (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request, @buffer, 4);
    if TUDSApi.StatusIsOk_2013(result) then
    begin
        result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
            @request, response, @request_confirmation);
    end;
    if TUDSApi.StatusIsOk_2013(result) then
    begin
        MessageBox(0, 'Response was received', 'Success', MB_OK);
    end
    else
    begin
        // An error occurred
        MessageBox(0, 'An error occurred', 'Error', MB_OK);
    end;

    // Free structures

```

```
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;
```

See also: `WaitForService_2013` on page 248.

Plain function version: `UDS_SvcSecuredDataTransmission_2013` on page 670.

### 3.7.56 SvcSecuredDataTransmission\_2020

Writes a UDS request according to the SecuredDataTransmission service's specifications (ISO-14229-1:2020). SecuredDataTransmission service's purpose is to transmit data that are protected against attacks from third parties, which could endanger data security.

#### Syntax

##### Pascal OO

```
class function SvcSecuredDataTransmission_2020(
  channel: cantp_handle;
  request_config: uds_msgconfig;
  var out_msg_request: uds_msg;
  administrative_parameter: UInt16;
  signature_encryption_calculation: Byte;
  anti_replay_counter: UInt16;
  internal_service_identifier: Byte;
  service_specific_parameters: PByte;
  service_specific_parameters_size: UInt32;
  signature_mac: PByte;
  signature_size: UInt16
): uds_status;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcSecuredDataTransmission_2020")]
public static extern uds_status SvcSecuredDataTransmission_2020(
  cantp_handle channel,
  uds_msgconfig request_config,
  out uds_msg out_msg_request,
  UInt16 administrative_parameter,
  Byte signature_encryption_calculation,
  UInt16 anti_replay_counter,
  Byte internal_service_identifier,
  [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 8)]
  Byte[] service_specific_parameters,
  UInt32 service_specific_parameters_size,
  [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 10)]
  Byte[] signature_mac,
  UInt16 signature_size);
```

##### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcSecuredDataTransmission_2020")]
static uds_status SvcSecuredDataTransmission_2020(
  [MarshalAs(UnmanagedType::U4)]
  cantp_handle channel,
  uds_msgconfig request_config,
  uds_msg %out_msg_request,
  UInt16 administrative_parameter,
  Byte signature_encryption_calculation,
```

```

UInt16 anti_replay_counter,
Byte internal_service_identifier,
[MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 8)]
array<Byte> ^service_specific_parameters,
UInt32 service_specific_parameters_size,
[MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 10)]
array<Byte> ^signature_mac,
UInt16 signature_size);

```

## Visual Basic

```

<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcSecuredDataTransmission_2020")>
Public Shared Function SvcSecuredDataTransmission_2020(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal administrative_parameter As UInt16,
    ByVal signature_encryption_calculation As Byte,
    ByVal anti_replay_counter As UInt16,
    ByVal internal_service_identifier As Byte,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=8)>
    ByVal service_specific_parameters As Byte(),
    ByVal service_specific_parameters_size As UInt32,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=10)>
    ByVal signature_mac As Byte(),
    ByVal signature_size As UInt16) As uds_status
End Function

```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the function (see uds_msg on page 21).
administrative_parameter	Security features used in the message (see SecuredDataTransmission Administrative Parameter Flags Definitions on page 767)
signature_encryption_calculation	Signature or encryption algorithm identifier.
anti_replay_counter	Anti-replay counter value.
internal_service_identifier	Internal message service request identifier (see uds_service on page 53).
service_specific_parameters	Buffer that contains internal message service request data.
service_specific_parameters_size	Internal message service request data size (in bytes).
signature_mac	Buffer that contains signature used to verify the message.
signature_size	Size in bytes of the signature.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_OVERFLOW</code>	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data size.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).


## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

When using `SecuredDataTransmission` service, user may need to construct a `security_data_request_record` that is equal to another UDS service request definition. That is why `UDS_Svc*` functions can be called with `PUDS_ONLY_PREPARE_REQUEST` as channel identifier (instead of using `cantp_handle`): it prepares the `uds_msg` structure without sending it.

## Example

The following example shows the use of the service method `SvcSecuredDataTransmission_2020` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();
UInt16 administrative_parameter;
Byte signature_encryption_calculation;
UInt16 anti_replay_counter;
Byte internal_service_identifier;
Byte[] service_specific_parameters = new Byte[4];
UInt32 service_specific_parameters_size;
Byte[] signature_mac = new Byte[6];
UInt16 signature_size;

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
```

```

config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical SecuredDataTransmission message
administrative_parameter = UDSApi.PUDS_SVC_PARAM_APAR_REQUEST_MSG_FLAG |
    UDSApi.PUDS_SVC_PARAM_APAR_REQUEST_RESPONSE_SIGNATURE_FLAG |
    UDSApi.PUDS_SVC_PARAM_APAR_SIGNED_MSG_FLAG;
signature_encryption_calculation = 0x0;
anti_replay_counter = 0x0124;
internal_service_identifier = 0x2E;
service_specific_parameters[0] = 0xF1;
service_specific_parameters[1] = 0x23;
service_specific_parameters[2] = 0xAA;
service_specific_parameters[3] = 0x55;
service_specific_parameters_size = 4;
signature_mac[0] = 0xDB;
signature_mac[1] = 0xD1;
signature_mac[2] = 0x0E;
signature_mac[3] = 0xDC;
signature_mac[4] = 0x55;
signature_mac[5] = 0xAA;
signature_size = 0x0006;
result = UDSApi.SvcSecuredDataTransmission_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, administrative_parameter, signature_encryption_calculation, anti_replay_counter,
    internal_service_identifier, service_specific_parameters, service_specific_parameters_size,
    signature_mac, signature_size);
if (UDSApI.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApI.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApI.MsgFree_2013(ref request);
UDSApI.MsgFree_2013(ref response);
UDSApI.MsgFree_2013(ref request_confirmation);

```

## C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};
UInt16 administrative_parameter;
Byte signature_encryption_calculation;
UInt16 anti_replay_counter;
Byte internal_service_identifier;
array<Byte>^ service_specific_parameters = gcnew array<Byte>(4);
UInt32 service_specific_parameters_size;
array<Byte>^ signature_mac = gcnew array<Byte>(6);
UInt16 signature_size;

// Set request message configuration
config.can_id = (UInt16)uds_can_id::PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype::PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol::PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address::PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;

```

```

config.nai.target_addr = (UInt16)uds_address::PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing::PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype::PUDS_MSGTYPE_USDT;

// Sends a physical SecuredDataTransmission message
administrative_parameter = UDSApi::PUDS_SVC_PARAM_APAR_REQUEST_MSG_FLAG |
    UDSApi::PUDS_SVC_PARAM_APAR_REQUEST_RESPONSE_SIGNATURE_FLAG |
    UDSApi::PUDS_SVC_PARAM_APAR_SIGNED_MSG_FLAG;
signature_encryption_calculation = 0x0;
anti_replay_counter = 0x0124;
internal_service_identifier = 0x2E;
service_specific_parameters[0] = 0xF1;
service_specific_parameters[1] = 0x23;
service_specific_parameters[2] = 0xAA;
service_specific_parameters[3] = 0x55;
service_specific_parameters_size = 4;
signature_mac[0] = 0xDB;
signature_mac[1] = 0xD1;
signature_mac[2] = 0x0E;
signature_mac[3] = 0xDC;
signature_mac[4] = 0x55;
signature_mac[5] = 0xAA;
signature_size = 0x0006;
result = UDSApi::SvcSecuredDataTransmission_2020(cantp_handle::PCANTP_HANDLE_USBBUS1, config,
    request, administrative_parameter, signature_encryption_calculation,
    anti_replay_counter, internal_service_identifier, service_specific_parameters,
    service_specific_parameters_size, signature_mac, signature_size);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(cantp_handle::PCANTP_HANDLE_USBBUS1, request,
        response, request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()
Dim administrative_parameter As UInt16
Dim signature_encryption_calculation As Byte
Dim anti_replay_counter As UInt16
Dim internal_service_identifier As Byte
Dim service_specific_parameters() As Byte = New Byte(4) {}
Dim service_specific_parameters_size As UInt32
Dim signature_mac() As Byte = New Byte(6) {}
Dim signature_size As UInt16

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT

```

```

config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical SecuredDataTransmission message
administrative_parameter = UDSApi.PUDS_SVC_PARAM_APAR_REQUEST_MSG_FLAG Or
    UDSApi.PUDS_SVC_PARAM_APAR_REQUEST_RESPONSE_SIGNATURE_FLAG Or
    UDSApi.PUDS_SVC_PARAM_APAR_SIGNED_MSG_FLAG
signature_encryption_calculation = &H0
anti_replay_counter = &H124
internal_service_identifier = &H2E
service_specific_parameters(0) = &HF1
service_specific_parameters(1) = &H23
service_specific_parameters(2) = &HAA
service_specific_parameters(3) = &H55
service_specific_parameters_size = 4
signature_mac(0) = &HDB
signature_mac(1) = &HD1
signature_mac(2) = &HE
signature_mac(3) = &HDC
signature_mac(4) = &H55
signature_mac(5) = &HAA
signature_size = &H6
result = UDSApi.SvcSecuredDataTransmission_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, administrative_parameter, signature_encryption_calculation, anti_replay_counter,
    internal_service_identifier, service_specific_parameters, service_specific_parameters_size,
    signature_mac, signature_size)
If (UDSApI.StatusIsOk_2013(result)) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If (UDSApI.StatusIsOk_2013(result)) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApI.MsgFree_2013(request)
UDSApI.MsgFree_2013(response)
UDSApI.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    administrative_parameter: UInt16;
    signature_encryption_calculation: Byte;
    anti_replay_counter: UInt16;
    internal_service_identifier: Byte;
    service_specific_parameters: array [0 .. 3] of Byte;
    service_specific_parameters_size: UInt32;
    signature_mac: array [0 .. 5] of Byte;
    signature_size: UInt16;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);

```



```

FillChar(response, sizeof(response), 0);

// Set request message configuration
FillChar(config, sizeof(config), 0);
config.can_id :=
    UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr := $0;
config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical SecuredDataTransmission message
administrative_parameter := TUDSApi.PUDS_SVC_PARAM_APAR_REQUEST_MSG_FLAG or
    TUDSApi.PUDS_SVC_PARAM_APAR_REQUEST_RESPONSE_SIGNATURE_FLAG or
    TUDSApi.PUDS_SVC_PARAM_APAR_SIGNED_MSG_FLAG;
signature_encryption_calculation := $0;
anti_replay_counter := $0124;
internal_service_identifier := $2E;
service_specific_parameters[0] := $F1;
service_specific_parameters[1] := $23;
service_specific_parameters[2] := $AA;
service_specific_parameters[3] := $55;
service_specific_parameters_size := 4;
signature_mac[0] := $DB;
signature_mac[1] := $D1;
signature_mac[2] := $0E;
signature_mac[3] := $DC;
signature_mac[4] := $55;
signature_mac[5] := $AA;
signature_size := $0006;
result := TUDSApi.SvcSecuredDataTransmission_2020(PCANTP_HANDLE_USBBUS1,
    config, &request, administrative_parameter,
    signature_encryption_calculation, anti_replay_counter,
    internal_service_identifier, PByte(@service_specific_parameters),
    service_specific_parameters_size, PByte(@signature_mac), signature_size);
if (TUDSApi.StatusIsOk_2013(result)) then
    result := TUDSApi.WaitForService_2013(PCANTP_HANDLE_USBBUS1, @request,
        &response, @request_confirmation);
if (TUDSApi.StatusIsOk_2013(result)) then
    MessageBox(0, 'Response was received', 'Success', MB_OK)
else
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);

// Free structures
TUDSApi.MsgFree_2013(&request);
TUDSApi.MsgFree_2013(&response);
TUDSApi.MsgFree_2013(&request_confirmation);
end;

```

**See also:** SecuredDataTransmission Administrative Parameter Flags Definitions on page 767,  
[WaitForService\\_2013](#) on page 248.



**Plain function version:** [UDS\\_SvcSecuredDataTransmission\\_2020](#) on page 672.



### 3.7.57 SvcControlDTCSetting\_2013

Writes a UDS request according to the ControlDTCSetting service's specifications. ControlDTCSetting service shall be used by a client to stop or resume the setting of diagnostic trouble codes (DTCs) in the server(s)/ECU(s).

#### Overloads

	Method	Description
	SvcControlDTCSetting_2013(cantp_handle, uds_msgconfig, uds_msg, uds_svc_param_cdtcs)	Writes to the transmit queue a request for UDS service ControlDTCSetting, without DTC settings control options.
	SvcControlDTCSetting_2013(cantp_handle, uds_msgconfig, uds_msg, uds_svc_param_cdtcs, Byte[], UInt32)	Writes to the transmit queue a request for UDS service ControlDTCSetting.

Plain function version: [UDS\\_SvcControlDTCSetting\\_2013](#) on page 675.

### 3.7.58 SvcControlDTCSetting\_2013(cantp\_handle, uds\_msgconfig, uds\_msg, uds\_svc\_param\_cdtcs)

Writes a UDS request according to the ControlDTCSetting service's specifications, without DTC setting control options. ControlDTCSetting service shall be used by a client to stop or resume the setting of diagnostic trouble codes (DTCs) in the server(s).

#### Syntax

##### Pascal OO

```
class function SvcControlDTCSetting_2013(
  channel: cantp_handle;
  request_config: uds_msgconfig;
  var out_msg_request: uds_msg;
  dtc_setting_type: uds_svc_param_cdtcs
): uds_status; overload;
```

##### C#

```
public static uds_status SvcControlDTCSetting_2013(
  cantp_handle channel,
  uds_msgconfig request_config,
  out uds_msg out_msg_request,
  uds_svc_param_cdtcs dtc_setting_type);
```

##### C++ / CLR

```
static uds_status SvcControlDTCSetting_2013(
  cantp_handle channel,
  uds_msgconfig request_config,
  uds_msg %out_msg_request,
  uds_svc_param_cdtcs dtc_setting_type);
```

##### Visual Basic

```
Public Shared Function SvcControlDTCSetting_2013(
  ByVal channel As cantp_handle,
  ByVal request_config As uds_msgconfig,
  ByRef out_msg_request As uds_msg,
  ByVal dtc_setting_type As uds_svc_param_cdtcs) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).
dtc_setting_type	Subfunction parameter (see <code>uds_svc_param_cdtcs</code> on page 76).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcControlDTCSetting_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ControlDTCSetting message
result = UDSApi.SvcControlDTCSetting_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, UDSApi.uds_svc_param_cdtcs.PUDS_SVC_PARAM_CDTCS_OFF);
```

```

if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

## C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ControlDTCSetting message
result = UDSApi::SvcControlDTCSetting_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_cdtcs::PUDS_SVC_PARAM_CDTCS_OFF);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT

```

```

config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical ControlDTCSetting message
result = UDSApi.SvcControlDTCSetting_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi.uds_svc_param_cdtcs.PUDS_SVC_PARAM_CDTCS_OFF)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

### Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.type := uds_msgtype.PUDS_MSGTYPE_USDT;

    // Sends a physical ControlDTCSetting message
    result := TUDSApi.SvcControlDTCSetting_2013
        (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
        uds_svc_param_cdtcs.PUDS_SVC_PARAM_CDTCS_OFF);
    if TUDSApi.StatusIsOk_2013(result) then
    begin
        result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
            @request, response, @request_confirmation);
    end;
    if TUDSApi.StatusIsOk_2013(result) then
    begin

```

```

    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function version:** [UDS\\_SvcControlDTCSetting\\_2013](#) on page 675.

### 3.7.59 `svcControlDTCSetting_2013(cantp_handle, uds_msgconfig, uds_msg, uds_svc_param_cdtcs, Byte[], UInt32)`

Writes UDS request according to the ControlDTCSetting service's specifications. ControlDTCSetting service shall be used by a client to stop or resume the setting of diagnostic trouble codes (DTCs) in the server(s).

#### Syntax

##### Pascal OO

```

class function SvcControlDTCSetting_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    dtc_setting_type: uds_svc_param_cdtcs;
    dtc_setting_control_option_record: PByte;
    dtc_setting_control_option_record_size: UInt32
): uds_status; overload;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcControlDTCSetting_2013")]
public static extern uds_status SvcControlDTCSetting_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    [MarshalAs(UnmanagedType.U1)]
    uds_svc_param_cdtcs dtc_setting_type,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 5)]
    Byte[] dtc_setting_control_option_record,
    UInt32 dtc_setting_control_option_record_size);

```

##### C++ / CLR

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcControlDTCSetting_2013")]
static uds_status SvcControlDTCSetting_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType.U1)]
    uds_svc_param_cdtcs dtc_setting_type,

```

```
[MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 5)]
array<Byte> ^dtc_setting_control_option_record,
UInt32 dtc_setting_control_option_record_size);
```

## Visual Basic

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcControlDTCSetting_2013")]
static uds_status SvcControlDTCSetting_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType::U1)]
    uds_svc_param_cdtcs dtc_setting_type,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 5)]
    array<Byte> ^dtc_setting_control_option_record,
    UInt32 dtc_setting_control_option_record_size);
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
dtc_setting_type	Subfunction parameter (see uds_svc_param_cdtcs on page 76).
dtc_setting_control_option_record	This parameter record is user-optional and transmits data to a server (ECU) when controlling the DTC setting. It can contain a list of DTCs to be turned on or off.
dtc_setting_control_option_record_size	Size in bytes of the buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is not valid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	The mapping given in the message configuration is unknown.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_OVERFLOW	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data length.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcControlDTCSetting_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized.

## C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

Byte[] buffer = { 0xF0, 0xA1, 0xB2, 0xC3 };

// Sends a physical ControlDTCSetting message
result = UDSApi.SvcControlDTCSetting_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, UDSApi.uds_svc_param_cdtcs.PUDS_SVC_PARAM_CDTCS_OFF, buffer, 4);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

## C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

array<Byte>^ buffer = { 0xF0, 0xA1, 0xB2, 0xC3 };

// Sends a physical ControlDTCSetting message
result = UDSApi::SvcControlDTCSetting_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_cdtcs::PUDS_SVC_PARAM_CDTCS_OFF, buffer, 4);
```



```

if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

Dim buffer As Byte() = {&HF0, &HA1, &HB2, &HC3}

' Sends a physical ControlDTCSetting message
result = UDSApi.SvcControlDTCSetting_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi.uds_svc_param_cdtcs.PUDS_SVC_PARAM_CDTCS_OFF, buffer, 4)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    buffer: array [0 .. 3] of Byte;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;

```



```

begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

    buffer[0] := $F0;
    buffer[1] := $A1;
    buffer[2] := $B2;
    buffer[3] := $C3;

    // Sends a physical ControlDTCSetting message
    result := TUDSApi.SvcControlDTCSetting_2013
        (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
         uds_svc_param_cdtcs.PUDS_SVC_PARAM_CDTCS_OFF, @buffer, 4);
    if TUDSApi.StatusIsOk_2013(result) then
        begin
            result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
                @request, response, @request_confirmation);
        end;
    if TUDSApi.StatusIsOk_2013(result) then
        begin
            MessageBox(0, 'Response was received', 'Success', MB_OK);
        end
    else
        begin
            // An error occurred
            MessageBox(0, 'An error occurred', 'Error', MB_OK);
        end;

    // Free structures
    TUDSApi.MsgFree_2013(request);
    TUDSApi.MsgFree_2013(response);
    TUDSApi.MsgFree_2013(request_confirmation);
end;

```




**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function version:** [UDS\\_SvcControlDTCSetting\\_2013](#) on page 675.

### 3.7.60 SvcResponseOnEvent\_2013

Writes a UDS request according to the ResponseOnEvent service's specifications. The ResponseOnEvent service requests a server (ECU) to start or stop the transmission of responses on a specified event.

#### Overloads

	Method	Description
	SvcResponseOnEvent_2013(cantp_handle, uds_msgconfig, uds_msg, uds_svc_param_roe, bool, byte)	Writes to the transmit queue a request for UDS service ResponseOnEvent, without service to respond to record and event type record.
	SvcResponseOnEvent_2013(cantp_handle, uds_msgconfig, uds_msg, uds_svc_param_roe, bool, byte, byte[], UInt32)	Writes to the transmit queue a request for UDS service ResponseOnEvent.
	SvcResponseOnEvent_2013(cantp_handle, uds_msgconfig, uds_msg, uds_svc_param_roe, bool, byte, byte[], UInt32, byte[], UInt32)	Writes to the transmit queue a request for UDS service ResponseOnEvent.

Plain function version: `UDS_SvcResponseOnEvent_2013` on page 677.

### 3.7.61 SvcResponseOnEvent\_2013(cantp\_handle, uds\_msgconfig, uds\_msg, uds\_svc\_param\_roe, bool, byte)

Writes a UDS request according to the ResponseOnEvent service's specifications, without service to respond to record and event type record. The ResponseOnEvent service requests a server (ECU) to start or stop the transmission of responses on a specified event.

#### Syntax

##### Pascal OO

```
class function SvcResponseOnEvent_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    event_type: uds_svc_param_roe;
    store_event: Boolean;
    event_window_time: Byte
): uds_status; overload;
```

##### C#

```
public static uds_status SvcResponseOnEvent_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    uds_svc_param_roe event_type,
    bool store_event,
    Byte event_window_time);
```

##### C++ / CLR

```
static uds_status SvcResponseOnEvent_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    uds_svc_param_roe event_type,
    bool store_event,
    Byte event_window_time);
```

##### Visual Basic

```
Public Shared Function SvcResponseOnEvent_2013(
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal event_type As uds_svc_param_roe,
    ByVal store_event As Boolean,
    ByVal event_window_time As Byte) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
event_type	Subfunction parameter: event type (see uds_svc_param_roe on page 77).
store_event	Storage State (true to store event, false to do not store event).
event_window_time	Specify a window for the event logic to be active in the server/ECU (see ResponseOnEvent Service Definitions on page 766).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The request configuration is not valid (see uds_msgconfig on page 27), or the given message buffer is null.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with Reset_2013 (see Reset_2013 on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see MsgFree_2013 on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcResponseOnEvent_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();
```

```
// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ResponseOnEvent message
result = UDSApi.SvcResponseOnEvent_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, UDSApi.uds_svc_param_roe.PUDS_SVC_PARAM_ROE_ONDTCS, false, 0x08);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

**C++/CLR**

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ResponseOnEvent message
result = UDSApi::SvcResponseOnEvent_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_roe::PUDS_SVC_PARAM_ROE_ONDTCS, false, 0x08);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);
```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical ResponseOnEvent message
result = UDSApi.SvcResponseOnEvent_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi.uds_svc_param_roe.PUDS_SVC_PARAM_ROE_ONDTCS, False, &H8)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);

```

```

config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ResponseOnEvent message
result := TUDSApi.SvcResponseOnEvent_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, request, uds_svc_param_roe.PUDS_SVC_PARAM_ROE_ONDTCS, false, $08);
if TUDSApi.StatusIsOk_2013(result) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248, [ResponseOnEvent Service Definitions](#) on page 766.

**Plain function version:** [UDS\\_SvcResponseOnEvent\\_2013](#) on page 677.

### 3.7.62 `SvcResponseOnEvent_2013(cantp_handle, uds_msgconfig, uds_msg, uds_svc_param_roe, bool, byte, byte[], UInt32)`

Writes a UDS request according to the ResponseOnEvent service's specifications, without service to respond to record. The ResponseOnEvent service requests a server (ECU) to start or stop the transmission of responses on a specified event.

#### Syntax

##### Pascal OO

```

class function SvcResponseOnEvent_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    event_type: uds_svc_param_roe;
    store_event: Boolean;
    event_window_time: Byte;
    event_type_record: PByte;
    event_type_record_size: UInt32
): uds_status; overload;

```

##### C#

```

public static uds_status SvcResponseOnEvent_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    uds_svc_param_roe event_type,
    bool store_event,
    Byte event_window_time,

```

```
Byte[] event_type_record,
UInt32 event_type_record_size);
```

## C++ / CLR

```
static uds_status SvcResponseOnEvent_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    uds_svc_param_roe event_type,
    bool store_event,
    Byte event_window_time,
    array<Byte> ^event_type_record,
    UInt32 event_type_record_size);
```

## Visual Basic

```
Public Shared Function SvcResponseOnEvent_2013(
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal event_type As uds_svc_param_roe,
    ByVal store_event As Boolean,
    ByVal event_window_time As Byte,
    ByVal event_type_record As Byte(),
    ByVal event_type_record_size As UInt32) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
event_type	Subfunction parameter: event type (see uds_svc_param_roe on page 77).
store_event	Storage State (true to store event, false to do not store event).
event_window_time	Specify a window for the event logic to be active in the server/ECU (see ResponseOnEvent Service Definitions on page 766).
event_type_record	Additional parameters for the specified event type.
event_type_record_size	Size in bytes of the event type Record (see ResponseOnEvent Service Definitions on page 766).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_OVERFLOW</code>	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data length.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcResponseOnEvent_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized.

### C#

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ResponseOnEvent message
Byte[] event_type_record = { 0x08, (Byte)uds_service.PUDS_SERVICE_SI_ReadDTCInformation };
result = UDSApi.SvcResponseOnEvent_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, UDSApi.uds_svc_param_roe.PUDS_SVC_PARAM_ROE_ONDTCS, false, 0x08,
    event_type_record, 2);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");

```



```

else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

## C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ResponseOnEvent message
array<Byte>^ event_type_record = { 0x08, uds_service::PUDS_SERVICE_SI_ReadDTCInformation };
result = UDSApi::SvcResponseOnEvent_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_roe::PUDS_SVC_PARAM_ROE_ONDTCS, false, 0x08, event_type_record,
    2);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL

```

```

config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical ResponseOnEvent message
Dim event_type_record As Byte() = {&H8, uds_service.PUDS_SERVICE_SI_ReadDTCInformation}
result = UDSApI.SvcResponseOnEvent_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    UDSApI.uds_svc_param_roe.PUDS_SVC_PARAM_ROE_ONDTCS, False, &H8, event_type_record, 2)
If UDSApI.StatusIsOk_2013(result) Then
    result = UDSApI.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApI.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApI.MsgFree_2013(request)
UDSApI.MsgFree_2013(response)
UDSApI.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    event_type_record: array [0 .. 1] of Byte;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

    // Sends a physical ResponseOnEvent message
    event_type_record[0] :=
        Byte(uds_svc_param_rdtci.PUDS_SVC_PARAM_RDTCI_RNODTCBSM);
    event_type_record[1] := $01;
    result := TUDSApI.SvcResponseOnEvent_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        config, request, uds_svc_param_roe.PUDS_SVC_PARAM_ROE_ONDTCS, false, $08,
        @event_type_record, 2);
    if TUDSApI.StatusIsOk_2013(result) then
        begin
            result := TUDSApI.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,

```

```

    @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248, [ResponseOnEvent](#) Service Definitions on page 766.

**Plain function version:** [UDS\\_SvcResponseOnEvent\\_2013](#) on page 677.

### 3.7.63 SvcResponseOnEvent\_2013(cantp\_handle, uds\_msgconfig, uds\_msg, uds\_svc\_param\_roe, bool, byte, byte[], UInt32, byte[], UInt32)

Writes a UDS request according to the ResponseOnEvent service's specifications. The ResponseOnEvent service requests a server (ECU) to start or stop the transmission of responses on a specified event.

#### Syntax

##### Pascal OO

```

class function SvcResponseOnEvent_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    event_type: uds_svc_param_roe;
    store_event: Boolean;
    event_window_time: Byte;
    event_type_record: PByte;
    event_type_record_size: UInt32;
    service_to_respond_to_record: PByte;
    service_to_respond_to_record_size: UInt32
): uds_status; overload;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcResponseOnEvent_2013")]
public static extern uds_status SvcResponseOnEvent_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    [MarshalAs(UnmanagedType.U1)]
    uds_svc_param_roe event_type,
    [MarshalAs(UnmanagedType.I1)]
    bool store_event,
    Byte event_window_time,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 7)]
    Byte[] event_type_record,
    UInt32 event_type_record_size,

```

```
[MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 9)]
Byte[] service_to_respond_to_record,
UInt32 service_to_respond_to_record_size);
```

## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcResponseOnEvent_2013")]
static uds_status SvcResponseOnEvent_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType::U1)]
    uds_svc_param_roe event_type,
    [MarshalAs(UnmanagedType::I1)]
    bool store_event,
    Byte event_window_time,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 7)]
    array<Byte> ^event_type_record,
    UInt32 event_type_record_size,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 9)]
    array<Byte> ^service_to_respond_to_record,
    UInt32 service_to_respond_to_record_size);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcResponseOnEvent_2013")>
Public Shared Function SvcResponseOnEvent_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.U1)>
    ByVal event_type As uds_svc_param_roe,
    <MarshalAs(UnmanagedType.I1)>
    ByVal store_event As Boolean,
    ByVal event_window_time As Byte,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=7)>
    ByVal event_type_record As Byte(),
    ByVal event_type_record_size As UInt32,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=9)>
    ByVal service_to_respond_to_record As Byte(),
    ByVal service_to_respond_to_record_size As UInt32) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
event_type	Subfunction parameter: event type (see uds_svc_param_roe on page 77).
store_event	Storage State (true to store event, false to do not store event).
event_window_time	Specify a window for the event logic to be active in the server/ECU (see ResponseOnEvent Service Definitions on page 766).
event_type_record	Additional parameters for the specified event type.
event_type_record_size	Size in bytes of the event type Record (see ResponseOnEvent Service Definitions on page 766).
service_to_respond_to_record	Service parameters, with first byte as service identifier (see uds_svc_param_roe_recommended_service_id on page 78).

Parameter	Description
service_to_respond_to_record_size	Size in bytes of the service to respond to record.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_OVERFLOW</code>	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data length.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcResponseOnEvent_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized.

### C#

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ResponseOnEvent message
Byte[] event_type_record = { (Byte)UDSApi.uds_svc_param_rdtci.PUDS_SVC_PARAM_RDTCI_RNODTCBSM,
0x01 };
Byte[] service_to_respond_to_record = { 0x08,
(Byte)uds_service.PUDS_SERVICE_SI_ReadDTCInformation };
result = UDSApi.SvcResponseOnEvent_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
request, UDSApi.uds_svc_param_roe.PUDS_SVC_PARAM_ROE_ONDTCS, false, 0x08,

```

```

    event_type_record, 2, service_to_respond_to_record, 2);
if (UDSApi.StatusIsOk_2013(result))
result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
    response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

## C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ResponseOnEvent message
array<Byte>^ event_type_record =
    {(Byte)UDSApi::uds_svc_param_rdtci::PUDS_SVC_PARAM_RDTCI_RNODTCBSM, 0x01};
array<Byte>^ service_to_respond_to_record = { 0x08,
uds_service::PUDS_SERVICE_SI_ReadDTCInformation };
result = UDSApi::SvcResponseOnEvent_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_roe::PUDS_SVC_PARAM_ROE_ONDTCS, false, 0x08, event_type_record, 2,
    service_to_respond_to_record, 2);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

```

```

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical ResponseOnEvent message
Dim event_type_record As Byte() = {UDSApi.uds_svc_param_rdtci.PUDS_SVC_PARAM_RDTCI_RNODTCBSM,
    &H1}
Dim service_to_respond_to_record As Byte() = {&H8,
    uds_service.PUDS_SERVICE_SI_ReadDTCInformation}
result = UDSApi.SvcResponseOnEvent_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi.uds_svc_param_roe.PUDS_SVC_PARAM_ROE_ONDTCS, False, &H8, event_type_record, 2,
    service_to_respond_to_record, 2)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    event_type_record: array [0 .. 1] of Byte;
    service_to_respond_to_record: array [0 .. 1] of Byte;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);

```



```

config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ResponseOnEvent message
event_type_record[0] := Byte(uds_svc_param_rdtci.PUDS_SVC_PARAM_RDTCI_RNODTCBSM);
event_type_record[1] := $01;
service_to_respond_to_record[0] := $08;
service_to_respond_to_record[1] := Byte(uds_service.PUDS_SERVICE_SI_ReadDTCInformation);
result := TUDSApi.SvcResponseOnEvent_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, request, uds_svc_param_roe.PUDS_SVC_PARAM_ROE_ONDTCS, false, $08,
    @event_type_record, 2, @service_to_respond_to_record, 2);
if TUDSApi.StatusIsOk_2013(result) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```



**See also:** [WaitForService\\_2013](#) on page 248, [ResponseOnEvent Service Definitions](#) on page 766.

**Plain function version:** [UDS\\_SvcResponseOnEvent\\_2013](#) on page 677.

### 3.7.64 SvcLinkControl\_2013

Writes a UDS request according to the LinkControl service's specifications. The LinkControl service is used to control the communication link baud rate between the client and the server(s)/ECU(s) for the exchange of diagnostic data.

#### Overloads

	Method	Description
	SvcLinkControl_2013(cantp_handle, uds_msgconfig, uds_msg, uds_svc_param_lc, uds_svc_param_lc_baudrate_identifier)	Writes to the transmit queue a request for UDS service LinkControl (without PUDS_SVC_PARAM_LC_VBTWSBR parameter).
	SvcLinkControl_2013(cantp_handle, uds_msgconfig, uds_msg, uds_svc_param_lc, uds_svc_param_lc_baudrate_identifier, UInt32)	Writes to the transmit queue a request for UDS service LinkControl with PUDS_SVC_PARAM_LC_VBTWSBR parameter and link baud rate parameter.

**Plain function version:** [UDS\\_SvcLinkControl\\_2013](#) on page 679.



### 3.7.65 SvcLinkControl\_2013(cantp\_handle, uds\_msgconfig, uds\_msg, uds\_svc\_param\_lc, uds\_svc\_param\_lc\_baudrate\_identifier)

Writes a UDS request according to the LinkControl service's specifications (without `PUDS_SVC_PARAM_LC_VBTWSBR` parameter). The LinkControl service is used to control the communication link baud rate between the client and the server(s)/ECU(s) for the exchange of diagnostic data.

#### Syntax

##### Pascal OO

```
class function SvcLinkControl_2013(
  channel: cantp_handle;
  request_config: uds_msgconfig;
  var out_msg_request: uds_msg;
  link_control_type: uds_svc_param_lc;
  baudrate_identifier: uds_svc_param_lc_baudrate_identifier
): uds_status; overload;
```

##### C#

```
public static uds_status SvcLinkControl_2013(
  cantp_handle channel,
  uds_msgconfig request_config,
  out uds_msg out_msg_request,
  uds_svc_param_lc link_control_type,
  uds_svc_param_lc_baudrate_identifier baudrate_identifier);
```

##### C++ / CLR

```
static uds_status SvcLinkControl_2013(
  cantp_handle channel,
  uds_msgconfig request_config,
  uds_msg %out_msg_request,
  uds_svc_param_lc link_control_type,
  uds_svc_param_lc_baudrate_identifier baudrate_identifier);
```

##### Visual Basic

```
Public Shared Function SvcLinkControl_2013(
  ByVal channel As cantp_handle,
  ByVal request_config As uds_msgconfig,
  ByRef out_msg_request As uds_msg,
  ByVal link_control_type As uds_svc_param_lc,
  ByVal baudrate_identifier As uds_svc_param_lc_baudrate_identifier) As uds_status
End Function
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).
link_control_type	Subfunction parameter: Link Control type (see <code>uds_svc_param_lc</code> on page 79).
baudrate_identifier	Defined baud rate identifier (see <code>uds_svc_param_lc_baudrate_identifier</code> on page 80, except <code>PUDS_SVC_PARAM_LC_VBTWSBR</code> ).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcLinkControl_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized.

### C#

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical LinkControl message (Verify Fixed Baudrate)
result = UDSApi.SvcLinkControl_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out request,
    UDSApi.uds_svc_param_lc.PUDS_SVC_PARAM_LC_VBTWSBR,
    UDSApi.uds_svc_param_lc_baudrate_identifier.PUDS_SVC_PARAM_LC_BAUDRATE_CAN_250K);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

```

```
// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

## C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical LinkControl message (Verify Fixed Baudrate)
result = UDSApi::SvcLinkControl_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_lc::PUDS_SVC_PARAM_LC_VBTWSBR,
    UDSApi::uds_svc_param_lc_baudrate_identifier::PUDS_SVC_PARAM_LC_BAUDRATE_CAN_250K);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);
```

## Visual Basic

```
Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical LinkControl message (Verify Fixed Baudrate)
result = UDSApi.SvcLinkControl_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi.uds_svc_param_lc.PUDS_SVC_PARAM_LC_VBTWSBR,
```

```

UDSApi.uds_svc_param_lc_baudrate_identifier.PUDS_SVC_PARAM_LC_BAUDRATE_CAN_250K)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.typem := uds_msgtype.PUDS_MSGTYPE_USDT;

    // Sends a physical LinkControl message (Verify Fixed Baudrate)
    result := TUDSApi.SvcLinkControl_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        config, request, uds_svc_param_lc.PUDS_SVC_PARAM_LC_VBTWSBR,
        uds_svc_param_lc_baudrate_identifier.PUDS_SVC_PARAM_LC_BAUDRATE_CAN_250K);
    if TUDSApi.StatusIsOk_2013(result) then
    begin
        result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
            @request, response, @request_confirmation);
    end;
    if TUDSApi.StatusIsOk_2013(result) then
    begin
        MessageBox(0, 'Response was received', 'Success', MB_OK);
    end
    else
    begin
        // An error occurred
    end
end

```

```

    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

See also: [WaitForService\\_2013](#) on page 248.

Plain function version: [UDS\\_SvcLinkControl\\_2013](#) on page 679.

### 3.7.66 SvcLinkControl\_2013(cantp\_handle, uds\_msgconfig, uds\_msg, uds\_svc\_param\_lc, uds\_svc\_param\_lc\_baudrate\_identifier, UInt32)

Writes a UDS request according to the LinkControl service's specifications (with [PUDS\\_SVC\\_PARAM\\_LC\\_VBTWSBR](#) parameter and link baud rate parameter). The LinkControl service is used to control the communication link baud rate between the client and the server(s)/ECU(s) for the exchange of diagnostic data.

#### Syntax

##### Pascal OO

```

class function SvcLinkControl_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    link_control_type: uds_svc_param_lc;
    baudrate_identifier: uds_svc_param_lc_baudrate_identifier;
    link_baudrate: UInt32
): uds_status; overload;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcLinkControl_2013")]
public static extern uds_status SvcLinkControl_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    [MarshalAs(UnmanagedType.U1)]
    uds_svc_param_lc link_control_type,
    [MarshalAs(UnmanagedType.U1)]
    uds_svc_param_lc_baudrate_identifier baudrate_identifier,
    UInt32 link_baudrate);

```

##### C++ / CLR

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcLinkControl_2013")]
static uds_status SvcLinkControl_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType.U1)]
    uds_svc_param_lc link_control_type,

```

```
[MarshalAs(UnmanagedType::U1)]
uds_svc_param_lc_baudrate_identifier baudrate_identifier,
UInt32 link_baudrate);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint="UDS_SvcLinkControl_2013")>
Public Shared Function SvcLinkControl_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.U1)>
    ByVal link_control_type As uds_svc_param_lc,
    <MarshalAs(UnmanagedType.U1)>
    ByVal baudrate_identifier As uds_svc_param_lc_baudrate_identifier,
    ByVal link_baudrate As UInt32) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).
link_control_type	Subfunction parameter: Link Control type (see <code>uds_svc_param_lc</code> on page 79).
baudrate_identifier	Defined baud rate identifier (see <code>uds_svc_param_lc_baudrate_identifier</code> on page 80).
link_baudrate	Used only with <code>PUDS_SVC_PARAM_LC_VBTWSBR</code> parameter: a three-byte value baud rate (baud rate High, Middle and Low Bytes).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcLinkControl_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

**C#**

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical LinkControl message (Verify Fixed Baudrate)
result = UDSApi.SvcLinkControl_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out request,
    UDSApi.uds_svc_param_lc.PUDS_SVC_PARAM_LC_VBTWSBR, 0, 500000);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

**C++/CLR**

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical LinkControl message (Verify Fixed Baudrate)
result = UDSApi::SvcLinkControl_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_lc::PUDS_SVC_PARAM_LC_VBTWSBR,
    (UDSApi::uds_svc_param_lc_baudrate_identifier) 0, 500000);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");

```



```

else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

### Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical LinkControl message (Verify Fixed Baudrate)
result = UDSApi.SvcLinkControl_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi.uds_svc_param_lc.PUDS_SVC_PARAM_LC_VBTWSBR, 0, 500000)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

### Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=

```



```

    UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr := $0;
config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical LinkControl message (Verify Fixed Baudrate)
result := TUDSApi.SvcLinkControl_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, request, uds_svc_param_lc.PUDS_SVC_PARAM_LC_VBTWSBR,
    uds_svc_param_lc_baudrate_identifier(0), 500000);
if TUDSApi.StatusIsOk_2013(result) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

See also: `WaitForService_2013` on page 248.

Plain function version: `UDS_SvcLinkControl_2013` on page 679.

### 3.7.67 SvcReadDataByIdentifier\_2013

Writes a UDS request according to the ReadDataByIdentifier service's specifications. The ReadDataByIdentifier service allows the client to request data record values from the server (ECU) identified by one or more data identifiers.

#### Syntax

##### Pascal OO

```

class function SvcReadDataByIdentifier_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    data_identifier: Puds_svc_param_di;
    data_identifier_length: UInt32
): uds_status;

```

**C#**

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDataByIdentifier_2013")]
public static extern uds_status SvcReadDataByIdentifier_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    [MarshalAs(UnmanagedType.LPArray, ArraySubType = UnmanagedType.U2, SizeParamIndex = 4)]
    uds_svc_param_di[] data_identifier,
    UInt32 data_identifier_length);
```

**C++ / CLR**

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDataByIdentifier_2013")]
static uds_status SvcReadDataByIdentifier_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType::LPArray, ArraySubType = UnmanagedType::U2, SizeParamIndex = 4)]
    array<uds_svc_param_di> ^data_identifier,
    UInt32 data_identifier_length);
```

**Visual Basic**

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcReadDataByIdentifier_2013")>
Public Shared Function SvcReadDataByIdentifier_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.LPArray, ArraySubType:=UnmanagedType.U2, SizeParamIndex:=4)>
    ByVal data_identifier As uds_svc_param_di(),
    ByVal data_identifier_length As UInt32) As uds_status
End Function
```

**Parameters**

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
data_identifier	Buffer containing a list of two-byte data identifiers (see uds_svc_param_di on page 82).
data_identifier_length	Number of elements in the buffer (size in UInt16 of the buffer).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_OVERFLOW</code>	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data length.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcReadDataByIdentifier_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ReadDataByIdentifier message
UDSApi.uds_svc_param_di[] buffer = { UDSApi.uds_svc_param_di.PUDS_SVC_PARAM_DI_ADSDID,
    UDSApi.uds_svc_param_di.PUDS_SVC_PARAM_DI_ECUMDDID };
result = UDSApi.SvcReadDataByIdentifier_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, buffer, 2);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");

```

```

else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

## C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDataByIdentifier message
array<UDSApi::uds_svc_param_di>^ buffer = { UDSApi::uds_svc_param_di::PUDS_SVC_PARAM_DI_ADSDID,
    UDSApi::uds_svc_param_di::PUDS_SVC_PARAM_DI_ECUMDDID };
result = UDSApi::SvcReadDataByIdentifier_2013(PCANTP_HANDLE_USBBUS1, config, request, buffer,
    2);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL

```

```

config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical ReadDataByIdentifier message
Dim buffer As UDSApi.uds_svc_param_di() = {UDSApi.uds_svc_param_di.PUDS_SVC_PARAM_DI_ADSDID,
UDSApi.uds_svc_param_di.PUDS_SVC_PARAM_DI_ECUMDDID}
result = UDSApi.SvcReadDataByIdentifier_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
request, buffer, 2)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    buffer: array [0 .. 1] of uds_svc_param_di;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.typem := uds_msgtype.PUDS_MSGTYPE_USDT;

    // Sends a physical ReadDataByIdentifier message
    buffer[0] := uds_svc_param_di.PUDS_SVC_PARAM_DI_ADSDID;
    buffer[1] := uds_svc_param_di.PUDS_SVC_PARAM_DI_ECUMDDID;
    result := TUDSApi.SvcReadDataByIdentifier_2013
        (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request, @buffer, 2);
    if TUDSApi.StatusIsOk_2013(result) then
        begin
            result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
                @request, response, @request_confirmation);
        end
    end

```

```

end;
if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248, [uds\\_svc\\_param\\_di](#) on page 82.

**Plain function version:** [UDS\\_SvcReadDataByIdentifier\\_2013](#) on page 681.

### 3.7.68 SvcReadMemoryByAddress\_2013

Writes a UDS request according to the ReadMemoryByAddress service's specifications. The ReadMemoryByAddress service allows the client to request memory data from the server (ECU) via a provided starting address and to specify the size of memory to be read.

#### Syntax

##### Pascal OO

```

class function SvcReadMemoryByAddress_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    memory_address_buffer: PByte;
    memory_address_size: Byte;
    memory_size_buffer: PByte;
    memory_size_size: Byte
): uds_status;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadMemoryByAddress_2013")]
public static extern uds_status SvcReadMemoryByAddress_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 4)]
    byte[] memory_address_buffer,
    byte memory_address_size,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 6)]
    byte[] memory_size_buffer,
    byte memory_size_size);

```

##### C++ / CLR

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadMemoryByAddress_2013")]
static uds_status SvcReadMemoryByAddress_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,

```

```

uds_msgconfig request_config,
uds_msg %out_msg_request,
[MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 4)]
array<Byte> ^memory_address_buffer,
Byte memory_address_size,
[MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 6)]
array<Byte> ^memory_size_buffer,
Byte memory_size_size);

```

## Visual Basic

```

<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcReadMemoryByAddress_2013")>
Public Shared Function SvcReadMemoryByAddress_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=4)>
    ByVal memory_address_buffer As Byte(),
    ByVal memory_address_size As Byte,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=6)>
    ByVal memory_size_buffer As Byte(),
    ByVal memory_size_size As Byte) As uds_status
End Function

```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
memory_address_buffer	Starting address of server (ECU) memory from which data is to be retrieved.
memory_address_size	Size in bytes of the memory address buffer (max.: 0xF).
memory_size_buffer	Number of bytes to be read starting at the address specified by memory address.
memory_size_size	Size in bytes of the memory size buffer (max.: 0xF).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is not valid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	The mapping given in the message configuration is unknown.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with Reset_2013 (see Reset_2013 on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see MsgFree_2013 on page 214).


## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).



## Example

The following example shows the use of the service method `SvcReadMemoryByAddress_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
Byte[] memory_address_buffer = new Byte[10];
Byte[] memory_size_buffer = new Byte[10];
Byte memory_address_size = 10;
Byte memory_size_size = 3;
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Fill data
for (int i = 0; i < memory_address_size; i++)
{
    memory_address_buffer[i] = (Byte)(Convert.ToByte('A') + i);
    memory_size_buffer[i] = (Byte)(Convert.ToByte('1') + i);
}

// Sends a physical ReadMemoryByAddress message
result = UDSApi.SvcReadMemoryByAddress_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, memory_address_buffer, memory_address_size, memory_size_buffer, memory_size_size);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

### C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
array<Byte>^ memory_address_buffer = gcnew array<Byte>(10);
array<Byte>^ memory_size_buffer = gcnew array<Byte>(10);
```



```

Byte memory_address_size = 10;
Byte memory_size_size = 3;
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Fill data
for (int i = 0; i < memory_address_size; i++)
{
    memory_address_buffer[i] = 'A' + i;
    memory_size_buffer[i] = '1' + i;
}
// Sends a physical ReadMemoryByAddress message
result = UDSApi::SvcReadMemoryByAddress_2013(PCANTP_HANDLE_USBBUS1, config, request,
    memory_address_buffer, memory_address_size, memory_size_buffer, memory_size_size);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim memory_address_buffer(10) As Byte
Dim memory_size_buffer(10) As Byte
Dim memory_address_size As Byte = 10
Dim memory_size_size As Byte = 3
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Fill data
Dim addr_start As Char = "A"
Dim size_start As Char = "1"

```

```

For i As UInt32 = 0 To memory_address_size - 1
    memory_address_buffer(i) = Convert.ToByte(addr_start) + i
    memory_size_buffer(i) = Convert.ToByte(size_start) + i
Next
' Sends a physical ReadMemoryByAddress message
result = UDSApi.SvcReadMemoryByAddress_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, memory_address_buffer, memory_address_size, memory_size_buffer, memory_size_size)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    memory_address_buffer: array [0 .. 9] of Byte;
    memory_size_buffer: array [0 .. 9] of Byte;
    memory_address_size: Byte;
    memory_size_size: Byte;
    i: UInt32;
begin
    memory_address_size := 10;
    memory_size_size := 3;
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

    // Fill data
    for i := 0 to memory_address_size - 1 do
        begin

```

```

    memory_address_buffer[i] := $41 + i;
    memory_size_buffer[i] := $31 + i;
end;
// Sends a physical ReadMemoryByAddress message
result := TUDSApi.SvcReadMemoryByAddress_2013
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request, @memory_address_buffer,
    memory_address_size, @memory_size_buffer, memory_size_size);
if TUDSApi.StatusIsOk_2013(result) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function version:** [UDS\\_SvcReadMemoryByAddress\\_2013](#) on page 683.

### 3.7.69 SvcReadScalingDataByIdentifier\_2013

Writes a UDS request according to the ReadScalingDataByIdentifier service's specifications. The ReadScalingDataByIdentifier service allows the client to request scaling data record information from the server (ECU) identified by a data identifier.

#### Syntax

##### Pascal OO

```

class function SvcReadScalingDataByIdentifier_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    data_identifier: uds_svc_param_di
): uds_status;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadScalingDataByIdentifier_2013")]
public static extern uds_status SvcReadScalingDataByIdentifier_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    [MarshalAs(UnmanagedType.U2)]
    uds_svc_param_di data_identifier);

```

## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadScalingDataByIdentifier_2013")]
static uds_status SvcReadScalingDataByIdentifier_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType::U2)]
    uds_svc_param_di data_identifier);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcReadScalingDataByIdentifier_2013")>
Public Shared Function SvcReadScalingDataByIdentifier_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.U2)>
    ByVal data_identifier As uds_svc_param_di) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
data_identifier	A two-byte Data Identifier (see uds_svc_param_di on page 82).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The request configuration is not valid (see uds_msgconfig on page 27), or the given message buffer is null.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcReadScalingDataByIdentifier_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized.

## C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ReadScalingDataByIdentifier message
result = UDSApi.SvcReadScalingDataByIdentifier_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    out request, UDSApi.uds_svc_param_di.PUDS_SVC_PARAM_DI_BSFPDID);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

## C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadScalingDataByIdentifier message
result = UDSApi::SvcReadScalingDataByIdentifier_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_di::PUDS_SVC_PARAM_DI_BSFPDID);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
```

```

        MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical ReadScalingDataByIdentifier message
result = UDSApi.SvcReadScalingDataByIdentifier_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, UDSApi.uds_svc_param_di.PUDS_SVC_PARAM_DI_BSFPDID)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);

```

```

config.can_id :=
    UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr := $0;
config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ReadScalingDataByIdentifier message
result := TUDSApi.SvcReadScalingDataByIdentifier_2013
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    uds_svc_param_di.PUDS_SVC_PARAM_DI_BSFPDID);
if TUDSApi.StatusIsOk_2013(result) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** `WaitForService_2013` on page 248, `uds_svc_param_di` on page 82.

**Plain function version:** `UDS_SvcReadScalingDataByIdentifier_2013` on page 685.

### 3.7.70 SvcReadDataByPeriodicIdentifier\_2013

Writes a UDS request according to the `ReadDataByPeriodicIdentifier` service's specifications. The `ReadDataByPeriodicIdentifier` service allows the client to request the periodic transmission of data record values from the server (ECU) identified by one or more periodic data identifier.

#### Syntax

##### Pascal OO

```

class function SvcReadDataByPeriodicIdentifier_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    transmission_mode: uds_svc_param_rdbpi;
    periodic_data_identifier: PByte;
    periodic_data_identifier_size: UInt32
): uds_status;

```



**C#**

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDataByPeriodicIdentifier_2013")]
public static extern uds_status SvcReadDataByPeriodicIdentifier_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    [MarshalAs(UnmanagedType.U1)]
    uds_svc_param_rdbpi transmission_mode,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 5)]
    byte[] periodic_data_identifier,
    UInt32 periodic_data_identifier_size);
```

**C++ / CLR**

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDataByPeriodicIdentifier_2013")]
static uds_status SvcReadDataByPeriodicIdentifier_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType::U1)]
    uds_svc_param_rdbpi transmission_mode,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 5)]
    array<Byte> ^periodic_data_identifier,
    UInt32 periodic_data_identifier_size);
```

**Visual Basic**

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcReadDataByPeriodicIdentifier_2013")>
Public Shared Function SvcReadDataByPeriodicIdentifier_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.U1)>
    ByVal transmission_mode As uds_svc_param_rdbpi,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=5)>
    ByVal periodic_data_identifier As Byte(),
    ByVal periodic_data_identifier_size As UInt32) As uds_status
End Function
```

**Parameters**

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 25).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
transmission_mode	Transmission rate mode (see uds_svc_param_rdbpi on page 86).
periodic_data_identifier	Buffer containing a list of periodic data identifiers (see uds_svc_param_di on page 82).
periodic_data_identifier_size	Number of elements in the buffer (size in bytes of the buffer).

**Returns**

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:




PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is not valid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	The mapping given in the message configuration is unknown.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <a href="#">Reset_2013</a> (see <a href="#">Reset_2013</a> on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_OVERFLOW	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data length.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <a href="#">MsgFree_2013</a> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see [MsgFree\\_2013](#) on page 214).

## Example

The following example shows the use of the service method [SvcReadDataByPeriodicIdentifier\\_2013](#) on the channel [PCANTP\\_HANDLE\\_USBBUS1](#). A UDS physical service request is transmitted, and the [WaitForService\\_2013](#) method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
Byte[] periodic_data_identifier = new Byte[10];
UInt16 periodic_data_identifier_size = 10;
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Fill Data
for (int i = 0; i < periodic_data_identifier_size; i++)
{
    periodic_data_identifier[i] = (Byte)(Convert.ToByte('A') + i);
}

// Sends a physical ReadDataByPeriodicIdentifier message
result = UDSApi.SvcReadDataByPeriodicIdentifier_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, out request, UDSApi.uds_svc_param_rdbpi.PUDS_SVC_PARAM_RDBPI_SAMR,
    periodic_data_identifier, periodic_data_identifier_size);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);

```

```

if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

## C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
array<Byte>^ periodic_data_identifier = gcnew array<Byte>(10);
UInt16 periodic_data_identifier_size = 10;
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Fill Data
for (int i = 0; i < periodic_data_identifier_size; i++)
{
    periodic_data_identifier[i] = 'A' + i;
}

// Sends a physical ReadDataByPeriodicIdentifier message
result = UDSApi::SvcReadDataByPeriodicIdentifier_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_rdbpi::PUDS_SVC_PARAM_RDBPI_SAMR, periodic_data_identifier,
    periodic_data_identifier_size);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim periodic_data_identifier(10) As Byte

```

```

Dim periodic_data_identifier_size As UInt16 = 10
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Fill Data
Dim start_value As Char = "A"
For i As UInt32 = 0 To periodic_data_identifier_size - 1
    periodic_data_identifier(i) = Convert.ToByte(start_value) + i
Next

' Sends a physical ReadDataByPeriodicIdentifier message
result = UDSApi.SvcReadDataByPeriodicIdentifier_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, request, UDSApi.uds_svc_param_rdbpi.PUDS_SVC_PARAM_RDBPI_SAMR,
    periodic_data_identifier, periodic_data_identifier_size)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    periodic_data_identifier: array [0 .. 9] of Byte;
    periodic_data_identifier_size: UInt16;
    i: UInt32;
begin
    periodic_data_identifier_size := 10;
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;

```

```

config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Fill Data
for i := 0 to periodic_data_identifier_size - 1 do
begin
    periodic_data_identifier[i] := $41 + i;
end;

// Sends a physical ReadDataByPeriodicIdentifier message
result := TUDSApi.SvcReadDataByPeriodicIdentifier_2013
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    uds_svc_param_rdbpi.PUDS_SVC_PARAM_RDBPI_SAMR, @periodic_data_identifier,
    periodic_data_identifier_size);
if TUDSApi.StatusIsOk_2013(result) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248, [uds\\_svc\\_param\\_di](#) on page 82.

**Plain function version:** [UDS\\_SvcReadDataByPeriodicIdentifier\\_2013](#) on page 686.

### 3.7.71 SvcDynamicallyDefineDataIdentifierDBID\_2013

Writes a UDS request according to the DynamicallyDefineDataIdentifier service's specifications. The DynamicallyDefineDataIdentifier service allows the client to dynamically define in a server (ECU) a data identifier that can be read via the ReadDataByIdentifier service later. The define by identifier subfunction specifies that the definition of the dynamic data identifier shall occur via a data identifier reference.

#### Syntax

##### Pascal OO

```

class function SvcDynamicallyDefineDataIdentifierDBID_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    dynamically_defined_data_identifier: uds_svc_param_di;
    source_data_identifier: PUInt16;

```

```
memory_size: PByte;
position_in_source_data_record: PByte;
number_of_elements: UInt32
): uds_status;
```

**C#**

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcDynamicallyDefineDataIdentifierDBID_2013")]
public static extern uds_status SvcDynamicallyDefineDataIdentifierDBID_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    [MarshalAs(UnmanagedType.U2)]
    uds_svc_param_di dynamically_defined_data_identifier,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 7)]
    UInt16[] source_data_identifier,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 7)]
    Byte[] memory_size,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 7)]
    Byte[] position_in_source_data_record,
    UInt32 number_of_elements);
```

**C++ / CLR**

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcDynamicallyDefineDataIdentifierDBID_2013")]
static uds_status SvcDynamicallyDefineDataIdentifierDBID_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType::U2)]
    uds_svc_param_di dynamically_defined_data_identifier,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 7)]
    array<UInt16> ^source_data_identifier,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 7)]
    array<Byte> ^memory_size,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 7)]
    array<Byte> ^position_in_source_data_record,
    UInt32 number_of_elements);
```

**Visual Basic**

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcDynamicallyDefineDataIdentifierDBID_2013")>
Public Shared Function SvcDynamicallyDefineDataIdentifierDBID_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.U2)>
    ByVal dynamically_defined_data_identifier As uds_svc_param_di,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=7)>
    ByVal source_data_identifier As UInt16(),
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=7)>
    ByVal memory_size As Byte(),
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=7)>
    ByVal position_in_source_data_record As Byte(),
    ByVal number_of_elements As UInt32) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).
dynamically_defined_data_identifier	A two-byte data identifier (see <code>uds_svc_param_di</code> on page 82).
source_data_identifier	Buffer containing the sources of information to be included into the dynamic data record.
memory_size	Buffer containing the total numbers of bytes from the source data record address.
position_in_source_data_record	Buffer containing the starting byte positions of the excerpt of the source data record.
number_of_elements	Number of <code>source_data_identifier</code> / <code>position_in_source_data_record</code> / <code>memory_size</code> triplet.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_OVERFLOW</code>	The total buffer length is too big. The resulting UDS message data size is bigger than the maximum data length.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcDynamicallyDefineDataIdentifierDBID_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
UInt16[] source_data_identifier = new UInt16[10];
Byte[] memory_size = new Byte[10];
Byte[] position_in_source_data_record = new Byte[10];
UInt16 number_of_elements = 10;
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
```

```

config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Fill Data
for (int i = 0; i < number_of_elements; i++)
{
    source_data_identifier[i] = (Byte)((((0xF0 + i) << 8) + ('A' + i)));
    memory_size[i] = (Byte)(i + 1);
    position_in_source_data_record[i] = (Byte)(100 + i);
}

// Sends a physical DynamicallyDefineDataIdentifierDBID message
result = UDSApi.SvcDynamicallyDefineDataIdentifierDBID_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, out request, UDSApi.uds_svc_param_di.PUDS_SVC_PARAM_DI_CDDID,
    source_data_identifier, memory_size, position_in_source_data_record, number_of_elements);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

## C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
array<UInt16>^ source_data_identifier = gcnew array<UInt16>(10);
array<Byte>^ memory_size = gcnew array<Byte>(10);
array<Byte>^ position_in_source_data_record = gcnew array<Byte>(10);
UInt16 number_of_elements = 10;
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Fill Data
for (int i = 0; i < number_of_elements; i++)
{
    source_data_identifier[i] = (((0xF0 + i) << 8) + ('A' + i));
    memory_size[i] = (i + 1);
    position_in_source_data_record[i] = (100 + i);
}

```



```
// Sends a physical DynamicallyDefineDataIdentifierDBID message
result = UDSApi::SvcDynamicallyDefineDataIdentifierDBID_2013(PCANTP_HANDLE_USBBUS1, config,
    request, UDSApi::uds_svc_param_di::PUDS_SVC_PARAM_DI_CDDID, source_data_identifier,
    memory_size, position_in_source_data_record, number_of_elements);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);
```

### Visual Basic

```
Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim source_data_identifier(10) As UInt16
Dim memory_size(10) As Byte
Dim position_in_source_data_record(10) As Byte
Dim number_of_elements As UInt16 = 10
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Fill Data
Dim start_value As Char = "A"
For i As UInt32 = 0 To number_of_elements - 1
    source_data_identifier(i) = (((&HF0 + i) << 8) + (Convert.ToByte(start_value) + i))
    memory_size(i) = i + 1
    position_in_source_data_record(i) = 100 + i
Next

' Sends a physical DynamicallyDefineDataIdentifierDBID message
result = UDSApi.SvcDynamicallyDefineDataIdentifierDBID_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, request, UDSApi.uds_svc_param_di.PUDS_SVC_PARAM_DI_CDDID, source_data_identifier,
    memory_size, position_in_source_data_record, number_of_elements)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
```



End If

```
' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)
```

## Pascal OO

```
var
  result: uds_status;
  request: uds_msg;
  request_confirmation: uds_msg;
  response: uds_msg;
  config: uds_msgconfig;
  memory_size: array [0 .. 9] of Byte;
  position_in_source_data_record: array [0 .. 9] of Byte;
  source_data_identifier: array [0 .. 9] of UInt16;
  number_of_elements: UInt16;
  i: UInt32;
begin
  number_of_elements := 10;
  FillChar(request, sizeof(request), 0);
  FillChar(request_confirmation, sizeof(request_confirmation), 0);
  FillChar(response, sizeof(response), 0);

  // Set request message configuration
  FillChar(config, sizeof(config), 0);
  config.can_id :=
    UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
  config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
  config.nai.extension_addr := $0;
  config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
  config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
  config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
  config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
  config.typem := uds_msgtype.PUDS_MSGTYPE_USDT;

  // Fill Data
  for i := 0 to number_of_elements - 1 do
  begin
    source_data_identifier[i] := ((($F0 + i) Shl 8) + ($41 + i));
    memory_size[i] := (i + 1);
    position_in_source_data_record[i] := (100 + i);
  end;

  // Sends a physical DynamicallyDefineDataIdentifierDBID message
  result := TUDSApi.SvcDynamicallyDefineDataIdentifierDBID_2013
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
     uds_svc_param_di.PUDS_SVC_PARAM_DI_CDDID, @source_data_identifier, @memory_size,
     @position_in_source_data_record, number_of_elements);
  if TUDSApi.StatusIsOk_2013(result) then
  begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
     @request, response, @request_confirmation);
  end;
  if TUDSApi.StatusIsOk_2013(result) then
  begin
```

```

    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** `WaitForService_2013` on page 248.

**Plain function version:** `UDS_SvcDynamicallyDefineDataIdentifierDBID_2013` on page 688.

### 3.7.72 `svcDynamicallyDefineDataIdentifierDBMA_2013`

Writes a UDS request according to the `DynamicallyDefineDataIdentifier` service's specifications. The `DynamicallyDefineDataIdentifier` service allows the client to dynamically define in a server (ECU) a data identifier that can be read via the `ReadDataByIdentifier` service later. Defined by the memory address subfunction, this specifies that the definition of the dynamic data identifier shall occur via an address reference.

#### Syntax

##### Pascal OO

```

class function SvcDynamicallyDefineDataIdentifierDBMA_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    dynamically_defined_data_identifier: uds_svc_param_di;
    memory_address_size: Byte;
    memory_size_size: Byte;
    memory_address_buffer: PByte;
    memory_size_buffer: PByte;
    number_of_elements: UInt32
): uds_status;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcDynamicallyDefineDataIdentifierDBMA_2013")]
public static extern uds_status SvcDynamicallyDefineDataIdentifierDBMA_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    [MarshalAs(UnmanagedType.U2)]
    uds_svc_param_di dynamically_defined_data_identifier,
    Byte memory_address_size,
    Byte memory_size_size,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 8)]
    Byte[] memory_address_buffer,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 8)]
    Byte[] memory_size_buffer,
    UInt32 number_of_elements);

```

## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcDynamicallyDefineDataIdentifierDBMA_2013")]
static uds_status SvcDynamicallyDefineDataIdentifierDBMA_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType::U2)]
    uds_svc_param_di dynamically_defined_data_identifier,
    Byte memory_address_size,
    Byte memory_size_size,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 8)]
    array<Byte> ^memory_address_buffer,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 8)]
    array<Byte> ^Memory_size_buffer,
    UInt32 number_of_elements);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcDynamicallyDefineDataIdentifierDBMA_2013")>
Public Shared Function SvcDynamicallyDefineDataIdentifierDBMA_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.U2)>
    ByVal dynamically_defined_data_identifier As uds_svc_param_di,
    ByVal memory_address_size As Byte,
    ByVal memory_size_size As Byte,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=8)>
    ByVal memory_address_buffer As Byte(),
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=8)>
    ByVal Memory_size_buffer As Byte(),
    ByVal number_of_elements As UInt32) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
dynamically_defined_data_identifier	A two-byte Data Identifier (see uds_svc_param_di on page 82).
memory_address_size	Size in bytes of the memory address items in the memory address buffer (max.: 0xF).
memory_size_size	Size in bytes of the memory size items in the memory size buffer (max.: 0xF).
memory_address_buffer	Buffer containing the memory address buffers must be an array of 'buffers length' entries which contains 'memory address length' bytes (size is 'buffers length * memory address length' bytes).
Memory_size_buffer	Buffer containing the memory size buffers must be an array of 'buffers length' entries which contains 'memory size length' bytes (size is 'buffers length * memory size length' bytes).
number_of_elements	Number of memory address/memory_size couple.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is not valid.


PUDS_STATUS_MAPPING_NOT_INITIALIZED	The mapping given in the message configuration is unknown.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <a href="#">Reset_2013</a> (see <a href="#">Reset_2013</a> on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_OVERFLOW	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data length.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <a href="#">MsgFree_2013</a> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see [MsgFree\\_2013](#) on page 214).

## Example

The following example shows the use of the service method [SvcDynamicallyDefineDataIdentifierDBMA\\_2013](#) on the channel [PCANTP\\_HANDLE\\_USBBUS1](#). A UDS physical service request is transmitted, and the [WaitForService\\_2013](#) method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
UInt16 number_of_elements = 3;
Byte[] memory_address_buffer = new Byte[15];
Byte[] memory_size_buffer = new Byte[9];
Byte memory_address_size = 5;
Byte memory_size_size = 3;
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Fill data
for (int j = 0; j < number_of_elements; j++)
{
    for (int i = 0; i < memory_address_size; i++)
    {
        memory_address_buffer[memory_address_size * j + i] = (Byte)((10 * j) + i + 1);
    }
    for (int i = 0; i < memory_size_size; i++)
    {
        memory_size_buffer[memory_size_size * j + i] = (Byte)(100 + (10 * j) + i + 1);
    }
}

```

```
// Sends a physical DynamicallyDefineDataIdentifierDBMA message
result = UDSApi.SvcDynamicallyDefineDataIdentifierDBMA_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, out request, UDSApi.uds_svc_param_di.PUDS_SVC_PARAM_DI_CESWNDID,
    memory_address_size, memory_size_size, memory_address_buffer, memory_size_buffer,
    number_of_elements);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

## C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
UInt16 number_of_elements = 3;
array<Byte>^ memory_address_buffer = gcnew array<Byte>(15);
array<Byte>^ memory_size_buffer = gcnew array<Byte>(9);
Byte memory_address_size = 5;
Byte memory_size_size = 3;
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Fill data
for (int j = 0; j < number_of_elements; j++)
{
    for (int i = 0; i < memory_address_size; i++)
    {
        memory_address_buffer[memory_address_size * j + i] = ((10 * j) + i + 1);
    }
    for (int i = 0; i < memory_size_size; i++)
    {
        memory_size_buffer[memory_size_size * j + i] = (100 + (10 * j) + i + 1);
    }
}

// Sends a physical DynamicallyDefineDataIdentifierDBMA message
result = UDSApi::SvcDynamicallyDefineDataIdentifierDBMA_2013(PCANTP_HANDLE_USBBUS1, config,
    request, UDSApi::uds_svc_param_di::PUDS_SVC_PARAM_DI_CESWNDID, memory_address_size,
    memory_size_size, memory_address_buffer, memory_size_buffer, number_of_elements);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
```

```

if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim number_of_elements As UInt16 = 3
Dim memory_address_buffer(15) As Byte
Dim memory_size_buffer(9) As Byte
Dim memory_address_size As Byte = 5
Dim memory_size_size As Byte = 3
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Fill data
For j As UInt32 = 0 To number_of_elements - 1
    For i As UInt32 = 0 To memory_address_size - 1
        memory_address_buffer(memory_address_size * j + i) = ((10 * j) + i + 1)
    Next
    For i As UInt32 = 0 To memory_size_size - 1
        memory_size_buffer(memory_size_size * j + i) = (100 + (10 * j) + i + 1)
    Next
Next

' Sends a physical DynamicallyDefinedDataIdentifierDBMA message
result = UDSApi.SvcDynamicallyDefinedDataIdentifierDBMA_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, request, UDSApi.uds_svc_param_di.PUDS_SVC_PARAM_DI_CESWNDID, memory_address_size,
    memory_size_size, memory_address_buffer, memory_size_buffer, number_of_elements)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures

```

```
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)
```

## Pascal OO

```
var
  result: uds_status;
  request: uds_msg;
  request_confirmation: uds_msg;
  response: uds_msg;
  config: uds_msgconfig;
  memory_address_buffer: array [0 .. 14] of Byte;
  memory_size_buffer: array [0 .. 8] of Byte;
  number_of_elements: UInt16;
  memory_address_size: Byte;
  memory_size_size: Byte;
  i: UInt32;
  j: UInt32;
begin
  number_of_elements := 3;
  memory_address_size := 5;
  memory_size_size := 3;
  FillChar(request, sizeof(request), 0);
  FillChar(request_confirmation, sizeof(request_confirmation), 0);
  FillChar(response, sizeof(response), 0);

  // Set request message configuration
  FillChar(config, sizeof(config), 0);
  config.can_id :=
    UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
  config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
  config.nai.extension_addr := $0;
  config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
  config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
  config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
  config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
  config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

  // Fill data
  for j := 0 to number_of_elements - 1 do
  begin
    for i := 0 to memory_address_size - 1 do
    begin
      memory_address_buffer[memory_address_size * j + i] := ((10 * j) + i + 1);
    end;
    for i := 0 to memory_size_size - 1 do
    begin
      memory_size_buffer[memory_size_size * j + i] := (100 + (10 * j) + i + 1);
    end;
  end;

  // Sends a physical DynamicallyDefineDataIdentifierDBMA message
  result := TUDSApi.SvcDynamicallyDefineDataIdentifierDBMA_2013
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
     uds_svc_param_di.PUDS_SVC_PARAM_DI_CESWNDID, memory_address_size, memory_size_size,
     @memory_address_buffer, @memory_size_buffer, number_of_elements);
  if TUDSApi.StatusIsOk_2013(result) then
```

```

begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248, [uds\\_svc\\_param\\_di](#) on page 82.

**Plain function version:** [UDS\\_SvcDynamicallyDefineDataIdentifierDBMA\\_2013](#) on page 690.

### 3.7.73 svcDynamicallyDefineDataIdentifierCDDDI\_2013

Writes a UDS request according to the Dynamically Defined Data Identifier service's specifications. The Clear Dynamically Defined Data Identifier subfunction shall be used to clear the specified dynamic data identifier.

#### Syntax

##### Pascal OO

```

class function SvcDynamicallyDefineDataIdentifierCDDDI_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    dynamically_defined_data_identifier: uds_svc_param_di
): uds_status;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcDynamicallyDefineDataIdentifierCDDDI_2013")]
public static extern uds_status SvcDynamicallyDefineDataIdentifierCDDDI_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    [MarshalAs(UnmanagedType.U2)]
    uds_svc_param_di dynamically_defined_data_identifier);

```

##### C++ / CLR

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcDynamicallyDefineDataIdentifierCDDDI_2013")]
static uds_status SvcDynamicallyDefineDataIdentifierCDDDI_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,

```



```
uds_msg %out_msg_request,
[MarshalAs(UnmanagedType::U2)]
uds_svc_param_di dynamically_defined_data_identifier);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcDynamicallyDefineDataIdentifierCDDDI_2013")>
Public Shared Function SvcDynamicallyDefineDataIdentifierCDDDI_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.U2)>
    ByVal dynamically_defined_data_identifier As uds_svc_param_di) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
dynamically_defined_data_identifier	A two-byte data identifier (see uds_svc_param_di on page 82).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The request configuration is not valid (see uds_msgconfig on page 27), or the given message buffer is null.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcDynamicallyDefineDataIdentifierCDDDI_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

## C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
```

```

uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical DynamicallyDefineDataIdentifierCDDDI message
result =
    UDSApi.SvcDynamicallyDefineDataIdentifierCDDDI_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        config, out request, UDSApi.uds_svc_param_di.PUDS_SVC_PARAM_DI_CESWNDID);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

## C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical DynamicallyDefineDataIdentifierCDDDI message
result = UDSApi::SvcDynamicallyDefineDataIdentifierCDDDI_2013(PCANTP_HANDLE_USBBUS1, config,
    request, UDSApi::uds_svc_param_di::PUDS_SVC_PARAM_DI_CESWNDID);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures

```

```
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);
```

## Visual Basic

```
Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical DynamicallyDefineDataIdentifierCDDDI message
result =
    UDSApi.SvcDynamicallyDefineDataIdentifierCDDDI_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        config, request, UDSApi.uds_svc_param_di.PUDS_SVC_PARAM_DI_CESWNDID)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)
```

## Pascal OO

```
var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
```

```

config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical DynamicallyDefineDataIdentifierCDDDI message
result := TUDSApi.SvcDynamicallyDefineDataIdentifierCDDDI_2013
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    uds_svc_param_di.PUDS_SVC_PARAM_DI_CESWNDID);
if TUDSApi.StatusIsOk_2013(result) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248, [uds\\_svc\\_param\\_di](#) on page 82.

**Plain function version:** [UDS\\_SvcDynamicallyDefineDataIdentifierCDDDI\\_2013](#) on page 693.

### 3.7.74 SvcDynamicallyDefineDataIdentifierClearAllDDDI\_2013

Writes a UDS request according to the Clear all Dynamically Defined Data Identifier service's specifications. The Clear Dynamically Defined Data Identifier subfunction (without data identifier parameter) shall be used to clear all the specified dynamic data identifier in the server.

#### Syntax

##### Pascal OO

```

class function SvcDynamicallyDefineDataIdentifierClearAllDDDI_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg
): uds_status;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint =
    "UDS_SvcDynamicallyDefineDataIdentifierClearAllDDDI_2013")]
public static extern uds_status SvcDynamicallyDefineDataIdentifierClearAllDDDI_2013(
    [MarshalAs(UnmanagedType.U4)]

```

```
cantp_handle channel,
uds_msgconfig request_config,
out uds_msg out_msg_request);
```

## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint =
"UDS_SvcDynamicallyDefineDataIdentifierClearAllDDDI_2013")]
static uds_status SvcDynamicallyDefineDataIdentifierClearAllDDDI_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll",
EntryPoint:="UDS_SvcDynamicallyDefineDataIdentifierClearAllDDDI_2013")>
Public Shared Function SvcDynamicallyDefineDataIdentifierClearAllDDDI_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcDynamicallyDefineDataIdentifierClearAllDDDI_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the

`WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized.

## C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical DynamicallyDefineDataIdentifierClearAllDDDI message
result =
    UDSApi.SvcDynamicallyDefineDataIdentifierClearAllDDDI_2013(
        cantp_handle.PCANTP_HANDLE_USBBUS1, config, out request);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

## C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical DynamicallyDefineDataIdentifierClearAllDDDI message
result = UDSApi::SvcDynamicallyDefineDataIdentifierClearAllDDDI_2013(PCANTP_HANDLE_USBBUS1,
```

```

        config, request);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical DynamicallyDefineDataIdentifierClearAllDDDI message
result =
    UDSApi.SvcDynamicallyDefineDataIdentifierClearAllDDDI_2013(
        cantp_handle.PCANTP_HANDLE_USBBUS1, config, request)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;

```



```

begin
  FillChar(request, sizeof(request), 0);
  FillChar(request_confirmation, sizeof(request_confirmation), 0);
  FillChar(response, sizeof(response), 0);

  // Set request message configuration
  FillChar(config, sizeof(config), 0);
  config.can_id :=
    UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
  config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
  config.nai.extension_addr := $0;
  config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
  config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
  config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
  config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
  config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

  // Sends a physical DynamicallyDefineDataIdentifierClearAllDDDI message
  result := TUDSApi.SvcDynamicallyDefineDataIdentifierClearAllDDDI_2013
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request);
  if TUDSApi.StatusIsOk_2013(result) then
    begin
      result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
    end;
  if TUDSApi.StatusIsOk_2013(result) then
    begin
      MessageBox(0, 'Response was received', 'Success', MB_OK);
    end
  else
    begin
      // An error occurred
      MessageBox(0, 'An error occurred', 'Error', MB_OK);
    end;

  // Free structures
  TUDSApi.MsgFree_2013(request);
  TUDSApi.MsgFree_2013(response);
  TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function version:** [UDS\\_SvcDynamicallyDefineDataIdentifierClearAllDDDI\\_2013](#) on page 694.

### 3.7.75 SvcWriteDataByIdentifier\_2013

Writes a UDS request according to the WriteDataByIdentifier service's specifications. The WriteDataByIdentifier service allows the client to write information into the server (ECU) at an internal location specified by the provided data identifier.

#### Syntax

##### Pascal OO

```

class function SvcWriteDataByIdentifier_2013(
  channel: cantp_handle;
  request_config: uds_msgconfig;

```



```
var out_msg_request: uds_msg;
data_identifier: uds_svc_param_di;
data_record: PByte;
data_record_size: UInt32
): uds_status;
```

**C#**

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcWriteDataByIdentifier_2013")]
public static extern uds_status SvcWriteDataByIdentifier_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    [MarshalAs(UnmanagedType.U2)]
    uds_svc_param_di data_identifier,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 5)]
    Byte[] data_record,
    UInt32 data_record_size);
```

**C++ / CLR**

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcWriteDataByIdentifier_2013")]
static uds_status SvcWriteDataByIdentifier_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType::U2)]
    uds_svc_param_di data_identifier,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 5)]
    array<Byte> ^data_record,
    UInt32 data_record_size);
```

**Visual Basic**

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcWriteDataByIdentifier_2013")>
Public Shared Function SvcWriteDataByIdentifier_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.U2)>
    ByVal data_identifier As uds_svc_param_di,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=5)>
    ByVal data_record As Byte(),
    ByVal data_record_size As UInt32) As uds_status
End Function
```

**Parameters**

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
data_identifier	A two-byte data identifier (see uds_svc_param_di on page 82).
data_record	Buffer containing the data to write.
data_record_size	Size in bytes of the buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_OVERFLOW</code>	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data length.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcWriteDataByIdentifier_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized.

### C#

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
Byte[] data_record = new Byte[10];
UInt16 data_record_size = 10;
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Fill Data
for (int i = 0; i < data_record_size; i++)
{
    data_record[i] = (Byte)(Convert.ToByte('A') + i);
}

// Sends a physical WriteDataByIdentifier message
result = UDSApi.SvcWriteDataByIdentifier_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out

```

```

    request, UDSApi.uds_svc_param_di.PUDS_SVC_PARAM_DI_ASFPDID, data_record, data_record_size);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

## C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
array<Byte>^ data_record = gcnew array<Byte>(10);
UInt16 data_record_size = 10;
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Fill Data
for (int i = 0; i < data_record_size; i++)
{
    data_record[i] = 'A' + i;
}

// Sends a physical WriteDataByIdentifier message
result = UDSApi::SvcWriteDataByIdentifier_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_di::PUDS_SVC_PARAM_DI_ASFPDID, data_record, data_record_size);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()

```

```

Dim response As uds_msg = New uds_msg()
Dim data_record(10) As Byte
Dim data_record_size As UInt16 = 10
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Fill Data
Dim start_value As Char = "A"
For i As UInt32 = 0 To data_record_size - 1
    data_record(i) = Convert.ToByte(start_value) + i
Next

' Sends a physical WriteDataByIdentifier message
result = UDSApi.SvcWriteDataByIdentifier_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, UDSApi.uds_svc_param_di.PUDS_SVC_PARAM_DI_ASFPDID, data_record, data_record_size)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    data_record: array [0 .. 9] of Byte;
    data_record_size: UInt16;
    i: UInt32;
begin
    data_record_size := 10;
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;

```

```

config.nai.extension_addr := $0;
config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Fill Data
for i := 0 to data_record_size - 1 do
begin
    data_record[i] := ($41 + i);
end;

// Sends a physical WriteDataByIdentifier message
result := TUDSApi.SvcWriteDataByIdentifier_2013
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    uds_svc_param_di.PUDS_SVC_PARAM_DI_ASFPDID, @data_record, data_record_size);
if TUDSApi.StatusIsOk_2013(result) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248, [uds\\_svc\\_param\\_di](#) on page 82.

**Plain function version:** [UDS\\_SvcWriteDataByIdentifier\\_2013](#) on page 696.

### 3.7.76 SvcWriteMemoryByAddress\_2013

Writes a UDS request according to the WriteMemoryByAddress service's specifications. The WriteMemoryByAddress service allows the client to write information into the server (ECU) at one or more contiguous memory locations.

#### Syntax

##### Pascal OO

```

class function SvcWriteMemoryByAddress_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    memory_address_buffer: PByte;

```

```
memory_address_size: Byte;
memory_size_buffer: PByte;
memory_size_size: Byte;
data_record: PByte;
data_record_size: UInt32
): uds_status;
```

**C#**

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcWriteMemoryByAddress_2013")]
public static extern uds_status SvcWriteMemoryByAddress_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 4)]
    Byte[] memory_address_buffer,
    Byte memory_address_size,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 6)]
    Byte[] memory_size_buffer,
    Byte memory_size_size,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 8)]
    Byte[] data_record,
    UInt32 data_record_size);
```

**C++ / CLR**

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcWriteMemoryByAddress_2013")]
static uds_status SvcWriteMemoryByAddress_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 4)]
    array<Byte> ^memory_address_buffer,
    Byte memory_address_size,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 6)]
    array<Byte> ^memory_size_buffer,
    Byte memory_size_size,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 8)]
    array<Byte> ^data_record,
    UInt32 data_record_size);
```

**Visual Basic**

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcWriteMemoryByAddress_2013")>
Public Shared Function SvcWriteMemoryByAddress_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=4)>
    ByVal memory_address_buffer As Byte(),
    ByVal memory_address_size As Byte,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=6)>
    ByVal memory_size_buffer As Byte(),
    ByVal memory_size_size As Byte,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=8)>
    ByVal data_record As Byte(),
    ByVal data_record_size As UInt32) As uds_status
```

## End Function

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).
memory_address_buffer	Starting address buffer of server (ECU) memory to which data is to be written.
memory_address_size	Size in bytes of the memory address buffer (max.: 0xF).
memory_size_buffer	Number of bytes to be written starting at the address specified by memory address.
memory_size_size	Size in bytes of the memory size buffer (max.: 0xF).
data_record	Buffer containing the data to write.
data_record_size	Size in bytes of the buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_OVERFLOW</code>	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data length.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcWriteMemoryByAddress_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

## C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
Byte[] data_record = new Byte[50];
Byte[] memory_address_buffer = new Byte[50];
Byte[] memory_size_buffer = new Byte[50];
UInt16 data_record_size = 50;
Byte memory_address_size = 5;
```



```

Byte memory_size_size = 3;
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Fill Data
for (int i = 0; i < data_record_size; i++)
{
    data_record[i] = (Byte)(i + 1);
    memory_address_buffer[i] = (Byte)(Convert.ToByte('A') + i);
    memory_size_buffer[i] = (Byte)(10 + i);
}

// Sends a physical WriteMemoryByAddress message
result = UDSApi.SvcWriteMemoryByAddress_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, memory_address_buffer, memory_address_size, memory_size_buffer, memory_size_size,
    data_record, data_record_size);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

## C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
array<Byte>^ data_record = gcnew array<Byte>(50);
array<Byte>^ memory_address_buffer = gcnew array<Byte>(50);
array<Byte>^ memory_size_buffer = gcnew array<Byte>(50);
UInt16 data_record_size = 50;
Byte memory_address_size = 5;
Byte memory_size_size = 3;
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

```



```

// Fill Data
for (int i = 0; i < data_record_size; i++)
{
    data_record[i] = (i + 1);
    memory_address_buffer[i] = 'A' + i;
    memory_size_buffer[i] = (10 + i);
}

// Sends a physical WriteMemoryByAddress message
result = UDSApi::SvcWriteMemoryByAddress_2013(PCANTP_HANDLE_USBBUS1, config, request,
    memory_address_buffer, memory_address_size, memory_size_buffer, memory_size_size,
    data_record, data_record_size);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
    request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim data_record(50) As Byte
Dim memory_address_buffer(50) As Byte
Dim memory_size_buffer(50) As Byte
Dim data_record_size As UInt16 = 50
Dim memory_address_size As Byte = 5
Dim memory_size_size As Byte = 3
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Fill Data
Dim start_value As Char = "A"
For i As UInt32 = 0 To data_record_size - 1
    data_record(i) = i + 1
    memory_address_buffer(i) = Convert.ToByte(start_value) + i
    memory_size_buffer(i) = 10 + i
Next

' Sends a physical WriteMemoryByAddress message
result = UDSApi.SvcWriteMemoryByAddress_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, memory_address_buffer, memory_address_size, memory_size_buffer, memory_size_size,

```

```

    data_record, data_record_size)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    data_record: array [0 .. 49] of Byte;
    memory_address_buffer: array [0 .. 49] of Byte;
    memory_size_buffer: array [0 .. 49] of Byte;
    data_record_size: UInt16;
    memory_address_size: Byte;
    memory_size_size: Byte;
    i: UInt32;
begin
    data_record_size := 50;
    memory_address_size := 5;
    memory_size_size := 3;
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

    // Fill Data
    for i := 0 to data_record_size - 1 do
    begin
        data_record[i] := (i + 1);
        memory_address_buffer[i] := ($41 + i);
        memory_size_buffer[i] := (10 + i);
    end

```

```

end;

// Sends a physical WriteMemoryByAddress message
result := TUDSApi.SvcWriteMemoryByAddress_2013
  (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request, @memory_address_buffer,
   memory_address_size, @memory_size_buffer, memory_size_size, @data_record,
   data_record_size);
if TUDSApi.StatusIsOk_2013(result) then
begin
  result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
  MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
  // An error occurred
  MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function version:** [UDS\\_SvcWriteMemoryByAddress\\_2013](#) on page 698.

### 3.7.77 svcClearDiagnosticInformation\_2013

Writes a UDS request according to the ClearDiagnosticInformation service's specifications. The ClearDiagnosticInformation service is used by the client to clear diagnostic information in one server's (ECU) or multiple servers' (ECUs) memory.

#### Syntax

##### Pascal OO

```

class function SvcClearDiagnosticInformation_2013(
  channel: cantp_handle;
  request_config: uds_msgconfig;
  var out_msg_request: uds_msg;
  group_of_dtc: UInt32
): uds_status;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcClearDiagnosticInformation_2013")]
public static extern uds_status SvcClearDiagnosticInformation_2013(
  [MarshalAs(UnmanagedType.U4)]
  cantp_handle channel,
  uds_msgconfig request_config,
  out uds_msg out_msg_request,
  UInt32 group_of_dtc);

```

## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcClearDiagnosticInformation_2013")]
static uds_status SvcClearDiagnosticInformation_2013(
[MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    UInt32 group_of_dtc);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcClearDiagnosticInformation_2013")>
Public Shared Function SvcClearDiagnosticInformation_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal group_of_dtc As UInt32) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).
group_of_dtc	A three-byte value indicating the group of DTCs (e.g. powertrain, body, chassis) or the particular DTC to be cleared (see <code>ClearDiagnosticInformation Group of DTC Definitions</code> on page 767).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcClearDiagnosticInformation_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.



**Note:** It is assumed that the channel was already initialized.

**C#**

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ClearDiagnosticInformation message
result = UDSApi.SvcClearDiagnosticInformation_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    out request, 0xF1A2B3);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

**C++/CLR**

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ClearDiagnosticInformation message
result = UDSApi::SvcClearDiagnosticInformation_2013(PCANTP_HANDLE_USBBUS1, config, request,
    0xF1A2B3);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else

```

```

// An error occurred
MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

### Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical ClearDiagnosticInformation message
result = UDSApi.SvcClearDiagnosticInformation_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, &HF1A2B3)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

### Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;

```

```

config.nai.extension_addr := $0;
config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ClearDiagnosticInformation message
result := TUDSApi.SvcClearDiagnosticInformation_2013
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request, $F1A2B3);
if TUDSApi.StatusIsOk_2013(result) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248, [ClearDiagnosticInformation](#) Group of DTC Definitions on page 767, [SvcClearDiagnosticInformation\\_2020](#) on page 391.

**Plain function version:** [UDS\\_SvcClearDiagnosticInformation\\_2013](#) on page 700.

### 3.7.78 svcClearDiagnosticInformation\_2020

Writes a UDS request according to the ClearDiagnosticInformation service's specifications with memory selection parameter (ISO-14229-1:2020). The ClearDiagnosticInformation service is used by the client to clear diagnostic information in one server's or multiple servers' memory.

#### Syntax

##### Pascal OO

```

class function SvcClearDiagnosticInformation_2020(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    group_of_dtc: UInt32;
    memory_selection: Byte
): uds_status;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcClearDiagnosticInformation_2020")]

```

```
public static extern uds_status SvcClearDiagnosticInformation_2020(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    UInt32 group_of_dtc,
    Byte memory_selection);
```

## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcClearDiagnosticInformation_2013")]
static uds_status SvcClearDiagnosticInformation_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    UInt32 group_of_dtc);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcClearDiagnosticInformation_2020")>
Public Shared Function SvcClearDiagnosticInformation_2020(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal group_of_dtc As UInt32,
    ByVal memory_selection As Byte) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
group_of_dtc	A three-byte value indicating the group of DTCs (e.g. powertrain, body, chassis) or the particular DTC to be cleared (see ClearDiagnosticInformation Group of DTC Definitions on page 767).
memory_selection	User defined DTC memory.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The request configuration is not valid (see uds_msgconfig on page 27), or the given message buffer is null.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with Reset_2013 (see Reset_2013 on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see MsgFree_2013 on page 214).




## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see [MsgFree\\_2013](#) on page 214).

## Example

The following example shows the use of the service method [SvcClearDiagnosticInformation\\_2020](#) on the channel [PCANTP\\_HANDLE\\_USBBUS1](#). A UDS physical service request is transmitted, and the [WaitForService\\_2013](#) method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ClearDiagnosticInformation message
result = UDSApi.SvcClearDiagnosticInformation_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    out request, 0xF1A2B3, 0x42);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

### C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
```

```

config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ClearDiagnosticInformation message
result = UDSApi::SvcClearDiagnosticInformation_2020(PCANTP_HANDLE_USBBUS1, config, request,
    0xF1A2B3, 0x42);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical ClearDiagnosticInformation message
result = UDSApi.SvcClearDiagnosticInformation_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, &HF1A2B3, &H42)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
  result: uds_status;
  request: uds_msg;
  request_confirmation: uds_msg;
  response: uds_msg;
  config: uds_msgconfig;
begin
  FillChar(request, sizeof(request), 0);
  FillChar(request_confirmation, sizeof(request_confirmation), 0);
  FillChar(response, sizeof(response), 0);

  // Set request message configuration
  FillChar(config, sizeof(config), 0);
  config.can_id :=
    UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
  config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
  config.nai.extension_addr := $0;
  config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
  config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
  config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
  config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
  config.typem := uds_msgtype.PUDS_MSGTYPE_USDT;

  // Sends a physical ClearDiagnosticInformation message
  result := TUDSApi.SvcClearDiagnosticInformation_2020
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request, $F1A2B3, $42);
  if TUDSApi.StatusIsOk_2013(result) then
  begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
      @request, response, @request_confirmation);
  end;
  if TUDSApi.StatusIsOk_2013(result) then
  begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
  end
  else
  begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
  end;

  // Free structures
  TUDSApi.MsgFree_2013(request);
  TUDSApi.MsgFree_2013(response);
  TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248, [ClearDiagnosticInformation](#) Group of DTC Definitions on page 767, [SvcClearDiagnosticInformation\\_2013](#) on page 387.

**Plain function version:** [UDS\\_SvcClearDiagnosticInformation\\_2020](#) on page 702.

### 3.7.79 SvcReadDTCInformation\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information.

#### Syntax

##### Pascal OO

```
class function SvcReadDTCInformation_2013(
  channel: cantp_handle;
  request_config: uds_msgconfig;
  var out_msg_request: uds_msg;
  PUDS_SVC_PARAM_RDTCI_Type: uds_svc_param_rdtci;
  dtc_status_mask: Byte
): uds_status;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformation_2013")]
public static extern uds_status SvcReadDTCInformation_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    [MarshalAs(UnmanagedType.U1)]
    uds_svc_param_rdtci PUDS_SVC_PARAM_RDTCI_Type,
    Byte dtc_status_mask);
```

##### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformation_2013")]
static uds_status SvcReadDTCInformation_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType::U1)]
    uds_svc_param_rdtci PUDS_SVC_PARAM_RDTCI_Type,
    Byte dtc_status_mask);
```

##### Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcReadDTCInformation_2013")>
Public Shared Function SvcReadDTCInformation_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.U1)>
    ByVal PUDS_SVC_PARAM_RDTCI_Type As uds_svc_param_rdtci,
    ByVal dtc_status_mask As Byte) As uds_status
End Function
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).

Parameter	Description
PUDS_SVC_PARAM_RDTCL_Type	Subfunction parameter, ReadDTCInformation type, use one of the following: PUDS_SVC_PARAM_RDTCL_RNODTCBSM, PUDS_SVC_PARAM_RDTCL_RDTCSM, PUDS_SVC_PARAM_RDTCL_RMMDTCBSM, PUDS_SVC_PARAM_RDTCL_RNOMMDTCBSM, PUDS_SVC_PARAM_RDTCL_RNOBDDTCBSM, PUDS_SVC_PARAM_RDTCL_ROBDDTCBSM. See also <code>uds_svc_param_rdtcl</code> on page 88.
<code>dtc_status_mask</code>	Contains eight DTC status bits.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

- This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).
- Only the following subfunctions are allowed:
  - `reportNumberOfDTCByStatusMask`,
  - `reportDTCByStatusMask`,
  - `reportMirrorMemoryDTCByStatusMask`,
  - `reportNumberOfMirrorMemoryDTCByStatusMask`,
  - `reportNumberOfEmissionsRelatedOBDDTCByStatusMask`,
  - `reportEmissionsRelatedOBDDTCByStatusMask`.

## Example

The following example shows the use of the service method `SvcReadDTCInformation_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.



**Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
```

```

config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformation message
result = UDSApi.SvcReadDTCInformation_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, UDSApi.uds_svc_param_rdtci.PUDS_SVC_PARAM_RDTCI_RDTCBSM, 0xF0);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

## C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformation message
result = UDSApi::SvcReadDTCInformation_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_rdtci::PUDS_SVC_PARAM_RDTCI_RDTCBSM, 0xF0);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical ReadDTCInformation message
result = UDSApi.SvcReadDTCInformation_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi.uds_svc_param_rdtci.PUDS_SVC_PARAM_RDTCI_RDTCBSM, &HF0)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=

```



```

cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformation message
result := TUDSApi.SvcReadDTCInformation_2013
  (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
   uds_svc_param_rdtci.PUDS_SVC_PARAM_RDTCI_RDTCBSM, $F0);
if TUDSApi.StatusIsOk_2013(result) then
begin
  result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
  MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
  // An error occurred
  MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248, [uds\\_svc\\_param\\_rdtci](#) on page 88.

**Plain function version:** [UDS\\_SvcReadDTCInformation\\_2013](#) on page 704.

### 3.7.80 SvcReadDTCInformationRDTCSBDTC\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. The subfunction [reportDTCSnapshotRecordByDTCNumber](#) ([PUDS\\_SVC\\_PARAM\\_RDTCI\\_RDTCSSBDTC](#)) is implicit.

#### Syntax

##### Pascal OO

```

class function SvcReadDTCInformationRDTCSBDTC_2013(
  channel: cantp_handle;
  request_config: uds_msgconfig;
  var out_msg_request: uds_msg;
  dtc_mask: UInt32;
  dtc_snapshot_record_number: Byte
): uds_status;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationRDTCSBDTC_2013")]
public static extern uds_status SvcReadDTCInformationRDTCSBDTC_2013(
  [MarshalAs(UnmanagedType.U4)]
  cantp_handle channel,
  uds_msgconfig request_config,
  out uds_msg out_msg_request,
  UInt32 dtc_mask,
  Byte dtc_snapshot_record_number);

```



## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationRDTCSBDTC_2013")]
static uds_status SvcReadDTCInformationRDTCSBDTC_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    UInt32 dtc_mask,
    Byte dtc_snapshot_record_number);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcReadDTCInformationRDTCSBDTC_2013")>
Public Shared Function SvcReadDTCInformationRDTCSBDTC_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal dtc_mask As UInt32,
    ByVal dtc_snapshot_record_number As Byte) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
dtc_mask	A unique identification number (three-byte value) for a specific diagnostic trouble code (DTC).
dtc_snapshot_record_number	The number of the specific DTCSnapshot data records.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The request configuration is not valid (see uds_msgconfig on page 27), or the given message buffer is null.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with Reset_2013 (see Reset_2013 on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see MsgFree_2013 on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcReadDTCInformationRDTCSsBDTC_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRDTCSsBDTC message
result = UDSApi.SvcReadDTCInformationRDTCSsBDTC_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, out request, 0x00A1B2B3, 0x12);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

### C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRDTCSsBDTC message
```

```

result = UDSApi::SvcReadDTCInformationRDTCSBDTC_2013(PCANTP_HANDLE_USBBUS1, config, request,
    0x00A1B2B3, 0x12);
if (UDSApI::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApI::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApI::MsgFree_2013(request);
UDSApI::MsgFree_2013(response);
UDSApI::MsgFree_2013(request_confirmation);

```

### Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical ReadDTCInformationRDTCSBDTC message
result = UDSApi.SvcReadDTCInformationRDTCSBDTC_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, request, &HA1B2B3, &H12)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApI.MsgFree_2013(request)
UDSApI.MsgFree_2013(response)
UDSApI.MsgFree_2013(request_confirmation)

```

### Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin

```

```

FillChar(request, sizeof(request), 0);
FillChar(request_confirmation, sizeof(request_confirmation), 0);
FillChar(response, sizeof(response), 0);

// Set request message configuration
FillChar(config, sizeof(config), 0);
config.can_id :=
    UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr := $0;
config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRDTCSBDTC message
result := TUDSApi.SvcReadDTCInformationRDTCSBDTC_2013
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request, $00A1B2B3, $12);
if TUDSApi.StatusIsOk_2013(result) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function version:** [UDS\\_SvcReadDTCInformationRDTCSBDTC\\_2013](#) on page 706.

### 3.7.81 SvcReadDTCInformationRDTCSBRN\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. The subfunction reportDTCSnapshotByRecordNumber ([PUDS\\_SVC\\_PARAM\\_RDTCI\\_RDTCSBRN](#)) is implicit.

#### Syntax

##### Pascal OO

```

class function SvcReadDTCInformationRDTCSBRN_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;

```

```
    dtc_snapshot_record_number: Byte
): uds_status;
```

**C#**

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationRDTCSBRN_2013")]
public static extern uds_status SvcReadDTCInformationRDTCSBRN_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    Byte dtc_snapshot_record_number);
```

**C++ / CLR**

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationRDTCSBRN_2013")]
static uds_status SvcReadDTCInformationRDTCSBRN_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    Byte dtc_snapshot_record_number);
```

**Visual Basic**

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcReadDTCInformationRDTCSBRN_2013")>
Public Shared Function SvcReadDTCInformationRDTCSBRN_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal dtc_snapshot_record_number As Byte) As uds_status
End Function
```

**Parameters**

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
dtc_snapshot_record_number	The number of the specific DTCSnapshot data records.

**Returns**

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The request configuration is not valid (see uds_msgconfig on page 27), or the given message buffer is null.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with Reset_2013 (see Reset_2013 on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see MsgFree_2013 on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see [MsgFree\\_2013](#) on page 214).

## Example

The following example shows the use of the service method [SvcReadDTCInformationRDTCSBRN\\_2013](#) on the channel [PCANTP\\_HANDLE\\_USBBUS1](#). A UDS physical service request is transmitted, and the [WaitForService\\_2013](#) method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRDTCSBRN message
result = UDSApi.SvcReadDTCInformationRDTCSBRN_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    out request, 0x12);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

### C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
```

```

config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRDTCSB RN message
result = UDSApi::SvcReadDTCInformationRDTCSB RN_2013(PCANTP_HANDLE_USBBUS1, config, request,
    0x12);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

### Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical ReadDTCInformationRDTCSB RN message
result = UDSApi.SvcReadDTCInformationRDTCSB RN_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, &H12)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

### Pascal OO

```
var
```



```

result: uds_status;
request: uds_msg;
request_confirmation: uds_msg;
response: uds_msg;
config: uds_msgconfig;
begin
  FillChar(request, sizeof(request), 0);
  FillChar(request_confirmation, sizeof(request_confirmation), 0);
  FillChar(response, sizeof(response), 0);

  // Set request message configuration
  FillChar(config, sizeof(config), 0);
  config.can_id :=
    UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
  config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
  config.nai.extension_addr := $0;
  config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
  config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
  config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
  config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
  config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

  // Sends a physical ReadDTCInformationRDTCSBRN message
  result := TUDSApi.SvcReadDTCInformationRDTCSBRN_2013
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request, $12);
  if TUDSApi.StatusIsOk_2013(result) then
  begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
      @request, response, @request_confirmation);
  end;
  if TUDSApi.StatusIsOk_2013(result) then
  begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
  end
  else
  begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
  end;

  // Free structures
  TUDSApi.MsgFree_2013(request);
  TUDSApi.MsgFree_2013(response);
  TUDSApi.MsgFree_2013(request_confirmation);
end;
```

**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function version:** [UDS\\_SvcReadDTCInformationRDTCSBRN\\_2013](#) on page 707.

### 3.7.82 SvcReadDTCInformationReportExtended\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. Only



reportDTCExtendedDataRecordByDTCNumber and  
reportMirrorMemoryDTCExtendedDataRecordByDTCNumber subfunctions are allowed.

## Syntax

### Pascal OO

```
class function SvcReadDTCInformationReportExtended_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    PUDS_SVC_PARAM_RDTCI_Type: uds_svc_param_rdtci;
    dtc_mask: UInt32;
    dtc_extended_data_record_number: Byte
): uds_status;
```

### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationReportExtended_2013")]
public static extern uds_status SvcReadDTCInformationReportExtended_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    [MarshalAs(UnmanagedType.U1)]
    uds_svc_param_rdtci PUDS_SVC_PARAM_RDTCI_Type,
    UInt32 dtc_mask,
    Byte dtc_extended_data_record_number);
```

### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationReportExtended_2013")]
static uds_status SvcReadDTCInformationReportExtended_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType::U1)]
    uds_svc_param_rdtci PUDS_SVC_PARAM_RDTCI_Type,
    UInt32 dtc_mask,
    Byte dtc_extended_data_record_number);
```

### Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcReadDTCInformationReportExtended_2013")>
Public Shared Function SvcReadDTCInformationReportExtended_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.U1)>
    ByVal PUDS_SVC_PARAM_RDTCI_Type As uds_svc_param_rdtci,
    ByVal dtc_mask As UInt32,
    ByVal dtc_extended_data_record_number As Byte) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).
PUDS_SVC_PARAM_RDTCL_Type	Subfunction parameter, ReadDTCInformation type, use one of the following: PUDS_SVC_PARAM_RDTCL_RDTCEDRBDN, PUDS_SVC_PARAM_RDTCL_RMMDEDRBDN. See also <code>uds_svc_param_rdtci</code> on page 88.
dtc_mask	A unique identification number (three-byte value) for a specific diagnostic trouble code.
dtc_extended_data_record_number	The number of the specific DTCExtendedData record requested.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcReadDTCInformationReportExtended_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
```

```

config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationReportExtended message
result = UDSApi.SvcReadDTCInformationReportExtended_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, out request, UDSApi.uds_svc_param_rdtci.PUDS_SVC_PARAM_RDTCI_RDTCEDRBDN,
    0x00A1B2B3, 0x12);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

### C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationReportExtended message
result = UDSApi::SvcReadDTCInformationReportExtended_2013(PCANTP_HANDLE_USBBUS1, config,
    request, UDSApi::uds_svc_param_rdtci::PUDS_SVC_PARAM_RDTCI_RDTCEDRBDN, 0x00A1B2B3,
    0x12);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

### Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()

```

```

Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical ReadDTCInformationReportExtended message
result = UDSApi.SvcReadDTCInformationReportExtended_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, request, UDSApi.uds_svc_param_rdtci.PUDS_SVC_PARAM_RDTCI_RDTCEDRBDN, &HA1B2B3,
    &H12)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.type := uds_msgtype.PUDS_MSGTYPE_USDT;

    // Sends a physical ReadDTCInformationReportExtended message

```

```

result := TUDSApi.SvcReadDTCInformationReportExtended_2013
  (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
   uds_svc_param_rdtci.PUDS_SVC_PARAM_RDTCI_RDTCEDRBDN, $00A1B2B3, $12);
if TUDSApi.StatusIsOk_2013(result) then
begin
  result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
  MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
  // An error occurred
  MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248, [uds\\_svc\\_param\\_rdtci](#) on page 88.

**Plain function version:** [UDS\\_SvcReadDTCInformationReportExtended\\_2013](#) on page 709.

### 3.7.83 SvcReadDTCInformationReportSeverity\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. Only reportNumberOfDTCBySeverityMaskRecord and reportDTCSeverityInformation subfunctions are allowed.

#### Syntax

##### Pascal OO

```

class function SvcReadDTCInformationReportSeverity_2013(
  channel: cantp_handle;
  request_config: uds_msgconfig;
  var out_msg_request: uds_msg;
  PUDS_SVC_PARAM_RDTCI_Type: uds_svc_param_rdtci;
  dtc_severity_mask: Byte;
  dtc_status_mask: Byte
): uds_status;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationReportSeverity_2013")]
public static extern uds_status SvcReadDTCInformationReportSeverity_2013(
  [MarshalAs(UnmanagedType.U4)]
  cantp_handle channel,
  uds_msgconfig request_config,
  out uds_msg out_msg_request,
  [MarshalAs(UnmanagedType.U1)]
  uds_svc_param_rdtci PUDS_SVC_PARAM_RDTCI_Type,
  byte dtc_severity_mask,
  Byte dtc_status_mask);

```

## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationReportSeverity_2013")]
static uds_status SvcReadDTCInformationReportSeverity_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType::U1)]
    uds_svc_param_rdtci PUDS_SVC_PARAM_RDTCI_Type,
    Byte dtc_severity_mask,
    Byte dtc_status_mask);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcReadDTCInformationReportSeverity_2013")>
Public Shared Function SvcReadDTCInformationReportSeverity_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.U1)>
    ByVal PUDS_SVC_PARAM_RDTCI_Type As uds_svc_param_rdtci,
    ByVal dtc_severity_mask As Byte,
    ByVal dtc_status_mask As Byte) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
PUDS_SVC_PARAM_RDTCI_Type	Subfunction parameter, ReadDTCInformation type, use one of the following: PUDS_SVC_PARAM_RDTCI_RNODTCBSMR, PUDS_SVC_PARAM_RDTCI_RDTCBSMR See also uds_svc_param_rdtci on page 88.
dtc_severity_mask	A mask of eight (8) DTC severity bits (see uds_svc_param_rdtci_dtcsvm on page 91).
dtc_status_mask	A mask of eight (8) DTC status bits.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The request configuration is not valid (see uds_msgconfig on page 27), or the given message buffer is null.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with Reset_2013 (see Reset_2013 on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see MsgFree_2013 on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see [MsgFree\\_2013](#) on page 214).

## Example

The following example shows the use of the service method [SvcReadDTCInformationReportSeverity\\_2013](#) on the channel [PCANTP\\_HANDLE\\_USBBUS1](#). A UDS physical service request is transmitted, and the [WaitForService\\_2013](#) method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationReportSeverity message
result = UDSApi.SvcReadDTCInformationReportSeverity_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, out request, UDSApi.uds_svc_param_rdtci.PUDS_SVC_PARAM_RDTCI_RNODTCBSMR, 0xF1,
    0x12);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

### C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
```



```

config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationReportSeverity message
result = UDSApi::SvcReadDTCInformationReportSeverity_2013(PCANTP_HANDLE_USBBUS1, config,
    request, UDSApi::uds_svc_param_rdtci::PUDS_SVC_PARAM_RDTCI_RNODTCBSMR, 0xF1, 0x12);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

### Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical ReadDTCInformationReportSeverity message
result = UDSApi.SvcReadDTCInformationReportSeverity_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, request, UDSApi.uds_svc_param_rdtci.PUDS_SVC_PARAM_RDTCI_RNODTCBSMR, &HF1, &H12)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```



## Pascal OO

```

var
  result: uds_status;
  request: uds_msg;
  request_confirmation: uds_msg;
  response: uds_msg;
  config: uds_msgconfig;
begin
  FillChar(request, sizeof(request), 0);
  FillChar(request_confirmation, sizeof(request_confirmation), 0);
  FillChar(response, sizeof(response), 0);

  // Set request message configuration
  FillChar(config, sizeof(config), 0);
  config.can_id :=
    UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
  config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
  config.nai.extension_addr := $0;
  config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
  config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
  config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
  config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
  config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

  // Sends a physical ReadDTCInformationReportSeverity message
  result := TUDSApi.SvcReadDTCInformationReportSeverity_2013
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
     uds_svc_param_rdtci.PUDS_SVC_PARAM_RDTCI_RNODTCBSMR, $F1, $12);
  if TUDSApi.StatusIsOk_2013(result) then
  begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
      @request, response, @request_confirmation);
  end;
  if TUDSApi.StatusIsOk_2013(result) then
  begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
  end
  else
  begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
  end;

  // Free structures
  TUDSApi.MsgFree_2013(request);
  TUDSApi.MsgFree_2013(response);
  TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248, [uds\\_svc\\_param\\_rdtci](#) on page 88, [uds\\_svc\\_param\\_rdtci\\_dtcsvm](#) on page 91.  
**Plain function version:** [UDS\\_SvcReadDTCInformationReportSeverity\\_2013](#) on page 711.

### 3.7.84 SvcReadDTCInformationRSIODTC\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. The subfunction reportSeverityInformationOfDTC (PUDS\_SVC\_PARAM\_RDTCL\_RSIODTC) is implicit.

#### Syntax

##### Pascal OO

```
class function SvcReadDTCInformationRSIODTC_2013(
  channel: cantp_handle;
  request_config: uds_msgconfig;
  var out_msg_request: uds_msg;
  dtc_mask: UInt32
): uds_status;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationRSIODTC_2013")]
public static extern uds_status SvcReadDTCInformationRSIODTC_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    UInt32 dtc_mask);
```

##### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationRSIODTC_2013")]
static uds_status SvcReadDTCInformationRSIODTC_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    UInt32 dtc_mask);
```

##### Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcReadDTCInformationRSIODTC_2013")>
Public Shared Function SvcReadDTCInformationRSIODTC_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal dtc_mask As UInt32) As uds_status
End Function
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
dtc_mask	A unique identification number for a specific diagnostic trouble code.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcReadDTCInformationRSIODTC_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRSIODTC message
result = UDSApi.SvcReadDTCInformationRSIODTC_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    out request, 0xF1A1B2B3);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

```

```
// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

## C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRSIODTC message
result = UDSApi::SvcReadDTCInformationRSIODTC_2013(PCANTP_HANDLE_USBBUS1, config, request,
0xF1A1B2B3);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
    request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);
```

## Visual Basic

```
Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical ReadDTCInformationRSIODTC message
result = UDSApi.SvcReadDTCInformationRSIODTC_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, &HF1A1B2B3UI)
If UDSApi.StatusIsOk_2013(result) Then
```

```

    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

    // Sends a physical ReadDTCInformationRSIODTC message
    result := TUDSApi.SvcReadDTCInformationRSIODTC_2013
        (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request, $F1A1B2B3);
    if TUDSApi.StatusIsOk_2013(result) then
    begin
        result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
            @request, response, @request_confirmation);
    end;
    if TUDSApi.StatusIsOk_2013(result) then
    begin
        MessageBox(0, 'Response was received', 'Success', MB_OK);
    end
    else
    begin
        // An error occurred
        MessageBox(0, 'An error occurred', 'Error', MB_OK);
    end;

    // Free structures

```

```
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;
```

**See also:** `WaitForService_2013` on page 248.

**Plain function version:** `UDS_SvcReadDTCInformationRSIODTC_2013` on page 713.

### 3.7.85 SvcReadDTCInformationNoParam\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. Only these following subfunctions are allowed:

- reportSupportedDTC
- reportFirstTestFailedDTC
- reportFirstConfirmedDTC
- reportMostRecentTestFailedDTC
- reportMostRecentConfirmedDTC
- reportDTCFaultDetectionCounter
- reportDTCWithPermanentStatus
- reportDTCSnapshotIdentification

## Syntax

### Pascal OO

```
class function SvcReadDTCInformationNoParam_2013(
  channel: cantp_handle;
  request_config: uds_msgconfig;
  var out_msg_request: uds_msg;
  PUDS_SVC_PARAM_RDTCI_Type: uds_svc_param_rdtci
): uds_status;
```

### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationNoParam_2013")]
public static extern uds_status SvcReadDTCInformationNoParam_2013(
  [MarshalAs(UnmanagedType.U4)]
  cantp_handle channel,
  uds_msgconfig request_config,
  out uds_msg out_msg_request,
  [MarshalAs(UnmanagedType.U1)]
  uds_svc_param_rdtci PUDS_SVC_PARAM_RDTCI_Type);
```

### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationNoParam_2013")]
static uds_status SvcReadDTCInformationNoParam_2013(
  [MarshalAs(UnmanagedType.U4)]
  cantp_handle channel,
  uds_msgconfig request_config,
  uds_msg %out_msg_request,
  [MarshalAs(UnmanagedType.U1)]
  uds_svc_param_rdtci PUDS_SVC_PARAM_RDTCI_Type);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcReadDTCInformationNoParam_2013")>
Public Shared Function SvcReadDTCInformationNoParam_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.U1)>
    ByVal PUDS_SVC_PARAM_RDTCI_Type As uds_svc_param_rdtci) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).
PUDS_SVC_PARAM_RDTCI_Type	Subfunction parameter, ReadDTCInformation type, use one of the following: PUDS_SVC_PARAM_RDTCI_RFTDTC, PUDS_SVC_PARAM_RDTCI_RFCDDTC, PUDS_SVC_PARAM_RDTCI_RMRTDTC, PUDS_SVC_PARAM_RDTCI_RMRCDDTC, PUDS_SVC_PARAM_RDTCI_RSUPDTC, PUDS_SVC_PARAM_RDTCI_RDTWPS, PUDS_SVC_PARAM_RDTCI_RDTSSI. See also <code>uds_svc_param_rdtci</code> on page 88.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcReadDTCInformationNoParam_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

C#



```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationNoParam message
result = UDSApi.SvcReadDTCInformationNoParam_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    out request, UDSApi.uds_svc_param_rdtci.PUDS_SVC_PARAM_RDTCI_RSUPDTC);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

## C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationNoParam message
result = UDSApi::SvcReadDTCInformationNoParam_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_rdtci::PUDS_SVC_PARAM_RDTCI_RSUPDTC);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred

```



```

        MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical ReadDTCInformationNoParam message
result = UDSApi.SvcReadDTCInformationNoParam_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, UDSApi.uds_svc_param_rdtci.PUDS_SVC_PARAM_RDTCI_RSUPDTC)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);

```

```

config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr := $0;
config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationNoParam message
result := TUDSApi.SvcReadDTCInformationNoParam_2013
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    uds_svc_param_rdtci.PUDS_SVC_PARAM_RDTCI_RSUPDTC);
if TUDSApi.StatusIsOk_2013(result) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248, [uds\\_svc\\_param\\_rdtci](#) on page 88.

**Plain function version:** [UDS\\_SvcReadDTCInformationNoParam\\_2013](#) on page 714.

### 3.7.86 SvcReadDTCInformationRDTCEDBR\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. The subfunction [reportDTCExtDataRecordByRecordNumber](#) ([PUDS\\_SVC\\_PARAM\\_RDTCI\\_RDTCEDBR](#)) is implicit.

#### Syntax

##### Pascal OO

```

class function SvcReadDTCInformationRDTCEDBR_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    dtc_extended_data_record_number: Byte
): uds_status;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationRDTCEDBR_2013")]

```

```
public static extern uds_status SvcReadDTCInformationRDTCEDBR_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    Byte dtc_extended_data_record_number);
```

## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationRDTCEDBR_2013")]
static uds_status SvcReadDTCInformationRDTCEDBR_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    Byte dtc_extended_data_record_number);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcReadDTCInformationRDTCEDBR_2013")>
Public Shared Function SvcReadDTCInformationRDTCEDBR_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal dtc_extended_data_record_number As Byte) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
dtc_extended_data_record_number	DTC extended data record number.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The request configuration is not valid (see uds_msgconfig on page 27), or the given message buffer is null.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with Reset_2013 (see Reset_2013 on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see MsgFree_2013 on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcReadDTCInformationRDTCEDBR_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();
Byte dtc_extended_data_record_number = 0x12;

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical SvcReadDTCInformationRDTCEDBR message
result = UDSApi.SvcReadDTCInformationRDTCEDBR_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    out request, dtc_extended_data_record_number);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

### C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};
Byte dtc_extended_data_record_number = 0x12;

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;
```

```
// Sends a physical SvcReadDTCInformationRDTCEDBR message
result = UDSApi::SvcReadDTCInformationRDTCEDBR_2013(cantp_handle::PCANTP_HANDLE_USBBUS1,
    config, request, dtc_extended_data_record_number);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(cantp_handle::PCANTP_HANDLE_USBBUS1, request,
        response, request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);
```

### Visual Basic

```
Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()
Dim dtc_extended_data_record_number As Byte = &H12

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical SvcReadDTCInformationRDTCEDBR message
result = UDSApi.SvcReadDTCInformationRDTCEDBR_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, dtc_extended_data_record_number)
If (UDSApi.StatusIsOk_2013(result)) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If (UDSApi.StatusIsOk_2013(result)) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)
```

### Pascal OO

```
var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
```

```

response: uds_msg;
config: uds_msgconfig;
dtc_extended_data_record_number: Byte;
begin
    dtc_extended_data_record_number := $12;
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

    // Sends a physical SvcReadDTCInformationRDTCEDBR message
    result := TUDSApi.SvcReadDTCInformationRDTCEDBR_2013(PCANTP_HANDLE_USBBUS1,
        config, request, dtc_extended_data_record_number);
    if (TUDSApi.StatusIsOk_2013(result)) then
    begin
        result := TUDSApi.WaitForService_2013(PCANTP_HANDLE_USBBUS1, @request,
            response, @request_confirmation);
    end;
    if (TUDSApi.StatusIsOk_2013(result)) then
    begin
        MessageBox(0, 'Response was received', 'Success', MB_OK);
    end
    else
    begin
        // An error occurred
        MessageBox(0, 'An error occurred', 'Error', MB_OK);
    end;

    // Free structures
    TUDSApi.MsgFree_2013(request);
    TUDSApi.MsgFree_2013(response);
    TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function version:** [UDS\\_SvcReadDTCInformationRDTCEDBR\\_2013](#) on page 716.

### 3.7.87 SvcReadDTCInformationRUDMDTCBSM\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. The subfunction reportUserDefMemoryDTCByStatusMask (PUDS\_SVC\_PARAM\_RDTCI\_RUDMDTCBSM) is implicit.

#### Syntax

##### Pascal OO

```
class function SvcReadDTCInformationRUDMDTCBSM_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    dtc_status_mask: Byte;
    memory_selection: Byte
): uds_status;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationRUDMDTCBSM_2013")]
public static extern uds_status SvcReadDTCInformationRUDMDTCBSM_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    Byte dtc_status_mask,
    Byte memory_selection);
```

##### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationRUDMDTCBSM_2013")]
static uds_status SvcReadDTCInformationRUDMDTCBSM_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    Byte dtc_status_mask,
    Byte memory_selection);
```

##### Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcReadDTCInformationRUDMDTCBSM_2013")>
Public Shared Function SvcReadDTCInformationRUDMDTCBSM_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal dtc_status_mask As Byte,
    ByVal memory_selection As Byte) As uds_status
End Function
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
dtc_status_mask	A mask of eight (8) DTC status bits.



Parameter	Description
memory_selection	Memory selection.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcReadDTCInformationRUDMDTCBSM_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();
Byte dtc_status_mask = 0x12;
Byte memory_selection = 0x34;

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRUDMDTCBSM message
result = UDSApi.SvcReadDTCInformationRUDMDTCBSM_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, out request, dtc_status_mask, memory_selection);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))

```



```

    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

## C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};
Byte dtc_status_mask = 0x12;
Byte memory_selection = 0x34;

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRUDMDTCBSM message
result = UDSApi::SvcReadDTCInformationRUDMDTCBSM_2013(cantp_handle::PCANTP_HANDLE_USBBUS1,
    config, request, dtc_status_mask, memory_selection);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(cantp_handle::PCANTP_HANDLE_USBBUS1, request,
        response, request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()
Dim dtc_status_mask As Byte = &H12
Dim memory_selection As Byte = &H34

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL

```

```

config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical ReadDTCInformationRUDMDTCBSM message
result = UDSApi.SvcReadDTCInformationRUDMDTCBSM_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, request, dtc_status_mask, memory_selection)
If (UDSApi.StatusIsOk_2013(result)) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If (UDSApi.StatusIsOk_2013(result)) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    dtc_status_mask: Byte;
    memory_selection: Byte;
begin
    dtc_status_mask := $12;
    memory_selection := $34;
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.type := uds_msgtype.PUDS_MSGTYPE_USDT;

    // Sends a physical ReadDTCInformationRUDMDTCBSM message
    result := TUDSApi.SvcReadDTCInformationRUDMDTCBSM_2013(PCANTP_HANDLE_USBBUS1,
        config, request, dtc_status_mask, memory_selection);
    if (TUDSApi.StatusIsOk_2013(result)) then
        begin

```

```

    result := TUDSApi.WaitForService_2013(PCANTP_HANDLE_USBBUS1, @request,
        response, @request_confirmation);
end;
if (TUDSApi.StatusIsOk_2013(result)) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** `WaitForService_2013` on page 248.

**Plain function version:** `UDS_SvcReadDTCInformationRUDMDTCSSBDTC_2013` on page 718.

### 3.7.88 SvcReadDTCInformationRUDMDTCSSBDTC\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. The subfunction `reportUserDefMemoryDTCSnapshotRecordByDTCNumber` (`PUDS_SVC_PARAM_RDTCL_RUDMDTCSSBDTC`) is implicit.

#### Syntax

##### Pascal OO

```

class function SvcReadDTCInformationRUDMDTCSSBDTC_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    dtc_mask: UInt32;
    user_def_dtc_snapshot_record_number: Byte;
    memory_selection: Byte
): uds_status;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationRUDMDTCSSBDTC_2013")]
public static extern uds_status SvcReadDTCInformationRUDMDTCSSBDTC_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    UInt32 dtc_mask,
    Byte user_def_dtc_snapshot_record_number,
    Byte memory_selection);

```

##### C++ / CLR

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationRUDMDTCSSBDTC_2013")]
static uds_status SvcReadDTCInformationRUDMDTCSSBDTC_2013(
    [MarshalAs(UnmanagedType.U4)]

```

```

cantp_handle channel,
uds_msgconfig request_config,
uds_msg %out_msg_request,
UInt32 dtc_mask,
Byte user_def_dtc_snapshot_record_number,
Byte memory_selection);

```

## Visual Basic

```

<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcReadDTCInformationRUDMDTCSSBDTC_2013")>
Public Shared Function SvcReadDTCInformationRUDMDTCSSBDTC_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal dtc_mask As UInt32,
    ByVal user_def_dtc_snapshot_record_number As Byte,
    ByVal memory_selection As Byte) As uds_status
End Function

```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
dtc_mask	A unique identification number (three-byte value) for a specific diagnostic trouble code.
user_def_dtc_snapshot_record_number	User DTC snapshot record number.
memory_selection	Memory selection.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The request configuration is not valid (see uds_msgconfig on page 27), or the given message buffer is null.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with Reset_2013 (see Reset_2013 on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see MsgFree_2013 on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcReadDTCInformationRUDMDTCSSBDTC_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized.

## C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();
UInt32 dtc_mask = 0x12345678;
Byte user_def_dtc_snapshot_record_number = 0x9A;
Byte memory_selection = 0xBC;

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRUDMDTCSSBDTC message
result = UDSApi.SvcReadDTCInformationRUDMDTCSSBDTC_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, out request, dtc_mask, user_def_dtc_snapshot_record_number, memory_selection);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

## C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};
UInt32 dtc_mask = 0x12345678;
Byte user_def_dtc_snapshot_record_number = 0x9A;
Byte memory_selection = 0xBC;

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRUDMDTCSSBDTC message
```

```

result = UDSApi::SvcReadDTCInformationRUDMDTCSSBDTC_2013(cantp_handle::PCANTP_HANDLE_USBBUS1,
    config, request, dtc_mask, user_def_dtc_snapshot_record_number, memory_selection);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(cantp_handle::PCANTP_HANDLE_USBBUS1, request,
        response, request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

### Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()
Dim dtc_mask As UInt32 = &H12345678
Dim user_def_dtc_snapshot_record_number As Byte = &H9A
Dim memory_selection As Byte = &HBC

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical ReadDTCInformationRUDMDTCSSBDTC message
result = UDSApi.SvcReadDTCInformationRUDMDTCSSBDTC_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, request, dtc_mask, user_def_dtc_snapshot_record_number, memory_selection)
If (UDSApi.StatusIsOk_2013(result)) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If (UDSApi.StatusIsOk_2013(result)) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

### Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;

```

```

response: uds_msg;
config: uds_msgconfig;
dtc_mask: UInt32;
user_def_dtc_snapshot_record_number: Byte;
memory_selection: Byte;
begin
    dtc_mask := $12345678;
    user_def_dtc_snapshot_record_number := $9A;
    memory_selection := $BC;
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

    // Sends a physical ReadDTCInformationRUDMDTCSSBDTC message
    result := TUDSApi.SvcReadDTCInformationRUDMDTCSSBDTC_2013
        (PCANTP_HANDLE_USBBUS1, config, request, dtc_mask,
        user_def_dtc_snapshot_record_number, memory_selection);
    if (TUDSApi.StatusIsOk_2013(result)) then
    begin
        result := TUDSApi.WaitForService_2013(PCANTP_HANDLE_USBBUS1, @request,
            response, @request_confirmation);
    end;
    if (TUDSApi.StatusIsOk_2013(result)) then
    begin
        MessageBox(0, 'Response was received', 'Success', MB_OK);
    end
    else
    begin
        // An error occurred
        MessageBox(0, 'An error occurred', 'Error', MB_OK);
    end;

    // Free structures
    TUDSApi.MsgFree_2013(request);
    TUDSApi.MsgFree_2013(response);
    TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function version:** [UDS\\_SvcReadDTCInformationRUDMDTCSSBDTC\\_2013](#) on page 720.



### 3.7.89 SvcReadDTCInformationRUDMDTCEDRBDN\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. The subfunction reportUserDefMemoryDTCExtDataRecordByDTCNumber (PUDS\_SVC\_PARAM\_RDTCL\_RUDMDTCEDRBDN) is implicit.

#### Syntax

##### Pascal OO

```
class function SvcReadDTCInformationRUDMDTCEDRBDN_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    dtc_mask: UInt32;
    dtc_extended_data_record_number: Byte;
    memory_selection: Byte
): uds_status;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationRUDMDTCEDRBDN_2013")]
public static extern uds_status SvcReadDTCInformationRUDMDTCEDRBDN_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    UInt32 dtc_mask,
    Byte dtc_extended_data_record_number,
    Byte memory_selection);
```

##### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationRUDMDTCEDRBDN_2013")]
static uds_status SvcReadDTCInformationRUDMDTCEDRBDN_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    UInt32 dtc_mask,
    Byte dtc_extended_data_record_number,
    Byte memory_selection);
```

##### Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcReadDTCInformationRUDMDTCEDRBDN_2013")>
Public Shared Function SvcReadDTCInformationRUDMDTCEDRBDN_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal dtc_mask As UInt32,
    ByVal dtc_extended_data_record_number As Byte,
    ByVal memory_selection As Byte) As uds_status
End Function
```



## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).
dtc_mask	A unique identification number (three-byte value) for a specific diagnostic trouble code.
dtc_extended_data_record_number	DTC extended data record number.
memory_selection	Memory selection.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcReadDTCInformationRUDMDTCEDRBDN_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();
UInt32 dtc_mask = 0x12345678;
Byte dtc_extended_data_record_number = 0x9A;
Byte memory_selection = 0xBC;

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
```

```

config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRUDMDTCEDRBDN message
result = UDSApi.SvcReadDTCInformationRUDMDTCEDRBDN_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, out request, dtc_mask, dtc_extended_data_record_number, memory_selection);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

### C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};
UInt32 dtc_mask = 0x12345678;
Byte dtc_extended_data_record_number = 0x9A;
Byte memory_selection = 0xBC;

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRUDMDTCEDRBDN message
result = UDSApi::SvcReadDTCInformationRUDMDTCEDRBDN_2013(cantp_handle::PCANTP_HANDLE_USBBUS1,
    config, request, dtc_mask, dtc_extended_data_record_number, memory_selection);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(cantp_handle::PCANTP_HANDLE_USBBUS1, request,
        response, request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

### Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()

```

```

Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()
Dim dtc_mask As UInt32 = &H12345678
Dim dtc_extended_data_record_number As Byte = &H9A
Dim memory_selection As Byte = &HBC

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical ReadDTCInformationRUDMDTCEDRBDN message
result = UDSApi.SvcReadDTCInformationRUDMDTCEDRBDN_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, request, dtc_mask, dtc_extended_data_record_number, memory_selection)
If (UDSApi.StatusIsOk_2013(result)) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If (UDSApi.StatusIsOk_2013(result)) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    dtc_mask: UInt32;
    dtc_extended_data_record_number: Byte;
    memory_selection: Byte;
begin
    dtc_mask := $12345678;
    dtc_extended_data_record_number := $9A;
    memory_selection := $BC;
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=

```

```

uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr :=
  UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
config.nai.target_addr :=
  UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
  cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRUDMDTCEDRBDN message
result := TUDSApi.SvcReadDTCInformationRUDMDTCEDRBDN_2013
  (PCANTP_HANDLE_USBBUS1, config, request, dtc_mask,
   dtc_extended_data_record_number, memory_selection);
if (TUDSApi.StatusIsOk_2013(result)) then
begin
  result := TUDSApi.WaitForService_2013(PCANTP_HANDLE_USBBUS1, @request,
    response, @request_confirmation);
end;
if (TUDSApi.StatusIsOk_2013(result)) then
begin
  MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
  // An error occurred
  MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function version:** [UDS\\_SvcReadDTCInformationRUDMDTCEDRBDN\\_2013](#) on page 722.

### 3.7.90 SvcReadDTCInformationRDTCEDI\_2020

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. The subfunction reportSupportedDTCExtDataRecord (PUDS\_SVC\_PARAM\_RDTCEI\_RDTCEDI) is implicit.

#### Syntax

##### Pascal OO

```

class function SvcReadDTCInformationRDTCEDI_2020(
  channel: cantp_handle;
  request_config: uds_msgconfig;
  var out_msg_request: uds_msg;
  dtc_extended_data_record_number: Byte
): uds_status;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationRDTCEDI_2020")]
public static extern uds_status SvcReadDTCInformationRDTCEDI_2020(
  [MarshalAs(UnmanagedType.U4)]

```

```
cantp_handle channel,
uds_msgconfig request_config,
out uds_msg out_msg_request,
Byte dtc_extended_data_record_number);
```

## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationRDTCEdi_2020")]
static uds_status SvcReadDTCInformationRDTCEdi_2020(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    Byte dtc_extended_data_record_number);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcReadDTCInformationRDTCEdi_2020")>
Public Shared Function SvcReadDTCInformationRDTCEdi_2020(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal dtc_extended_data_record_number As Byte) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
dtc_extended_data_record_number	DTC extended data record number.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The request configuration is not valid (see uds_msgconfig on page 27), or the given message buffer is null.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with Reset_2013 (see Reset_2013 on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see MsgFree_2013 on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcReadDTCInformationRDTCEdi_2020` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();
Byte dtc_extended_data_record_number = 0x12;

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRDTCEdi message
result = UDSApi.SvcReadDTCInformationRDTCEdi_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    out request, dtc_extended_data_record_number);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

### C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};
Byte dtc_extended_data_record_number = 0x12;

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;
```

```
// Sends a physical ReadDTCInformationRDTCEdi message
result = UDSApi::SvcReadDTCInformationRDTCEdi_2020(cantp_handle::PCANTP_HANDLE_USBBUS1, config,
    request, dtc_extended_data_record_number);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(cantp_handle::PCANTP_HANDLE_USBBUS1, request,
        response, request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);
```

### Visual Basic

```
Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()
Dim dtc_extended_data_record_number As Byte = &H12

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical ReadDTCInformationRDTCEdi message
result = UDSApi.SvcReadDTCInformationRDTCEdi_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, dtc_extended_data_record_number)
If (UDSApi.StatusIsOk_2013(result)) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If (UDSApi.StatusIsOk_2013(result)) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)
```

### Pascal OO

```
var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
```



```

response: uds_msg;
config: uds_msgconfig;
dtc_extended_data_record_number: Byte;
begin
    dtc_extended_data_record_number := $12;
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

    // Sends a physical ReadDTCInformationRDTCEdi message
    result := TUDSApi.SvcReadDTCInformationRDTCEdi_2020(PCANTP_HANDLE_USBBUS1,
        config, request, dtc_extended_data_record_number);
    if (TUDSApi.StatusIsOk_2013(result)) then
    begin
        result := TUDSApi.WaitForService_2013(PCANTP_HANDLE_USBBUS1, @request,
            response, @request_confirmation);
    end;
    if (TUDSApi.StatusIsOk_2013(result)) then
    begin
        MessageBox(0, 'Response was received', 'Success', MB_OK);
    end
    else
    begin
        // An error occurred
        MessageBox(0, 'An error occurred', 'Error', MB_OK);
    end;

    // Free structures
    TUDSApi.MsgFree_2013(request);
    TUDSApi.MsgFree_2013(response);
    TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function version:** [UDS\\_SvcReadDTCInformationRDTCEdi\\_2020](#) on page 724.



### 3.7.91 SvcReadDTCInformationRWWHOBDDTCBMR\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. The subfunction reportRWWHOBDDTCByMaskRecord (PUDS\_SVC\_PARAM\_RDTCI\_RWWHOBDDTCBMR) is implicit.

#### Syntax

##### Pascal OO

```
class function SvcReadDTCInformationRWWHOBDDTCBMR_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    functional_group_identifier: Byte;
    dtc_status_mask: Byte;
    dtc_severity_mask: Byte
): uds_status;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationRWWHOBDDTCBMR_2013")]
public static extern uds_status SvcReadDTCInformationRWWHOBDDTCBMR_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    Byte functional_group_identifier,
    Byte dtc_status_mask,
    Byte dtc_severity_mask);
```

##### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationRWWHOBDDTCBMR_2013")]
static uds_status SvcReadDTCInformationRWWHOBDDTCBMR_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    Byte functional_group_identifier,
    Byte dtc_status_mask,
    Byte dtc_severity_mask);
```

##### Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcReadDTCInformationRWWHOBDDTCBMR_2013")>
Public Shared Function SvcReadDTCInformationRWWHOBDDTCBMR_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal functional_group_identifier As Byte,
    ByVal dtc_status_mask As Byte,
    ByVal dtc_severity_mask As Byte) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).
functional_group_identifier	Functional group identifier.
dtc_status_mask	A mask of eight (8) DTC status bits.
dtc_severity_mask	A mask of eight (8) DTC severity bits (see <code>uds_svc_param_rdtci_dtcsvm</code> on page 91).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcReadDTCInformationRWWHOBDDTCBMR_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();
Byte functional_group_identifier = 0x12;
Byte dtc_status_mask = 0x34;
Byte dtc_severity_mask = 0x78;

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
```

```

config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRWWHOBDDTCBMR message
result = UDSApi.SvcReadDTCInformationRWWHOBDDTCBMR_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, out request, functional_group_identifiers, dtc_status_mask, dtc_severity_mask);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

### C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};
Byte functional_group_identifiers = 0x12;
Byte dtc_status_mask = 0x34;
Byte dtc_severity_mask = 0x78;

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRWWHOBDDTCBMR message
result = UDSApi::SvcReadDTCInformationRWWHOBDDTCBMR_2013(cantp_handle::PCANTP_HANDLE_USBBUS1,
    config, request, functional_group_identifiers, dtc_status_mask, dtc_severity_mask);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(cantp_handle::PCANTP_HANDLE_USBBUS1, request,
        response, request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

### Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()

```

```

Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()
Dim functional_group_identifier As Byte = &H12
Dim dtc_status_mask As Byte = &H34
Dim dtc_severity_mask As Byte = &H78

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical ReadDTCInformationRWWHOBDDTCBMR message
result = UDSApi.SvcReadDTCInformationRWWHOBDDTCBMR_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, request, functional_group_identifier, dtc_status_mask, dtc_severity_mask)
If (UDSApi.StatusIsOk_2013(result)) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If (UDSApi.StatusIsOk_2013(result)) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    functional_group_identifier: Byte;
    dtc_status_mask: Byte;
    dtc_severity_mask: Byte;
begin
    functional_group_identifier := $12;
    dtc_status_mask := $34;
    dtc_severity_mask := $78;
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=

```

```

uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr :=
  UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
config.nai.target_addr :=
  UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
  cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRWWHOBDDTCBMR message
result := TUDSApi.SvcReadDTCInformationRWWHOBDDTCBMR_2013
  (PCANTP_HANDLE_USBBUS1, config, request, functional_group_identifier,
   dtc_status_mask, dtc_severity_mask);
if (TUDSApi.StatusIsOk_2013(result)) then
begin
  result := TUDSApi.WaitForService_2013(PCANTP_HANDLE_USBBUS1, @request,
    response, @request_confirmation);
end;
if (TUDSApi.StatusIsOk_2013(result)) then
begin
  MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
  // An error occurred
  MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

See also: [WaitForService\\_2013](#) on page 248.

Plain function version: [UDS\\_SvcReadDTCInformationRWWHOBDDTCBMR\\_2013](#) on page 725.

### 3.7.92 SvcReadDTCInformationRWWHOBDDTCWPS\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. The subfunction reportRWWHOBDDTCWithPermanentStatus (PUDS\_SVC\_PARAM\_RDTCI\_RWWHOBDDTCWPS) is implicit.

#### Syntax

##### Pascal OO

```

class function SvcReadDTCInformationRWWHOBDDTCWPS_2013(
  channel: cantp_handle;
  request_config: uds_msgconfig;
  var out_msg_request: uds_msg;
  functional_group_identifier: Byte
): uds_status;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationRWWHOBDDTCWPS_2013")]
public static extern uds_status SvcReadDTCInformationRWWHOBDDTCWPS_2013(
  [MarshalAs(UnmanagedType.U4)]
  cantp_handle channel,

```

```
uds_msgconfig request_config,
out uds_msg out_msg_request,
Byte functional_group_identifier);
```

## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationRWWHOBDDTCWPS_2013")]
static uds_status SvcReadDTCInformationRWWHOBDDTCWPS_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    Byte functional_group_identifier);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcReadDTCInformationRWWHOBDDTCWPS_2013")>
Public Shared Function SvcReadDTCInformationRWWHOBDDTCWPS_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal functional_group_identifier As Byte) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
functional_group_identifier	Functional group identifier.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The request configuration is not valid (see uds_msgconfig on page 27), or the given message buffer is null.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with Reset_2013 (see Reset_2013 on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see MsgFree_2013 on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcReadDTCInformationRWWHOBDDTCWPS_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();
Byte functional_group_identifier = 0x12;

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRWWHOBDDTCWPS message
result = UDSApi.SvcReadDTCInformationRWWHOBDDTCWPS_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, out request, functional_group_identifier);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

### C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};
Byte functional_group_identifier = 0x12;

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
```



```

config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRWWHOBDDTCWPS message
result = UDSApi::SvcReadDTCInformationRWWHOBDDTCWPS_2013(cantp_handle::PCANTP_HANDLE_USBBUS1,
    config, request, functional_group_identifiser);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(cantp_handle::PCANTP_HANDLE_USBBUS1, request,
        response, request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

### Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()
Dim functional_group_identifiser As Byte = &H12

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical ReadDTCInformationRWWHOBDDTCWPS message
result = UDSApi.SvcReadDTCInformationRWWHOBDDTCWPS_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, request, functional_group_identifiser)
If (UDSApi.StatusIsOk_2013(result)) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If (UDSApi.StatusIsOk_2013(result)) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

### Pascal OO

```

var
    result: uds_status;
    request: uds_msg;

```



```

request_confirmation: uds_msg;
response: uds_msg;
config: uds_msgconfig;
functional_group_identifier: Byte;
begin
functional_group_identifier := $12;
FillChar(request, sizeof(request), 0);
FillChar(request_confirmation, sizeof(request_confirmation), 0);
FillChar(response, sizeof(response), 0);

// Set request message configuration
FillChar(config, sizeof(config), 0);
config.can_id :=
    UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr := $0;
config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRWWHOBDDTCWPS message
result := TUDSApi.SvcReadDTCInformationRWWHOBDDTCWPS_2013
    (PCANTP_HANDLE_USBBUS1, config, &request, functional_group_identifier);
if (TUDSApi.StatusIsOk_2013(result)) then
begin
    result := TUDSApi.WaitForService_2013(PCANTP_HANDLE_USBBUS1, @request,
        &response, @request_confirmation);
end;
if (TUDSApi.StatusIsOk_2013(result)) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function version:** [UDS\\_SvcReadDTCInformationRWWHOBDDTCWPS\\_2013](#) on page 727.

### 3.7.93 SvcReadDTCInformationRDTCBRGI\_2020

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. The subfunction reportDTCInformationByDTCReadinessGroupIdentifier (PUDS\_SVC\_PARAM\_RDTCI\_RDTCBRGI) is implicit.

#### Syntax

##### Pascal OO

```
class function SvcReadDTCInformationRDTCBRGI_2020(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    functional_group_identifier: Byte;
    dtc_readiness_group_identifier: Byte
): uds_status;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationRDTCBRGI_2020")]
public static extern uds_status SvcReadDTCInformationRDTCBRGI_2020(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    Byte functional_group_identifier,
    Byte dtc_readiness_group_identifier);
```

##### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcReadDTCInformationRDTCBRGI_2020")]
static uds_status SvcReadDTCInformationRDTCBRGI_2020(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    Byte functional_group_identifier,
    Byte dtc_readiness_group_identifier);
```

#### Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcReadDTCInformationRDTCBRGI_2020")>
Public Shared Function SvcReadDTCInformationRDTCBRGI_2020(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal functional_group_identifier As Byte,
    ByVal dtc_readiness_group_identifier As Byte) As uds_status
End Function
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).

Parameter	Description
functional_group_identifier	Functional group identifier.
dtc_readiness_group_identifier	DTC readiness group identifier.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcReadDTCInformationRDTCBRGI_2020` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();
Byte functional_group_identifier = 0x12;
Byte dtc_readiness_group_identifier = 0x34;

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRDTCBRGI message
result = UDSApi.SvcReadDTCInformationRDTCBRGI_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    out request, functional_group_identifier, dtc_readiness_group_identifier);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);

```

```

if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

### C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};
Byte functional_group_identifier = 0x12;
Byte dtc_readiness_group_identifier = 0x34;

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRDTCBRGI message
result = UDSApi::SvcReadDTCInformationRDTCBRGI_2020(cantp_handle::PCANTP_HANDLE_USBBUS1,
    config, request, functional_group_identifier, dtc_readiness_group_identifier);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(cantp_handle::PCANTP_HANDLE_USBBUS1, request,
        response, request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

### Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()
Dim functional_group_identifier As Byte = &H12
Dim dtc_readiness_group_identifier As Byte = &H34

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0

```

```

config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical ReadDTCInformationRDTCBRGI message
result = UDSApi.SvcReadDTCInformationRDTCBRGI_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, functional_group_identifier, dtc_readiness_group_identifier)
If (UDSApi.StatusIsOk_2013(result)) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If (UDSApi.StatusIsOk_2013(result)) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    functional_group_identifier: Byte;
    dtc_readiness_group_identifier: Byte;
begin
    functional_group_identifier := $12;
    dtc_readiness_group_identifier := $34;
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.type := uds_msgtype.PUDS_MSGTYPE_USDT;

    // Sends a physical ReadDTCInformationRDTCBRGI message
    result := TUDSApi.SvcReadDTCInformationRDTCBRGI_2020(PCANTP_HANDLE_USBBUS1,
        config, &request, functional_group_identifier,
        dtc_readiness_group_identifier);

```

```

if (TUDSApi.StatusIsOk_2013(result)) then
begin
    result := TUDSApi.WaitForService_2013(PCANTP_HANDLE_USBBUS1, @request,
        &response, @request_confirmation);
end;
if (TUDSApi.StatusIsOk_2013(result)) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```



**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function version:** [UDS\\_SvcReadDTCInformationRDTCBRG1\\_2020](#) on page 729.

### 3.7.94 SvcInputOutputControlByIdentifier\_2013

Writes a UDS request according to the InputOutputControlByIdentifier service's specifications. The InputOutputControlByIdentifier service is used by the client to substitute a value for an input signal, internal server (ECU) method and/or control an output (actuator) of an electronic system.

#### Overloads

	Method	Description
	SvcInputOutputControlByIdentifier_2013(cantp_handle, uds_msgconfig, uds_msg, uds_svc_param_di, byte[], UInt32)	Writes to the transmit queue a request for UDS service InputOutputControlByIdentifier, without control enable mask.
	SvcInputOutputControlByIdentifier_2013(cantp_handle, uds_msgconfig, uds_msg, uds_svc_param_di, byte[], UInt32, byte[], UInt32)	Writes to the transmit queue a request for UDS service InputOutputControlByIdentifier, with control enable mask.

**Plain function version:** [UDS\\_SvcInputOutputControlByIdentifier\\_2013](#) on page 731.

### 3.7.95 SvcInputOutputControlByIdentifier\_2013(cantp\_handle, uds\_msgconfig, uds\_msg, uds\_svc\_param\_di, byte[], UInt32)

Writes a UDS request according to the InputOutputControlByIdentifier service's specifications (without control enable mask). The InputOutputControlByIdentifier service is used by the client to substitute a value for an input signal, internal server (ECU) method and/or control an output (actuator) of an electronic system.

#### Syntax

#### Pascal OO

```

class function SvcInputOutputControlByIdentifier_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    data_identifier: uds_svc_param_di;

```

```

    control_option_record: PByte;
    control_option_record_size: UInt32
): uds_status; overload;

```

## C#

```

public static uds_status SvcInputOutputControlByIdentifier_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    uds_svc_param_di data_identifier,
    byte[] control_option_record,
    UInt32 control_option_record_size);

```

## C++ / CLR

```

static uds_status SvcInputOutputControlByIdentifier_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    uds_svc_param_di data_identifier,
    array<Byte> ^control_option_record,
    UInt32 control_option_record_size);

```

## Visual Basic

```

Public Shared Function SvcInputOutputControlByIdentifier_2013(
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal data_identifier As uds_svc_param_di,
    ByVal control_option_record As Byte(),
    ByVal control_option_record_size As UInt32) As uds_status
End Function

```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
data_identifier	A two-byte data identifier (see uds_svc_param_di on page 82).
control_option_record	First byte can be used as either an input output control parameter that describes how the server (ECU) shall control its inputs or outputs (see uds_svc_param_iocbi on page 92), or as an additional control state byte.
control_option_record_size	Size in bytes of the control option record buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:




PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is not valid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	The mapping given in the message configuration is unknown.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_OVERFLOW	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data length.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcInputOutputControlByIdentifier_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
Byte[] control_option_record = new Byte[10];
UInt16 control_option_record_size = 10;
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Fill Data
for (int i = 0; i < control_option_record_size; i++)
{
    control_option_record[i] = (Byte)(Convert.ToByte('A') + i);
}

// Sends a physical InputOutputControlByIdentifier message
result = UDSApi.SvcInputOutputControlByIdentifier_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, out request, UDSApi.uds_svc_param_di.PUDS_SVC_PARAM_DI_SSECUSWVNDID,
    control_option_record, control_option_record_size);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
```



```

        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

## C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
array<Byte>^ control_option_record = gcnew array<Byte>(10);
UInt16 control_option_record_size = 10;
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Fill Data
for (int i = 0; i < control_option_record_size; i++)
{
    control_option_record[i] = 'A' + i;
}

// Sends a physical InputOutputControlByIdentifier message
result = UDSApi::SvcInputOutputControlByIdentifier_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_di::PUDS_SVC_PARAM_DI_SSECUSWVNDID, control_option_record,
    control_option_record_size);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()

```

```

Dim response As uds_msg = New uds_msg()
Dim control_option_record(10) As Byte
Dim control_option_record_size As UInt16 = 10
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Fill Data
Dim start_value As Char = "A"
For i As UInt32 = 0 To control_option_record_size - 1
    control_option_record(i) = Convert.ToByte(start_value) + i
Next

' Sends a physical InputOutputControlByIdentifier message
result = UDSApi.SvcInputOutputControlByIdentifier_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, request, UDSApi.uds_svc_param_di.PUDS_SVC_PARAM_DI_SSECUSWVNDID,
    control_option_record, control_option_record_size)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    control_option_record: array [0 .. 9] of Byte;
    control_option_record_size: UInt16;
    i: UInt32;
begin
    control_option_record_size := 10;
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);

```

```

config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr := $0;
config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Fill Data
for i := 0 to control_option_record_size - 1 do
begin
    control_option_record[i] := ($41 + i);
end;

// Sends a physical InputOutputControlByIdentifier message
result := TUDSApi.SvcInputOutputControlByIdentifier_2013
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    uds_svc_param_di.PUDS_SVC_PARAM_DI_SSECUSWVNDID, @control_option_record,
    control_option_record_size);
if TUDSApi.StatusIsOk_2013(result) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248, [uds\\_svc\\_param\\_iocbi](#) on page 92.

**Plain function version:** [UDS\\_SvcInputOutputControlByIdentifier\\_2013](#) on page 731.

### 3.7.96 SvcInputOutputControlByIdentifier\_2013(cantp\_handle, uds\_msgconfig, uds\_msg, uds\_svc\_param\_di, byte[], UInt32, byte[], UInt32)

Writes a UDS request according to the InputOutputControlByIdentifier service's specifications. The InputOutputControlByIdentifier service is used by the client to substitute a value for an input signal, internal server (ECU) method and/or control an output (actuator) of an electronic system.

#### Syntax

##### Pascal OO

```
class function SvcInputOutputControlByIdentifier_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    data_identifier: uds_svc_param_di;
    control_option_record: PByte;
    control_option_record_size: UInt32;
    control_enable_mask_record: PByte;
    control_enable_mask_record_size: UInt32
): uds_status; overload;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcInputOutputControlByIdentifier_2013")]
public static extern uds_status SvcInputOutputControlByIdentifier_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    [MarshalAs(UnmanagedType.U2)]
    uds_svc_param_di data_identifier,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 5)]
    byte[] control_option_record,
    UInt32 control_option_record_size,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 7)]
    byte[] control_enable_mask_record,
    UInt32 control_enable_mask_record_size);
```

##### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcInputOutputControlByIdentifier_2013")]
static uds_status SvcInputOutputControlByIdentifier_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType::U2)]
    uds_svc_param_di data_identifier,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 5)]
    array<Byte> ^control_option_record,
    UInt32 control_option_record_size,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 7)]
    array<Byte> ^control_enable_mask_record,
    UInt32 control_enable_mask_record_size);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcInputOutputControlByIdentifier_2013")>
Public Shared Function SvcInputOutputControlByIdentifier_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.U2)>
    ByVal data_identifier As uds_svc_param_di,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=5)>
    ByVal control_option_record As Byte(),
    ByVal control_option_record_size As UInt32,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=7)>
    ByVal control_enable_mask_record As Byte(),
    ByVal control_enable_mask_record_size As UInt32) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).
data_identifier	A two-byte data identifier (see <code>uds_svc_param_di</code> on page 82).
control_option_record	First byte can be used as either an input output control parameter that describes how the server (ECU) shall control its inputs or outputs (see <code>uds_svc_param_iocbi</code> on page 92), or as an additional control state byte.
control_option_record_size	Size in bytes of the control option record buffer.
control_enable_mask_record	The control enable mask shall only be supported when the input output control parameter is used and the data identifier to be controlled consists of more than one parameter (i.e. the data identifier is bit-mapped or packed by definition). There shall be one bit in the control enable mask corresponding to each individual parameter defined within the data identifier.
control_enable_mask_record_size	Size in bytes of the control enable mask record buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_OVERFLOW</code>	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data length.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcInputOutputControlByIdentifier_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
Byte[] control_option_record = new Byte[10];
Byte[] control_enable_mask_record = new Byte[10];
UInt16 control_option_record_size = 10;
UInt16 control_enable_mask_record_size = 5;
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Fill Data
for (int i = 0; i < control_option_record_size; i++)
{
    control_option_record[i] = (Byte)(Convert.ToByte('A') + i);
    control_enable_mask_record[i] = (Byte)(10 + i);
}

// Sends a physical InputOutputControlByIdentifier message
result = UDSApi.SvcInputOutputControlByIdentifier_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, out request, UDSApi.uds_svc_param_di.PUDS_SVC_PARAM_DI_SSECUSWVNDID,
    control_option_record, control_option_record_size, control_enable_mask_record,
    control_enable_mask_record_size);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

### C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
```

```

uds_msg response = {};
array<Byte>^ control_option_record = gcnew array<Byte>(10);
array<Byte>^ control_enable_mask_record = gcnew array<Byte>(10);
UInt16 control_option_record_size = 10;
UInt16 control_enable_mask_record_size = 5;
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Fill Data
for (int i = 0; i < control_option_record_size; i++)
{
    control_option_record[i] = 'A' + i;
    control_enable_mask_record[i] = (10 + i);
}

// Sends a physical InputOutputControlByIdentifier message
result = UDSApi::SvcInputOutputControlByIdentifier_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_di::PUDS_SVC_PARAM_DI_SSECUSWVNDID, control_option_record,
    control_option_record_size, control_enable_mask_record,
    control_enable_mask_record_size);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim control_option_record(10) As Byte
Dim control_enable_mask_record(10) As Byte
Dim control_option_record_size As UInt16 = 10
Dim control_enable_mask_record_size As UInt16 = 5
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1

```



```

config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Fill Data
Dim start_value As Char = "A"
For i As UInt32 = 0 To control_option_record_size - 1
    control_option_record(i) = Convert.ToByte(start_value) + i
    control_enable_mask_record(i) = 10 + i
Next

' Sends a physical InputOutputControlByIdentifier message
result = UDSApi.SvcInputOutputControlByIdentifier_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, request, UDSApi.uds_svc_param_di.PUDS_SVC_PARAM_DI_SSECUSWVNDID,
    control_option_record, control_option_record_size, control_enable_mask_record,
    control_enable_mask_record_size)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    control_option_record: array [0 .. 9] of Byte;
    control_enable_mask_record: array [0 .. 9] of Byte;
    control_option_record_size: UInt16;
    control_enable_mask_record_size: UInt16;
    i: UInt32;
begin
    control_option_record_size := 10;
    control_enable_mask_record_size := 5;
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=

```



```

    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Fill Data
for i := 0 to control_option_record_size - 1 do
begin
    control_option_record[i] := ($41 + i);
    control_enable_mask_record[i] := (10 + i);
end;

// Sends a physical InputOutputControlByIdentifier message
result := TUDSApi.SvcInputOutputControlByIdentifier_2013
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    uds_svc_param_di.PUDS_SVC_PARAM_DI_SSECUSWVNDID, @control_option_record,
    control_option_record_size, @control_enable_mask_record,
    control_enable_mask_record_size);
if TUDSApi.StatusIsOk_2013(result) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```



See also: [WaitForService\\_2013](#) on page 248, [uds\\_svc\\_param\\_iocbj](#) on page 92.

Plain function version: [UDS\\_SvcInputOutputControlByIdentifier\\_2013](#) on page 731.

### 3.7.97 SvcRoutineControl\_2013

Writes a UDS request according to the RoutineControl service's specifications. The RoutineControl service is used by the client to start/stop a routine and request routine results.

#### Overloads

	Method	Description
	SvcRoutineControl_2013(cantp_handle, uds_msgconfig, uds_msg, uds_svc_param_rc, uds_svc_param_rc_rid)	Writes to the transmit queue a request for UDS service RoutineControl, without routine control options.
	SvcRoutineControl_2013(cantp_handle, uds_msgconfig, uds_msg, uds_svc_param_rc, uds_svc_param_rc_rid, byte[], UInt32)	Writes to the transmit queue a request for UDS service RoutineControl, with routine control options (only with start and stop routine subfunctions).

Plain function version: [UDS\\_SvcRoutineControl\\_2013](#) on page 733.

### 3.7.98 SvcRoutineControl\_2013(cantp\_handle, uds\_msgconfig, uds\_msg, uds\_svc\_param\_rc, uds\_svc\_param\_rc\_rid)

Writes a UDS request according to the RoutineControl service's specifications, without routine control options (with all subfunctions except "start" and "stop"). The RoutineControl service is used by the client to start/stop a routine and request routine results.

#### Syntax

##### Pascal OO

```
class function SvcRoutineControl_2013(
  channel: cantp_handle;
  request_config: uds_msgconfig;
  var out_msg_request: uds_msg;
  routine_control_type: uds_svc_param_rc;
  routine_identifier: uds_svc_param_rc_rid
): uds_status; overload;
```

##### C#

```
public static uds_status SvcRoutineControl_2013(
  cantp_handle channel,
  uds_msgconfig request_config,
  out uds_msg out_msg_request,
  uds_svc_param_rc routine_control_type,
  uds_svc_param_rc_rid routine_identifier);
```

##### C++ / CLR

```
static uds_status SvcRoutineControl_2013(
  cantp_handle channel,
  uds_msgconfig request_config,
  uds_msg %out_msg_request,
  uds_svc_param_rc routine_control_type,
  uds_svc_param_rc_rid routine_identifier);
```

##### Visual Basic

```
Public Shared Function SvcRoutineControl_2013(
  ByVal channel As cantp_handle,
  ByVal request_config As uds_msgconfig,
  ByRef out_msg_request As uds_msg,
  ByVal routine_control_type As uds_svc_param_rc,
  ByVal routine_identifier As uds_svc_param_rc_rid) As uds_status
End Function
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
routine_control_type	Subfunction parameter: routine control type (see uds_svc_param_rc on page 93).
routine_identifier	Server local routine identifier (see uds_svc_param_rc_rid on page 94).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcRoutineControl_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical RoutineControl message
result = UDSApi.SvcRoutineControl_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out request,
    UDSApi.uds_svc_param_rc.PUDS_SVC_PARAM_RC_RRR, (UDSApi.uds_svc_param_rc_rid)0xF1A2);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

```

```
// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

## C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical RoutineControl message
result = UDSApi::SvcRoutineControl_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_rc::PUDS_SVC_PARAM_RC_RRR, (UDSApi::uds_svc_param_rc_rid)0xF1A2);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);
```

## Visual Basic

```
Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical RoutineControl message
result = UDSApi.SvcRoutineControl_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi.uds_svc_param_rc.PUDS_SVC_PARAM_RC_RRR, &HF1A2)
```

```

If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApI.MsgFree_2013(request)
UDSApI.MsgFree_2013(response)
UDSApI.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

    // Sends a physical RoutineControl message
    result := TUDSApI.SvcRoutineControl_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        config, request, uds_svc_param_rc.PUDS_SVC_PARAM_RC_RRR,
        uds_svc_param_rc_rid($F1A2));
    if TUDSApI.StatusIsOk_2013(result) then
    begin
        result := TUDSApI.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
            @request, response, @request_confirmation);
    end;
    if TUDSApI.StatusIsOk_2013(result) then
    begin
        MessageBox(0, 'Response was received', 'Success', MB_OK);
    end
    else
    begin
        // An error occurred
        MessageBox(0, 'An error occurred', 'Error', MB_OK);
    end
end

```

```

end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248, [uds\\_svc\\_param\\_rc](#) on page 93, [uds\\_svc\\_param\\_rc\\_rid](#) on page 94.

**Plain function version:** [UDS\\_SvcRoutineControl\\_2013](#) on page 733.

### 3.7.99 SvcRoutineControl\_2013(cantp\_handle, uds\_msgconfig, uds\_msg, uds\_svc\_param\_rc, uds\_svc\_param\_rc\_rid, byte[], UInt32)

Writes a UDS request according to the RoutineControl service's specifications (only with start and stop routine subfunctions). The RoutineControl service is used by the client to start/stop a routine and request routine results.

## Syntax

### Pascal OO

```

class function SvcRoutineControl_2013(
  channel: cantp_handle;
  request_config: uds_msgconfig;
  var out_msg_request: uds_msg;
  routine_control_type: uds_svc_param_rc;
  routine_identifier: uds_svc_param_rc_rid;
  routine_control_option_record: PByte;
  routine_control_option_record_size: UInt32
): uds_status; overload;

```

### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcRoutineControl_2013")]
public static extern uds_status SvcRoutineControl_2013(
  [MarshalAs(UnmanagedType.U4)]
  cantp_handle channel,
  uds_msgconfig request_config,
  out uds_msg out_msg_request,
  [MarshalAs(UnmanagedType.U1)]
  uds_svc_param_rc routine_control_type,
  [MarshalAs(UnmanagedType.U2)]
  uds_svc_param_rc_rid routine_identifier,
  [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 6)]
  byte[] routine_control_option_record,
  UInt32 routine_control_option_record_size);

```

### C++ / CLR

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcRoutineControl_2013")]
static uds_status SvcRoutineControl_2013(
  [MarshalAs(UnmanagedType::U4)]
  cantp_handle channel,
  uds_msgconfig request_config,
  uds_msg %out_msg_request,
  [MarshalAs(UnmanagedType::U1)]
  uds_svc_param_rc routine_control_type,
  [MarshalAs(UnmanagedType::U2)]

```

```
uds_svc_param_rc_rid routine_identifier,
[MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 6)]
array<Byte> ^routine_control_option_record,
UInt32 routine_control_option_record_size);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcRoutineControl_2013")>
Public Shared Function SvcRoutineControl_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.U1)>
    ByVal routine_control_type As uds_svc_param_rc,
    <MarshalAs(UnmanagedType.U2)>
    ByVal routine_identifier As uds_svc_param_rc_rid,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=6)>
    ByVal routine_control_option_record As Byte(),
    ByVal routine_control_option_record_size As UInt32) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
routine_control_type	Subfunction parameter: routine control type (see uds_svc_param_rc on page 93).
routine_identifier	Server local routine identifier (see uds_svc_param_rc_rid on page 94).
routine_control_option_record	Buffer containing the routine control options (only with start and stop routine subfunctions).
routine_control_option_record_size	Size in bytes of the buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is not valid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	The mapping given in the message configuration is unknown.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with Reset_2013 (see Reset_2013 on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_OVERFLOW	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data length.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see MsgFree_2013 on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).



## Example

The following example shows the use of the service method `SvcRoutineControl_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
Byte[] routine_control_option_record = new Byte[10];
UInt16 routine_control_option_record_size = 10;
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Fill data
for (int i = 0; i < routine_control_option_record_size; i++)
{
    routine_control_option_record[i] = (Byte)(Convert.ToByte('A') + i);
}

// Sends a physical RoutineControl message
result = UDSApi.SvcRoutineControl_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out request,
    UDSApi.uds_svc_param_rc.PUDS_SVC_PARAM_RC_RRR, (UDSApi.uds_svc_param_rc_rid)0xF1A2,
    routine_control_option_record, routine_control_option_record_size);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

### C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
array<Byte>^ routine_control_option_record = gcnew array<Byte>(10);
UInt16 routine_control_option_record_size = 10;
uds_msgconfig config = {};
```



```
// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Fill data
for (int i = 0; i < routine_control_option_record_size; i++)
{
    routine_control_option_record[i] = 'A' + i;
}

// Sends a physical RoutineControl message
result = UDSApi::SvcRoutineControl_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_rc::PUDS_SVC_PARAM_RC_RRR, (UDSApi::uds_svc_param_rc_rid)0xF1A2,
    routine_control_option_record, routine_control_option_record_size);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);
```

## Visual Basic

```
Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim routine_control_option_record(10) As Byte
Dim routine_control_option_record_size As UInt16 = 10
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Fill data
Dim start_value As Char = "A"
For i As UInt32 = 0 To routine_control_option_record_size - 1
    routine_control_option_record(i) = Convert.ToByte(start_value) + i
Next

' Sends a physical RoutineControl message
result = UDSApi.SvcRoutineControl_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi.uds_svc_param_rc.PUDS_SVC_PARAM_RC_RRR, &HF1A2, routine_control_option_record,
```

```

    routine_control_option_record_size)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApI.MsgFree_2013(request)
UDSApI.MsgFree_2013(response)
UDSApI.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    routine_control_option_record: array [0 .. 9] of Byte;
    routine_control_option_record_size: UInt16;
    i: UInt32;
begin
    routine_control_option_record_size := 10;
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

    // Fill data
    for i := 0 to routine_control_option_record_size - 1 do
    begin
        routine_control_option_record[i] := ($41 + i);
    end;

    // Sends a physical RoutineControl message
    result := TUDSApI.SvcRoutineControl_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        config, request, uds_svc_param_rc.PUDS_SVC_PARAM_RC_RRR,
        uds_svc_param_rc_rid($F1A2), @routine_control_option_record,
        routine_control_option_record_size);
    if TUDSApI.StatusIsOk_2013(result) then

```

```

begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** `WaitForService_2013` on page 248, `uds_svc_param_rc` on page 93, `uds_svc_param_rc_rid` on page 94.

**Plain function version:** `UDS_SvcRoutineControl_2013` on page 733.

### 3.7.100 SvcRequestDownload\_2013

Writes a UDS request according to the RequestDownload service's specifications. The RequestDownload service is used by the client to initiate a data transfer from the client to the server/ECU (download).

#### Syntax

##### Pascal OO

```

class function SvcRequestDownload_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    compression_method: Byte;
    encrypting_method: Byte;
    memory_address: PByte;
    memory_address_size: Byte;
    memory_size: PByte;
    memory_size_size: Byte
): uds_status;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcRequestDownload_2013")]
public static extern uds_status SvcRequestDownload_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    Byte compression_method,
    Byte encrypting_method,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 6)]
    byte[] memory_address,
    byte memory_address_size,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 8)]
    byte[] memory_size,
    byte memory_size_size);

```

## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcRequestDownload_2013")]
static uds_status SvcRequestDownload_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    Byte compression_method,
    Byte encrypting_method,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 6)]
    array<Byte> ^memory_address,
    Byte memory_address_size,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 8)]
    array<Byte> ^memory_size,
    Byte memory_size_size);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcRequestDownload_2013")>
Public Shared Function SvcRequestDownload_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal compression_method As Byte,
    ByVal encrypting_method As Byte,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=6)>
    ByVal memory_address As Byte(),
    ByVal memory_address_size As Byte,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=8)>
    ByVal memory_size As Byte(),
    ByVal memory_size_size As Byte) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
compression_method	A nibble-value that specifies the compression method, the value 0x0 specifies that no compression method is used.
encrypting_method	A nibble-value that specifies the encrypting method, the value 0x0 specifies that no encrypting method is used.
memory_address	Starting address of server (ECU) memory to which data is to be written.
memory_address_size	Size in bytes of the memory address buffer (max.: 0xF).
memory_size	Used by the server (ECU) to compare the uncompressed memory size with the total amount of data transferred during the TransferData service.
memory_size_size	Size in bytes of the memory size buffer (max.: 0xF).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcRequestDownload_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
Byte[] memory_address_buffer = new Byte[8];
Byte[] memory_size_buffer = new Byte[8];
Byte memory_address_size = 8;
Byte memory_size_size = 8;
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Fill data
for (int i = 0; i < memory_address_size; i++)
{
    memory_address_buffer[i] = (Byte)(Convert.ToByte('A') + i);
    memory_size_buffer[i] = (Byte)(10 + i);
}

// Sends a physical RequestDownload message

```

```

result = UDSApi.SvcRequestDownload_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, 0x01, 0x02, memory_address_buffer, memory_address_size, memory_size_buffer,
memory_size_size);
if (UDSApI.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApI.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApI.MsgFree_2013(ref request);
UDSApI.MsgFree_2013(ref response);
UDSApI.MsgFree_2013(ref request_confirmation);

```

### C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
array<Byte>^ memory_address_buffer = gcnew array<Byte>(8);
array<Byte>^ memory_size_buffer = gcnew array<Byte>(8);
Byte memory_address_size = 8;
Byte memory_size_size = 8;
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Fill data
for (int i = 0; i < memory_address_size; i++)
{
    memory_address_buffer[i] = 'A' + i;
    memory_size_buffer[i] = (10 + i);
}

// Sends a physical RequestDownload message
result = UDSApi::SvcRequestDownload_2013(PCANTP_HANDLE_USBBUS1, config, request, 0x01, 0x02,
    memory_address_buffer, memory_address_size, memory_size_buffer, memory_size_size);
if (UDSApI::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApI::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApI::MsgFree_2013(request);
UDSApI::MsgFree_2013(response);
UDSApI::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim memory_address_buffer(8) As Byte
Dim memory_size_buffer(8) As Byte
Dim memory_address_size As Byte = 8
Dim memory_size_size As Byte = 8
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Fill data
Dim start_value As Char = "A"
For i As UInt32 = 0 To memory_address_size - 1
    memory_address_buffer(i) = Convert.ToByte(start_value) + i
    memory_size_buffer(i) = 10 + i
Next

' Sends a physical RequestDownload message
result = UDSApi.SvcRequestDownload_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    &H1, &H2, memory_address_buffer, memory_address_size, memory_size_buffer, memory_size_size)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    memory_address_buffer: array [0 .. 7] of Byte;
    memory_size_buffer: array [0 .. 7] of Byte;
    memory_address_size: Byte;
    memory_size_size: Byte;
    i: UInt32;
begin

```

```

memory_address_size := 8;
memory_size_size := 8;
FillChar(request, sizeof(request), 0);
FillChar(request_confirmation, sizeof(request_confirmation), 0);
FillChar(response, sizeof(response), 0);

// Set request message configuration
FillChar(config, sizeof(config), 0);
config.can_id :=
    UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr := $0;
config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Fill data
for i := 0 to memory_address_size - 1 do
begin
    memory_address_buffer[i] := ($41 + i);
    memory_size_buffer[i] := (10 + i);
end;

// Sends a physical RequestDownload message
result := TUDSApi.SvcRequestDownload_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, request, $01, $02, @memory_address_buffer, memory_address_size,
    @memory_size_buffer, memory_size_size);
if TUDSApi.StatusIsOk_2013(result) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function version:** [UDS\\_SvcRequestDownload\\_2013](#) on page 735.



### 3.7.101 SvcRequestUpload\_2013

Writes a UDS request according to the RequestUpload service's specifications. The RequestUpload service is used by the client to initiate a data transfer from the server/ECU to the client (upload).

#### Syntax

##### Pascal OO

```
class function SvcRequestUpload_2013(
  channel: cantp_handle;
  request_config: uds_msgconfig;
  var out_msg_request: uds_msg;
  compression_method: Byte;
  encrypting_method: Byte;
  memory_address: PByte;
  memory_address_size: Byte;
  memory_size: PByte;
  memory_size_size: Byte
): uds_status;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcRequestUpload_2013")]
public static extern uds_status SvcRequestUpload_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    byte compression_method,
    byte encrypting_method,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 6)]
    byte[] memory_address,
    byte memory_address_size,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 8)]
    byte[] memory_size,
    byte memory_size_size);
```

##### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcRequestUpload_2013")]
static uds_status SvcRequestUpload_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    Byte compression_method,
    Byte encrypting_method,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 6)]
    array<Byte> ^memory_address,
    Byte memory_address_size,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 8)]
    array<Byte> ^memory_size,
    Byte memory_size_size);
```

##### Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcRequestUpload_2013")>
Public Shared Function SvcRequestUpload_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
```

```

ByRef out_msg_request As uds_msg,
ByVal compression_method As Byte,
ByVal encrypting_method As Byte,
<MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=6)>
ByVal memory_address As Byte(),
ByVal memory_address_size As Byte,
<MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=8)>
ByVal memory_size As Byte(),
ByVal memory_size_size As Byte) As uds_status
End Function

```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>can_tp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).
compression_method	A nibble-value that specifies the compression method, the value 0x0 specifies that no compression method is used.
encrypting_method	A nibble-value that specifies the encrypting method, the value 0x0 specifies that no encrypting method is used.
memory_address	Starting address of server (ECU) memory from which data is to be retrieved.
memory_address_size	Size in bytes of the memory address buffer (max.: 0xF).
memory_size	Used by the server (ECU) to compare the uncompressed memory size with the total amount of data transferred during the TransferData service.
memory_size_size	Size in bytes of the memory size buffer (max.: 0xF).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcRequestUpload_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

**C#**

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
Byte[] memory_address_buffer = new Byte[4];
Byte[] memory_size_buffer = new Byte[4];
Byte memory_address_size = 4;
Byte memory_size_size = 4;
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical RequestUpload message
result = UDSApi.SvcRequestUpload_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out request,
    0x01, 0x02, memory_address_buffer, memory_address_size, memory_size_buffer,
    memory_size_size);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

**C++/CLR**

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
array<Byte>^ memory_address_buffer = gcnew array<Byte>(4);
array<Byte>^ memory_size_buffer = gcnew array<Byte>(4);
Byte memory_address_size = 4;
Byte memory_size_size = 4;
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

```

```
// Sends a physical RequestUpload message
result = UDSApi::SvcRequestUpload_2013(PCANTP_HANDLE_USBBUS1, config, request, 0x01, 0x02,
    memory_address_buffer, memory_address_size, memory_size_buffer, memory_size_size);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);
```

### Visual Basic

```
Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim memory_address_buffer(4) As Byte
Dim memory_size_buffer(4) As Byte
Dim memory_address_size As Byte = 4
Dim memory_size_size As Byte = 4
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical RequestUpload message
result = UDSApi.SvcRequestUpload_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request, &H1,
    &H2, memory_address_buffer, memory_address_size, memory_size_buffer, memory_size_size)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)
```

## Pascal OO

```

var
  result: uds_status;
  request: uds_msg;
  request_confirmation: uds_msg;
  response: uds_msg;
  config: uds_msgconfig;
  memory_address_buffer: array [0 .. 3] of Byte;
  memory_size_buffer: array [0 .. 3] of Byte;
  memory_address_size: Byte;
  memory_size_size: Byte;
begin
  memory_address_size := 4;
  memory_size_size := 4;
  FillChar(request, sizeof(request), 0);
  FillChar(request_confirmation, sizeof(request_confirmation), 0);
  FillChar(response, sizeof(response), 0);

  // Set request message configuration
  FillChar(config, sizeof(config), 0);
  config.can_id :=
    UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
  config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
  config.nai.extension_addr := $0;
  config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
  config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
  config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
  config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
  config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

  // Sends a physical RequestUpload message
  result := TUDSApi.SvcRequestUpload_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, request, $01, $02, @memory_address_buffer, memory_address_size,
    @memory_size_buffer, memory_size_size);
  if TUDSApi.StatusIsOk_2013(result) then
  begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
      @request, response, @request_confirmation);
  end;
  if TUDSApi.StatusIsOk_2013(result) then
  begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
  end
  else
  begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
  end;

  // Free structures
  TUDSApi.MsgFree_2013(request);
  TUDSApi.MsgFree_2013(response);
  TUDSApi.MsgFree_2013(request_confirmation);
end;

```



**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function version:** [UDS\\_SvcRequestUpload\\_2013](#) on page 737.

### 3.7.102 SvcTransferData\_2013

Writes a UDS request according to the TransferData service's specifications. The TransferData service is used by the client to transfer data either from the client to the server/ECU (download) or from the server/ECU to the client (upload).

#### Overloads

	Method	Description
	SvcTransferData_2013(cantp_handle, uds_msgconfig, uds_msg, byte)	Writes to the transmit queue a request for UDS service TransferData, without transfer request parameter.
	SvcTransferData_2013(cantp_handle, uds_msgconfig, uds_msg, byte, byte[], UInt32)	Writes to the transmit queue a request for UDS service TransferData, with transfer request parameter.

Plain function version: `UDS_SvcTransferData_2013` on page 739.

### 3.7.103 SvcTransferData\_2013(cantp\_handle, uds\_msgconfig, uds\_msg, byte)

Writes a UDS request according to the TransferData service's specifications (without transfer request parameter). The TransferData service is used by the client to transfer data either from the client to the server/ECU (download) or from the server/ECU to the client (upload).

#### Syntax

##### Pascal OO

```
class function SvcTransferData_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    block_sequence_counter: Byte
): uds_status; overload;
```

##### C#

```
public static uds_status SvcTransferData_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    byte block_sequence_counter);
```

##### C++ / CLR

```
static uds_status SvcTransferData_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    Byte block_sequence_counter);
```

##### Visual Basic

```
Public Shared Function SvcTransferData_2013(
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal block_sequence_counter As Byte) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).
block_sequence_counter	The <code>block_sequence_counter</code> parameter value starts at 0x01 with the first TransferData request that follows the RequestDownload (0x34) or RequestUpload (0x35) service. Its value is incremented by 1 for each subsequent TransferData request. At the value of 0xFF, the <code>block_sequence_counter</code> rolls over and starts at 0x0 with the next TransferData request message.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcTransferData_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;
```



```
// Sends a physical TransferData message
result = UDSApi.SvcTransferData_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out request,
    0x01);
if (UDSApI.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApI.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApI.MsgFree_2013(ref request);
UDSApI.MsgFree_2013(ref response);
UDSApI.MsgFree_2013(ref request_confirmation);
```

## C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical TransferData message
result = UDSApi::SvcTransferData_2013(PCANTP_HANDLE_USBBUS1, config, request, 0x01);
if (UDSApI::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApI::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApI::MsgFree_2013(request);
UDSApI::MsgFree_2013(response);
UDSApI::MsgFree_2013(request_confirmation);
```

## Visual Basic

```
Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
```



```

config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical TransferData message
result = UDSApi.SvcTransferData_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request, &H1)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.type := uds_msgtype.PUDS_MSGTYPE_USDT;

    // Sends a physical TransferData message
    result := TUDSApi.SvcTransferData_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        config, request, $01);
    if TUDSApi.StatusIsOk_2013(result) then
        begin
            result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
                @request, response, @request_confirmation);
        end;
end;

```

```

if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

See also: [WaitForService\\_2013](#) on page 248.

Plain function version: [UDS\\_SvcTransferData\\_2013](#) on page 739.

### 3.7.104 SvcTransferData\_2013(cantp\_handle, uds\_msgconfig, uds\_msg, byte, byte[], UInt32)

Writes a UDS request according to the TransferData service's specifications. The TransferData service is used by the client to transfer data either from the client to the server/ECU (download) or from the server/ECU to the client (upload).

#### Syntax

##### Pascal OO

```

class function SvcTransferData_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    block_sequence_counter: Byte;
    transfer_request_parameter_record: PByte;
    transfer_request_parameter_record_size: UInt32
): uds_status; overload;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcTransferData_2013")]
public static extern uds_status SvcTransferData_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    byte block_sequence_counter,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 5)]
    byte[] transfer_request_parameter_record,
    UInt32 transfer_request_parameter_record_size);

```

##### C++ / CLR

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcTransferData_2013")]
static uds_status SvcTransferData_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    Byte block_sequence_counter,

```

```
[MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 5)]
array<Byte> ^transfer_request_parameter_record,
UInt32 transfer_request_parameter_record_size);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcTransferData_2013")>
Public Shared Function SvcTransferData_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal block_sequence_counter As Byte,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=5)>
    ByVal transfer_request_parameter_record As Byte(),
    ByVal transfer_request_parameter_record_size As UInt32) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
block_sequence_counter	The block_sequence_counter parameter value starts at 0x01 with the first TransferData request that follows the RequestDownload (0x34) or RequestUpload (0x35) service. Its value is incremented by 1 for each subsequent TransferData request. At the value of 0xFF, the block_sequence_counter rolls over and starts at 0x0 with the next TransferData request message.
transfer_request_parameter_record	Buffer containing the required transfer parameters.
transfer_request_parameter_record_size	Size in bytes of the buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is not valid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	The mapping given in the message configuration is unknown.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with Reset_2013 (see Reset_2013 on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_OVERFLOW	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data length.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see MsgFree_2013 on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcTransferData_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
Byte[] record = new Byte[50];
Byte record_size = 50;
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Fill data
for (int i = 0; i < record_size; i++)
{
    record[i] = (Byte)(Convert.ToByte('A') + i);
}

// Sends a physical TransferData message
result = UDSApi.SvcTransferData_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out request,
    0x01, record, record_size);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

### C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
array<Byte>^ record = gcnew array<Byte>(50);
Byte record_size = 50;
uds_msgconfig config = {};

// Set request message configuration
```

```

config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Fill data
for (int i = 0; i < record_size; i++)
{
    record[i] = 'A' + i;
}

// Sends a physical TransferData message
result = UDSApi::SvcTransferData_2013(PCANTP_HANDLE_USBBUS1, config, request, 0x01, record,
    record_size);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim record(50) As Byte
Dim record_size As Byte = 50
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Fill data
Dim start_value As Char = "A"
For i As UInt32 = 0 To record_size - 1
    record(i) = Convert.ToByte(start_value) + i
Next

' Sends a physical TransferData message
result = UDSApi.SvcTransferData_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request, &H1,
    record, record_size)
If UDSApi.StatusIsOk_2013(result) Then

```

```

    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    param_record: array [0 .. 49] of Byte;
    record_size: Byte;
    i: UInt32;
begin
    record_size := 50;
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

    // Fill data
    for i := 0 to record_size - 1 do
    begin
        param_record[i] := ($41 + i);
    end;

    // Sends a physical TransferData message
    result := TUDSApi.SvcTransferData_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        config, request, $01, @param_record, record_size);
    if TUDSApi.StatusIsOk_2013(result) then
    begin
        result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
            @request, response, @request_confirmation);
    end;
end;

```

```

if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```



See also: [WaitForService\\_2013](#) on page 248.

Plain function version: [UDS\\_SvcTransferData\\_2013](#) on page 739.

### 3.7.105 SvcRequestTransferExit\_2013

Writes a UDS request according to the RequestTransferExit service's specifications. The RequestTransferExit service is used by the client to terminate a data transfer between the client and server/ECU (upload or download).

#### Overloads

	Method	Description
	<code>SvcRequestTransferExit_2013(cantp_handle, uds_msgconfig, uds_msg)</code>	Writes to the transmit queue a request for UDS service RequestTransferExit, without transfer request parameter.
	<code>SvcRequestTransferExit_2013(cantp_handle, uds_msgconfig, uds_msg, byte[], UInt32)</code>	Writes to the transmit queue a request for UDS service RequestTransferExit, with transfer request parameter.

Plain function version: [UDS\\_SvcRequestTransferExit\\_2013](#) on page 742.

### 3.7.106 SvcRequestTransferExit\_2013(cantp\_handle, uds\_msgconfig, uds\_msg)

Writes a UDS request according to the RequestTransferExit service's specifications, without transfer request parameter. The RequestTransferExit service is used by the client to terminate a data transfer between the client and server/ECU (upload or download).

#### Syntax

##### Pascal OO

```

class function SvcRequestTransferExit_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg
): uds_status; overload;

```

##### C#

```

public static uds_status SvcRequestTransferExit_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request);

```

## C++ / CLR

```
static uds_status SvcRequestTransferExit_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request);
```

## Visual Basic

```
Public Shared Function SvcRequestTransferExit_2013(
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcRequestTransferExit_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

## C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();
```



```
// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical RequestTransferExit message
result = UDSApi.SvcRequestTransferExit_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request);
if (UDSApI.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApI.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApI.MsgFree_2013(ref request);
UDSApI.MsgFree_2013(ref response);
UDSApI.MsgFree_2013(ref request_confirmation);
```

**C++/CLR**

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical RequestTransferExit message
result = UDSApi::SvcRequestTransferExit_2013(PCANTP_HANDLE_USBBUS1, config, request);
if (UDSApI::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApI::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApI::MsgFree_2013(request);
UDSApI::MsgFree_2013(response);
UDSApI::MsgFree_2013(request_confirmation);
```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical RequestTransferExit message
result = UDSApi.SvcRequestTransferExit_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=

```

```

cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical RequestTransferExit message
result := TUDSApi.SvcRequestTransferExit_2013
  (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request);
if TUDSApi.StatusIsOk_2013(result) then
begin
  result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
  MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
  // An error occurred
  MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** `WaitForService_2013` on page 248.

**Plain function version:** `UDS_SvcRequestTransferExit_2013` on page 742.

### 3.7.107 SvcRequestTransferExit\_2013(cantp\_handle, uds\_msgconfig, uds\_msg, byte[], UInt32)

Writes a UDS request according to the RequestTransferExit service's specifications. The RequestTransferExit service is used by the client to terminate a data transfer between the client and server/ECU (upload or download).

#### Syntax

##### Pascal OO

```

class function SvcRequestTransferExit_2013(
  channel: cantp_handle;
  request_config: uds_msgconfig;
  var out_msg_request: uds_msg;
  transfer_request_parameter_record: PByte;
  transfer_request_parameter_record_size: UInt32
): uds_status;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcRequestTransferExit_2013")]
public static extern uds_status SvcRequestTransferExit_2013(
  [MarshalAs(UnmanagedType.U4)]
  cantp_handle channel,
  uds_msgconfig request_config,
  out uds_msg out_msg_request,
  [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 4)]
  byte[] transfer_request_parameter_record,
  UInt32 transfer_request_parameter_record_size);

```

**C++ / CLR**

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcRequestTransferExit_2013")]
static uds_status SvcRequestTransferExit_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 4)]
    array<Byte> ^transfer_request_parameter_record,
    UInt32 transfer_request_parameter_record_size);
```

**Visual Basic**

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcRequestTransferExit_2013")>
Public Shared Function SvcRequestTransferExit_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=4)>
    ByVal transfer_request_parameter_record As Byte(),
    ByVal transfer_request_parameter_record_size As UInt32) As uds_status
End Function
```

**Parameters**

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
transfer_request_parameter_record	Buffer containing the required transfer parameters.
transfer_request_parameter_record_size	Size in bytes of the buffer.

**Returns**

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is not valid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	The mapping given in the message configuration is unknown.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with Reset_2013 (see Reset_2013 on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_OVERFLOW	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data length.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see MsgFree_2013 on page 214).

**Remarks**

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcRequestTransferExit_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
Byte[] transfer_request_parameter_record = new Byte[20];
Byte transfer_request_parameter_record_size = 20;
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Fill data
for (int i = 0; i < transfer_request_parameter_record_size; i++)
{
    transfer_request_parameter_record[i] = (Byte)(Convert.ToByte('A') + i);
}

// Sends a physical RequestTransferExit message
result = UDSApi.SvcRequestTransferExit_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, transfer_request_parameter_record, transfer_request_parameter_record_size);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

### C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
array<Byte>^ transfer_request_parameter_record = gcnew array<Byte>(20);
Byte transfer_request_parameter_record_size = 20;
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
```

```

config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Fill data
for (int i = 0; i < transfer_request_parameter_record_size; i++)
{
    transfer_request_parameter_record[i] = 'A' + i;
}

// Sends a physical RequestTransferExit message
result = UDSApi::SvcRequestTransferExit_2013(PCANTP_HANDLE_USBBUS1, config, request,
    transfer_request_parameter_record, transfer_request_parameter_record_size);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim transfer_request_parameter_record(20) As Byte
Dim transfer_request_parameter_record_size As Byte = 20
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Fill data
Dim start_value As Char = "A"
For i As UInt32 = 0 To transfer_request_parameter_record_size - 1
    transfer_request_parameter_record(i) = Convert.ToByte(start_value) + i
Next

' Sends a physical RequestTransferExit message
result = UDSApi.SvcRequestTransferExit_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, transfer_request_parameter_record, transfer_request_parameter_record_size)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,

```

```

        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    transfer_request_parameter_record: array [0 .. 19] of Byte;
    transfer_request_parameter_record_size: Byte;
    i: UInt32;
begin
    transfer_request_parameter_record_size := 20;
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

    // Fill data
    for i := 0 to transfer_request_parameter_record_size - 1 do
    begin
        transfer_request_parameter_record[i] := ($41 + i);
    end;

    // Sends a physical RequestTransferExit message
    result := TUDSApi.SvcRequestTransferExit_2013
        (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request, @transfer_request_parameter_record,
        transfer_request_parameter_record_size);
    if TUDSApi.StatusIsOk_2013(result) then
    begin
        result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
    end;
end;

```



```

if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

See also: [WaitForService\\_2013](#) on page 248.

Plain function version: [UDS\\_SvcRequestTransferExit\\_2013](#) on page 742.

### 3.7.108 SvcAccessTimingParameter\_2013

Writes a UDS request according to the AccessTimingParameter service's specifications.

#### Syntax

##### Pascal OO

```

class function SvcAccessTimingParameter_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    access_type: uds_svc_param_atp;
    request_record: PByte;
    record_size: UInt32
): uds_status;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcAccessTimingParameter_2013")]
public static extern uds_status SvcAccessTimingParameter_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    [MarshalAs(UnmanagedType.U1)]
    uds_svc_param_atp access_type,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 5)]
    byte[] request_record,
    UInt32 record_size);

```

##### C++ / CLR

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcAccessTimingParameter_2013")]
static uds_status SvcAccessTimingParameter_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType.U1)]
    uds_svc_param_atp access_type,

```



```
[MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 5)]
array<Byte> ^request_record,
UInt32 record_size);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcAccessTimingParameter_2013")>
Public Shared Function SvcAccessTimingParameter_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.U1)>
    ByVal access_type As uds_svc_param_atp,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=5)>
    ByVal request_record As Byte(),
    ByVal record_size As UInt32) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).
access_type	Access type (see <code>uds_svc_param_atp</code> on page 95).
request_record	Timing parameter request record.
record_size	Size in bytes of the request record.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_OVERFLOW</code>	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data length.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcAccessTimingParameter_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized.

## C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical SvcAccessTimingParameter message
Byte[] request_record = { 0xAB, 0xCD };
UInt32 record_size = 2;
result = UDSApi.SvcAccessTimingParameter_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, UDSApi.uds_svc_param_atp.PUDS_SVC_PARAM_ATP_RCATP, request_record,
    record_size);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

## C++ / CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical SvcAccessTimingParameter message
array<Byte>^ request_record = { 0xAB, 0xCD };
UInt32 record_size = 2;
result = UDSApi::SvcAccessTimingParameter_2013(PCANTP_HANDLE_USBBUS1, config, request,
```

```

        UDSApi::uds_svc_param_atp::PUDS_SVC_PARAM_ATP_RCATP, request_record, record_size);
if (UDSApI::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApI::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApI::MsgFree_2013(request);
UDSApI::MsgFree_2013(response);
UDSApI::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical SvcAccessTimingParameter message
Dim request_record As Byte() = {&HAB, &HCD}
Dim record_size As UInt32 = 2
result = UDSApi.SvcAccessTimingParameter_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, UDSApi.uds_svc_param_atp.PUDS_SVC_PARAM_ATP_RCATP, request_record,
    record_size)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApI.MsgFree_2013(request)
UDSApI.MsgFree_2013(response)
UDSApI.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request_record: array [0 .. 1] of Byte;
    request: uds_msg;
    request_confirmation: uds_msg;

```

```

response: uds_msg;
config: uds_msgconfig;
record_size: UInt32;
begin
  FillChar(request, sizeof(request), 0);
  FillChar(request_confirmation, sizeof(request_confirmation), 0);
  FillChar(response, sizeof(response), 0);

  // Set request message configuration
  FillChar(config, sizeof(config), 0);
  config.can_id :=
    UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
  config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
  config.nai.extension_addr := $0;
  config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
  config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
  config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
  config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
  config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

  // Sends a physical SvcAccessTimingParameter message
  request_record[0] := $AB;
  request_record[1] := $CD;
  record_size := 2;
  result := TUDSApi.SvcAccessTimingParameter_2013
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
     uds_svc_param_atp.PUDS_SVC_PARAM_ATP_RCATP, @request_record,
     record_size);
  if TUDSApi.StatusIsOk_2013(result) then
  begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
      @request, response, @request_confirmation);
  end;
  if TUDSApi.StatusIsOk_2013(result) then
  begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
  end
  else
  begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
  end;

  // Free structures
  TUDSApi.MsgFree_2013(request);
  TUDSApi.MsgFree_2013(response);
  TUDSApi.MsgFree_2013(request_confirmation);
end;

```







**See also:** `WaitForService_2013` on page 248, `uds_svc_param_atp` on page 95.

**Plain function version:** `UDS_SvcAccessTimingParameter_2013` on page 744.

### 3.7.109 SvcRequestFileTransfer\_2013

Writes a UDS request according to the SvcRequestFileTransfer service's specifications.

#### Overloads

	Method	Description
	SvcRequestFileTransfer_2013(cantp_handle, uds_msgconfig, uds_msg, uds_svc_param_rft_moop, UInt16, string)	Writes to the transmit queue a request for UDS service RequestFileTransfer. Use with a mode of operation which does not require file compressed or uncompressed sizes, nor compression or encrypting methods.
	SvcRequestFileTransfer_2013(cantp_handle, uds_msgconfig, uds_msg, uds_svc_param_rft_moop, UInt16, string, byte, byte)	Writes to the transmit queue a request for UDS service RequestFileTransfer. Use with a mode of operation which does not require file compressed or uncompressed sizes.
	SvcRequestFileTransfer_2013(cantp_handle, uds_msgconfig, uds_msg, uds_svc_param_rft_moop, UInt16, string, byte, byte, byte, byte[], byte[])	Writes to the transmit queue a request for UDS service RequestFileTransfer.
	SvcRequestFileTransfer_2013(cantp_handle, uds_msgconfig, uds_msg, uds_svc_param_rft_moop, UInt16, byte[])	Writes to the transmit queue a request for UDS service RequestFileTransfer. Use with a mode of operation which does not require file compressed or uncompressed sizes, nor compression or encrypting methods.
	SvcRequestFileTransfer_2013(cantp_handle, uds_msgconfig, out uds_msg, uds_svc_param_rft_moop, UInt16, byte[], byte, byte)	Writes to the transmit queue a request for UDS service RequestFileTransfer. Use with a mode of operation which does not require file compressed or uncompressed sizes.
	SvcRequestFileTransfer_2013(cantp_handle, uds_msgconfig, uds_msg, uds_svc_param_rft_moop, UInt16, byte[], byte, byte, byte, byte[], byte[])	Writes to the transmit queue a request for UDS service RequestFileTransfer.

Plain function version: [UDS\\_SvcRequestFileTransfer\\_2013](#) on page 745.

### 3.7.110 SvcRequestFileTransfer\_2013(cantp\_handle, uds\_msgconfig, uds\_msg, uds\_svc\_param\_rft\_moop, UInt16, string)

Writes to the transmit queue a request for UDS service RequestFileTransfer. Use with a mode of operation which does not require file compressed or uncompressed sizes, nor compression or encrypting methods.

#### Syntax

##### Pascal OO

```
class function SvcRequestFileTransfer_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    mode_of_operation: uds_svc_param_rft_moop;
    file_path_and_name_size: UInt16;
    file_path_and_name: PAnsiChar
): uds_status; overload;
```

##### C#

```
public static uds_status SvcRequestFileTransfer_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    uds_svc_param_rft_moop mode_of_operation,
    UInt16 file_path_and_name_size,
    string file_path_and_name);
```

## C++ / CLR

```
static uds_status SvcRequestFileTransfer_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    uds_svc_param_rft_moop mode_of_operation,
    UInt16 file_path_and_name_size,
    String ^file_path_and_name);
```

## Visual Basic

```
Public Shared Function SvcRequestFileTransfer_2013(
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal mode_of_operation As uds_svc_param_rft_moop,
    ByVal file_path_and_name_size As UInt16,
    ByVal file_path_and_name As String) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).
mode_of_operation	Mode of operation (see <code>uds_svc_param_rft_moop</code> on page 96).
file_path_and_name_size	File path and name string length.
file_path_and_name	File path and name string.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcRequestFileTransfer_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized.

## C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical RequestFileTransfer message
String file_name = "toto.txt";
result = UDSApi.SvcRequestFileTransfer_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, UDSApi.uds_svc_param_rft_moop.PUDS_SVC_PARAM_RFT_MOOP_DELFIL, 8, file_name);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

## C++ / CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical RequestFileTransfer message
String ^file_name = "toto.txt";
result = UDSApi::SvcRequestFileTransfer_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_rft_moop::PUDS_SVC_PARAM_RFT_MOOP_DELFIL, 8, file_name);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
```



```

        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

### Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical RequestFileTransfer message
Dim file_name As String = "toto.txt"
result = UDSApi.SvcRequestFileTransfer_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, UDSApi.uds_svc_param_rft_moop.PUDS_SVC_PARAM_RFT_MOOP_DELFIE, 8, file_name)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

### Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    file_name: PAnsichar;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);

```



```

FillChar(response, sizeof(response), 0);

// Set request message configuration
FillChar(config, sizeof(config), 0);
config.can_id :=
    UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr := $0;
config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical RequestFileTransfer message
file_name := 'toto.txt';
result := TUDSApi.SvcRequestFileTransfer_2013
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    uds_svc_param_rft_moop.PUDS_SVC_PARAM_RFT_MOOP_DELFIE, 8, file_name);
if TUDSApi.StatusIsOk_2013(result) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248, [uds\\_svc\\_param\\_rft\\_moop](#) on page 96,

**Plain function version:** [UDS\\_SvcRequestFileTransfer\\_2013](#) on page 745.

### 3.7.111 SvcRequestFileTransfer\_2013(cantp\_handle, uds\_msgconfig, uds\_msg, uds\_svc\_param\_rft\_moop, UInt16, string, byte, byte)

Writes to the transmit queue a request for UDS service RequestFileTransfer. Use with a mode of operation which does not require file compressed or uncompressed sizes.

#### Syntax

##### Pascal OO

```

class function SvcRequestFileTransfer_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;

```

```

mode_of_operation: uds_svc_param_rft_moop;
file_path_and_name_size: UInt16;
file_path_and_name: PAnsiChar;
compression_method: Byte;
encrypting_method: Byte
): uds_status; overload;

```

## C#

```

public static uds_status SvcRequestFileTransfer_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    uds_svc_param_rft_moop mode_of_operation,
    UInt16 file_path_and_name_size,
    string file_path_and_name,
    byte compression_method,
    byte encrypting_method);

```

## C++ / CLR

```

static uds_status SvcRequestFileTransfer_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    uds_svc_param_rft_moop mode_of_operation,
    UInt16 file_path_and_name_size,
    String ^file_path_and_name,
    Byte compression_method,
    Byte encrypting_method);

```

## Visual Basic

```

Public Shared Function SvcRequestFileTransfer_2013(
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal mode_of_operation As uds_svc_param_rft_moop,
    ByVal file_path_and_name_size As UInt16,
    ByVal file_path_and_name As String,
    ByVal compression_method As Byte,
    ByVal encrypting_method As Byte) As uds_status
End Function

```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
mode_of_operation	Mode of operation (see uds_svc_param_rft_moop on page 96).
file_path_and_name_size	File path and name string length.
file_path_and_name	File path and name string.
compression_method	A nibble-value that specifies the compression method, the value 0x0 specifies that no compression method is used.
encrypting_method	A nibble-value that specifies the encrypting method, the value 0x0 specifies that no encrypting method is used.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcRequestFileTransfer_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical RequestFileTransfer message
String file_name = "toto.txt";
result = UDSApi.SvcRequestFileTransfer_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, UDSApi.uds_svc_param_rft_moop.PUDS_SVC_PARAM_RFT_MOOP_RDFILE, 8, file_name, 0x01,
    0x02);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
```

```
MessageBox.Show("An error occurred", "Error");
```

```
// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

## C++ / CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical RequestFileTransfer message
String ^file_name = "toto.txt";
result = UDSApi::SvcRequestFileTransfer_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_rft_moop::PUDS_SVC_PARAM_RFT_MOOP_RDFILE, 8, file_name, 0x01,
    0x02);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);
```

## Visual Basic

```
Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT
```

```

' Sends a physical RequestFileTransfer message
Dim file_name As String = "toto.txt"
result = UDSApi.SvcRequestFileTransfer_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, UDSApi.uds_svc_param_rft_moop.PUDS_SVC_PARAM_RFT_MOOP_RDFILE, 8, file_name, &H1,
    &H2)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    file_name: PAnsichar;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

    // Sends a physical RequestFileTransfer message
    file_name := 'toto.txt';
    result := TUDSApi.SvcRequestFileTransfer_2013
        (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
        uds_svc_param_rft_moop.PUDS_SVC_PARAM_RFT_MOOP_RDFILE, 8, file_name,
        $01, $02);
    if TUDSApi.StatusIsOk_2013(result) then
    begin
        result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
            @request, response, @request_confirmation);
    end;
end;

```

```

if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

See also: [WaitForService\\_2013](#) on page 248, [uds\\_svc\\_param\\_rft\\_moop](#) on page 96,

Plain function version: [UDS\\_SvcRequestFileTransfer\\_2013](#) on page 745.

### 3.7.112 SvcRequestFileTransfer\_2013(cantp\_handle, uds\_msgconfig, uds\_msg, uds\_svc\_param\_rft\_moop, UInt16, string, byte, byte, byte, byte[], byte[])

Writes to the transmit queue a request for UDS service RequestFileTransfer.

#### Syntax

##### Pascal OO

```

class function SvcRequestFileTransfer_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    mode_of_operation: uds_svc_param_rft_moop;
    file_path_and_name_size: UInt16;
    file_path_and_name: PAnsiChar;
    compression_method: Byte;
    encrypting_method: Byte;
    file_size_parameter_size: Byte;
    file_size_uncompressed: PByte;
    file_size_compressed: PByte
): uds_status; overload;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcRequestFileTransfer_2013")]
public static extern uds_status SvcRequestFileTransfer_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    [MarshalAs(UnmanagedType.U1)]
    uds_svc_param_rft_moop mode_of_operation,
    UInt16 file_path_and_name_size,
    [MarshalAs(UnmanagedType.LPStr, SizeParamIndex = 4)]
    string file_path_and_name,
    byte compression_method,
    byte encrypting_method,
    byte file_size_parameter_size,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 8)]

```

```
byte[] file_size_uncompressed,
[MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 8)]
byte[] file_size_compressed);
```

## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcRequestFileTransfer_2013")]
static uds_status SvcRequestFileTransfer_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType::U1)]
    uds_svc_param_rft_moop mode_of_operation,
    UInt16 file_path_and_name_size,
    [MarshalAs(UnmanagedType::LPStr, SizeParamIndex = 4)]
    String ^file_path_and_name,
    Byte compression_method,
    Byte encrypting_method,
    Byte file_size_parameter_size,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 8)]
    array<Byte> ^file_size_uncompressed,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 8)]
    array<Byte> ^file_size_compressed);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcRequestFileTransfer_2013")>
Public Shared Function SvcRequestFileTransfer_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.U1)>
    ByVal mode_of_operation As uds_svc_param_rft_moop,
    ByVal file_path_and_name_size As UInt16,
    <MarshalAs(UnmanagedType.LPStr, SizeParamIndex:=4)>
    ByVal file_path_and_name As String,
    ByVal compression_method As Byte,
    ByVal encrypting_method As Byte,
    ByVal file_size_parameter_size As Byte,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=8)>
    ByVal file_size_uncompressed As Byte(),
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=8)>
    ByVal file_size_compressed As Byte()) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
mode_of_operation	Mode of operation (see uds_svc_param_rft_moop on page 96).
file_path_and_name_size	File path and name string length.
file_path_and_name	File path and name string.
compression_method	A nibble-value that specifies the compression method, the value 0x0 specifies that no compression method is used.
encrypting_method	A nibble-value that specifies the encrypting method, the value 0x0 specifies that no encrypting method is used.
file_size_parameter_size	File size parameter length in byte
file_size_uncompressed	Uncompressed file size.



Parameter	Description
file_size_compressed	Compressed file size.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcRequestFileTransfer_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

**C#**

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical RequestFileTransfer message
String file_name = "toto.txt";
Byte[] file_size_uncompressed = { 0x00, 0xD };
Byte[] file_size_compressed = { 0x0, 0xA };
result = UDSApi.SvcRequestFileTransfer_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, UDSApi.uds_svc_param_rft_moop.PUDS_SVC_PARAM_RFT_MOOP_ADDFILE, 8, file_name, 0, 0,
    2, file_size_uncompressed, file_size_compressed);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out

```



```

        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

## C++ / CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDES_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDES_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDES_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDES_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDES_MSGTYPE_USDT;

// Sends a physical RequestFileTransfer message
String ^file_name = "toto.txt";
array<Byte>^ file_size_uncompressed = { 0x00, 0xD };
array<Byte>^ file_size_compressed = { 0x0, 0xA };
result = UDSApi::SvcRequestFileTransfer_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_rft_moop::PUDES_SVC_PARAM_RFT_MOOP_ADDFILE, 8, file_name, 0, 0, 2,
    file_size_uncompressed, file_size_compressed);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDES_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD

```

```

config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical RequestFileTransfer message
Dim file_name As String = "toto.txt"
Dim file_size_uncompressed As Byte() = {&H0, &HD}
Dim file_size_compressed As Byte() = {&H0, &HA}
result = UDSApI.SvcRequestFileTransfer_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, UDSApI.uds_svc_param_rft_moop.PUDS_SVC_PARAM_RFT_MOOP_ADDFILE, 8, file_name, 0, 0,
    2, file_size_uncompressed, file_size_compressed)
If UDSApI.StatusIsOk_2013(result) Then
    result = UDSApI.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApI.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApI.MsgFree_2013(request)
UDSApI.MsgFree_2013(response)
UDSApI.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    file_size_uncompressed: array [0 .. 1] of Byte;
    file_size_compressed: array [0 .. 1] of Byte;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    file_name: PAnsichar;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.type := uds_msgtype.PUDS_MSGTYPE_USDT;

```

```
// Sends a physical RequestFileTransfer message
file_name := 'toto.txt';
file_size_uncompressed[0] := $00;
file_size_uncompressed[1] := $D;
file_size_compressed[0] := $0;
file_size_compressed[1] := $A;
result := TUDSApi.SvcRequestFileTransfer_2013
(
  cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
  uds_svc_param_rft_moop.PUDS_SVC_PARAM_RFT_MOOP_ADDFILE, 8, file_name, 0, 0,
  2, @file_size_uncompressed, @file_size_compressed);
if TUDSApi.StatusIsOk_2013(result) then
begin
  result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
  MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
  // An error occurred
  MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;
```

**See also:** [WaitForService\\_2013](#) on page 248, [uds\\_svc\\_param\\_rft\\_moop](#) on page 96,

**Plain function version:** [UDS\\_SvcRequestFileTransfer\\_2013](#) on page 745.

### 3.7.113 SvcRequestFileTransfer\_2013(cantp\_handle, uds\_msgconfig, uds\_msg, uds\_svc\_param\_rft\_moop, UInt16, byte[])

Writes to the transmit queue a request for UDS service RequestFileTransfer. Use with a mode of operation which does not require file compressed or uncompressed sizes, nor compression or encrypting methods.

#### Syntax

##### Pascal OO

```
class function SvcRequestFileTransfer_2013(
  channel: cantp_handle;
  request_config: uds_msgconfig;
  var out_msg_request: uds_msg;
  mode_of_operation: uds_svc_param_rft_moop;
  file_path_and_name_size: UInt16;
  file_path_and_name: PByte
): uds_status; overload;
```

##### C#

```
public static uds_status SvcRequestFileTransfer_2013(
  cantp_handle channel,
  uds_msgconfig request_config,
  out uds_msg out_msg_request,
```

```
uds_svc_param_rft_moop mode_of_operation,
UInt16 file_path_and_name_size,
byte[] file_path_and_name);
```

## C++ / CLR

```
static uds_status SvcRequestFileTransfer_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    uds_svc_param_rft_moop mode_of_operation,
    UInt16 file_path_and_name_size,
    array<Byte> ^file_path_and_name);
```

## Visual Basic

```
Public Shared Function SvcRequestFileTransfer_2013(
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal mode_of_operation As uds_svc_param_rft_moop,
    ByVal file_path_and_name_size As UInt16,
    ByVal file_path_and_name As Byte()) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
mode_of_operation	Mode of operation (see uds_svc_param_rft_moop on page 96).
file_path_and_name_size	File path and name string length.
file_path_and_name	File path and name string.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is not valid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	The mapping given in the message configuration is unknown.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with Reset_2013 (see Reset_2013 on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see MsgFree_2013 on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcRequestFileTransfer_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical RequestFileTransfer message
Byte[] file_name = Encoding.ASCII.GetBytes("toto.txt");
result = UDSApi.SvcRequestFileTransfer_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, UDSApi.uds_svc_param_rft_moop.PUDS_SVC_PARAM_RFT_MOOP_DELFIE, 8, file_name);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

### C++ / CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;
```

```
// Sends a physical RequestFileTransfer message
array<Byte>^ file_name = Encoding::ASCII->GetBytes("toto.txt");
result = UDSApi::SvcRequestFileTransfer_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_rft_moop::PUDS_SVC_PARAM_RFT_MOOP_DELFIL, 8, file_name);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);
```

### Visual Basic

```
Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical RequestFileTransfer message
Dim file_name As Byte() = Encoding.ASCII.GetBytes("toto.txt")
result = UDSApi.SvcRequestFileTransfer_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, UDSApi.uds_svc_param_rft_moop.PUDS_SVC_PARAM_RFT_MOOP_DELFIL, 8, file_name)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)
```

### Pascal OO

```
var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
```

```

response: uds_msg;
config: uds_msgconfig;
file_name: System.TArray<Byte>;
begin
  FillChar(request, sizeof(request), 0);
  FillChar(request_confirmation, sizeof(request_confirmation), 0);
  FillChar(response, sizeof(response), 0);

  // Set request message configuration
  FillChar(config, sizeof(config), 0);
  config.can_id :=
    UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
  config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
  config.nai.extension_addr := $0;
  config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
  config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
  config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
  config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
  config.type_m := uds_msgtype.PUDS_MSGTYPE_USDT;

  // Sends a physical RequestFileTransfer message
  file_name := TEncoding.ASCII.GetBytes('toto.txt');

  result := TUDSApi.SvcRequestFileTransfer_2013
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
     uds_svc_param_rft_moop.PUDS_SVC_PARAM_RFT_MOOP_DELFIE, 8,
     PByte(file_name));
  if TUDSApi.StatusIsOk_2013(result) then
  begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
      @request, response, @request_confirmation);
  end;
  if TUDSApi.StatusIsOk_2013(result) then
  begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
  end
  else
  begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
  end;

  // Free structures
  TUDSApi.MsgFree_2013(request);
  TUDSApi.MsgFree_2013(response);
  TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248, [uds\\_svc\\_param\\_rft\\_moop](#) on page 96,  
**Plain function version:** [UDS\\_SvcRequestFileTransfer\\_2013](#) on page 745.



### 3.7.114 SvcRequestFileTransfer\_2013(cantp\_handle, uds\_msgconfig, out uds\_msg, uds\_svc\_param\_rft\_moop, UInt16, byte[], byte, byte)

Writes to the transmit queue a request for UDS service RequestFileTransfer. Use with a mode of operation which does not require file compressed or uncompressed sizes.

#### Syntax

##### Pascal OO

```
class function SvcRequestFileTransfer_2013(
  channel: cantp_handle;
  request_config: uds_msgconfig;
  var out_msg_request: uds_msg;
  mode_of_operation: uds_svc_param_rft_moop;
  file_path_and_name_size: UInt16;
  file_path_and_name: PByte;
  compression_method: Byte;
  encrypting_method: Byte
): uds_status; overload;
```

##### C#

```
public static uds_status SvcRequestFileTransfer_2013(
  cantp_handle channel,
  uds_msgconfig request_config,
  out uds_msg out_msg_request,
  uds_svc_param_rft_moop mode_of_operation,
  UInt16 file_path_and_name_size,
  byte[] file_path_and_name,
  byte compression_method,
  byte encrypting_method);
```

##### C++ / CLR

```
static uds_status SvcRequestFileTransfer_2013(
  cantp_handle channel,
  uds_msgconfig request_config,
  uds_msg %out_msg_request,
  uds_svc_param_rft_moop mode_of_operation,
  UInt16 file_path_and_name_size,
  array<Byte> ^file_path_and_name,
  Byte compression_method,
  Byte encrypting_method);
```

#### Visual Basic

```
Public Shared Function SvcRequestFileTransfer_2013(
  ByVal channel As cantp_handle,
  ByVal request_config As uds_msgconfig,
  ByRef out_msg_request As uds_msg,
  ByVal mode_of_operation As uds_svc_param_rft_moop,
  ByVal file_path_and_name_size As UInt16,
  ByVal file_path_and_name As Byte(),
  ByVal compression_method As Byte,
  ByVal encrypting_method As Byte) As uds_status
End Function
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).



Parameter	Description
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).
mode_of_operation	Mode of operation (see <code>uds_svc_param_rft_moop</code> on page 96).
file_path_and_name_size	File path and name string length.
file_path_and_name	File path and name string.
compression_method	A nibble-value that specifies the compression method, the value 0x0 specifies that no compression method is used.
encrypting_method	A nibble-value that specifies the encrypting method, the value 0x0 specifies that no encrypting method is used.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcRequestFileTransfer_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

**C#**

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

```

```
// Sends a physical RequestFileTransfer message
Byte[] file_name = Encoding.ASCII.GetBytes("toto.txt");
result = UDSApi.SvcRequestFileTransfer_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, UDSApi.uds_svc_param_rft_moop.PUDS_SVC_PARAM_RFT_MOOP_RDFILE, 8, file_name, 0x01,
    0x02);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

**C++ / CLR**

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical RequestFileTransfer message
array<Byte>^ file_name = Encoding::ASCII->GetBytes("toto.txt");
result = UDSApi::SvcRequestFileTransfer_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_rft_moop::PUDS_SVC_PARAM_RFT_MOOP_RDFILE, 8, file_name, 0x01,
    0x02);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);
```

**Visual Basic**

```
Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
```

```

Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical RequestFileTransfer message
Dim file_name As Byte() = Encoding.ASCII.GetBytes("toto.txt")
result = UDSApi.SvcRequestFileTransfer_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, UDSApi.uds_svc_param_rft_moop.PUDS_SVC_PARAM_RFT_MOOP_RDFILE, 8, file_name, &H1,
    &H2)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    file_name: System.TArray<Byte>;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.type := uds_msgtype.PUDS_MSGTYPE_USDT;

```

```
// Sends a physical RequestFileTransfer message
file_name := TEncoding.ASCII.GetBytes('toto.txt');
result := TUDSApi.SvcRequestFileTransfer_2013
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    uds_svc_param_rft_moop.PUDS_SVC_PARAM_RFT_MOOP_RDFILE, 8, PByte(file_name),
    $01, $02);
if TUDSApi.StatusIsOk_2013(result) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;
```

See also: [WaitForService\\_2013](#) on page 248, [uds\\_svc\\_param\\_rft\\_moop](#) on page 96,

Plain function version: [UDS\\_SvcRequestFileTransfer\\_2013](#) on page 745.

### 3.7.115 SvcRequestFileTransfer\_2013(cantp\_handle, uds\_msgconfig, uds\_msg, uds\_svc\_param\_rft\_moop, UInt16, byte[], byte, byte, byte, byte[], byte[])

Writes to the transmit queue a request for UDS service RequestFileTransfer.

#### Syntax

##### Pascal OO

```
class function SvcRequestFileTransfer_2013(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    mode_of_operation: uds_svc_param_rft_moop;
    file_path_and_name_size: UInt16;
    file_path_and_name: PByte;
    compression_method: Byte;
    encrypting_method: Byte;
    file_size_parameter_size: Byte;
    file_size_uncompressed: PByte;
    file_size_compressed: PByte
): uds_status; overload;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcRequestFileTransfer_2013")]
private static extern uds_status SvcRequestFileTransfer_2013(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
```

```

uds_msgconfig request_config,
out uds_msg out_msg_request,
[MarshalAs(UnmanagedType.U1)]
uds_svc_param_rft_moop mode_of_operation,
UInt16 file_path_and_name_size,
[MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 4)]
byte[] file_path_and_name,
byte compression_method,
byte encrypting_method,
byte file_size_parameter_size,
IntPtr file_size_uncompressed,
IntPtr file_size_compressed);

```

## C++ / CLR

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcRequestFileTransfer_2013")]
static uds_status SvcRequestFileTransfer_2013(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType::U1)]
    uds_svc_param_rft_moop mode_of_operation,
    UInt16 file_path_and_name_size,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 4)]
    array<Byte> ^file_path_and_name,
    Byte compression_method,
    Byte encrypting_method,
    Byte file_size_parameter_size,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 8)]
    array<Byte> ^file_size_uncompressed,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 8)]
    array<Byte> ^file_size_compressed);

```

## Visual Basic

```

<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcRequestFileTransfer_2013")>
Public Shared Function SvcRequestFileTransfer_2013(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.U1)>
    ByVal mode_of_operation As uds_svc_param_rft_moop,
    ByVal file_path_and_name_size As UInt16,
    <MarshalAs(UnmanagedType.LPStr, SizeParamIndex:=4)>
    ByVal file_path_and_name As String,
    ByVal compression_method As Byte,
    ByVal encrypting_method As Byte,
    ByVal file_size_parameter_size As Byte,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=8)>
    ByVal file_size_uncompressed As Byte(),
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=8)>
    ByVal file_size_compressed As Byte()) As uds_status
End Function

```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).

Parameter	Description
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).
mode_of_operation	Mode of operation (see <code>uds_svc_param_rft_moop</code> on page 96).
file_path_and_name_size	File path and name string length.
file_path_and_name	File path and name string.
compression_method	A nibble-value that specifies the compression method, the value 0x0 specifies that no compression method is used.
encrypting_method	A nibble-value that specifies the encrypting method, the value 0x0 specifies that no encrypting method is used.
file_size_parameter_size	File size parameter length in byte
file_size_uncompressed	Uncompressed file size.
file_size_compressed	Compressed file size.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

## Example

The following example shows the use of the service method `SvcRequestFileTransfer_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
```

```

config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical RequestFileTransfer message
Byte[] file_name = Encoding.ASCII.GetBytes("toto.txt");
Byte[] file_size_uncompressed = { 0x00, 0xD };
Byte[] file_size_compressed = { 0x0, 0xA };
result = UDSApi.SvcRequestFileTransfer_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, UDSApi.uds_svc_param_rft_moop.PUDS_SVC_PARAM_RFT_MOOP_ADDFILE, 8, file_name, 0, 0,
    2, file_size_uncompressed, file_size_compressed);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

**C++ / CLR**

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical RequestFileTransfer message
array<Byte>^ file_name = Encoding::ASCII->GetBytes("toto.txt");
array<Byte>^ file_size_uncompressed = { 0x00, 0xD };
array<Byte>^ file_size_compressed = { 0x0, 0xA };
result = UDSApi::SvcRequestFileTransfer_2013(PCANTP_HANDLE_USBBUS1, config, request,
    UDSApi::uds_svc_param_rft_moop::PUDS_SVC_PARAM_RFT_MOOP_ADDFILE, 8, file_name, 0, 0, 2,
    file_size_uncompressed, file_size_compressed);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```



## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical RequestFileTransfer message
Dim file_name As Byte() = Encoding.ASCII.GetBytes("toto.txt")
Dim file_size_uncompressed As Byte() = {&H0, &HD}
Dim file_size_compressed As Byte() = {&H0, &HA}
result = UDSApi.SvcRequestFileTransfer_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, UDSApi.uds_svc_param_rft_moop.PUDS_SVC_PARAM_RFT_MOOP_ADDFILE, 8, file_name, 0, 0,
    2, file_size_uncompressed, file_size_compressed)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    file_size_uncompressed: array [0 .. 1] of Byte;
    file_size_compressed: array [0 .. 1] of Byte;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    file_name: System.TArray<Byte>;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;

```



```

config.nai.extension_addr := $0;
config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typepem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical RequestFileTransfer message
file_name := TEncoding.ASCII.GetBytes('toto.txt');
file_size_uncompressed[0] := $00;
file_size_uncompressed[1] := $D;
file_size_compressed[0] := $00;
file_size_compressed[1] := $A;
result := TUDSApi.SvcRequestFileTransfer_2013
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    uds_svc_param_rft_moop.PUDS_SVC_PARAM_RFT_MOOP_ADDFILE, 8, PByte(file_name),
    0, 0, 2, @file_size_uncompressed, @file_size_compressed);
if TUDSApi.StatusIsOk_2013(result) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
end;
if TUDSApi.StatusIsOk_2013(result) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248, [uds\\_svc\\_param\\_rft\\_moop](#) on page 96,

**Plain function version:** [UDS\\_SvcRequestFileTransfer\\_2013](#) on page 745.

### 3.7.116 SvcAuthenticationDA\_2020

Writes a UDS request according to the Authentication service's specifications (ISO-14229-1:2020). The subfunction deAuthenticate is implicit.

#### Syntax

##### Pascal OO

```

class function SvcAuthenticationDA_2020(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg
): uds_status;

```

**C#**

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcAuthenticationDA_2020")]
public static extern uds_status SvcAuthenticationDA_2020(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request);
```

**C++ / CLR**

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcAuthenticationDA_2020")]
static uds_status SvcAuthenticationDA_2020(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request);
```

**Visual Basic**

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcAuthenticationDA_2020")>
Public Shared Function SvcAuthenticationDA_2020(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg) As uds_status
End Function
```

**Parameters**

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).

**Returns**

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The request configuration is not valid (see uds_msgconfig on page 27), or the given message buffer is null.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with Reset_2013 (see Reset_2013 on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see MsgFree_2013 on page 214).


**Remarks**

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

The PCAN-UDS 2.x API provides `uds_svc_authentication_subfunction` (see on page 98) and `uds_svc_authentication_return_parameter` (see on page 99) enumerations to help user to decode Authentication service responses.

## Example

The following example shows the use of the service method `SvcAuthenticationDA_2020` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/deAuthenticate message
result = UDSApi.SvcAuthenticationDA_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

### C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/deAuthenticate message
```

```

result = UDSApi::SvcAuthenticationDA_2020(cantp_handle::PCANTP_HANDLE_USBBUS1, config,
    request);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(cantp_handle::PCANTP_HANDLE_USBBUS1, request,
        response, request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

### Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical Authentication/deAuthenticate message
result = UDSApi.SvcAuthenticationDA_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

### Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);

```

```

FillChar(request_confirmation, sizeof(request_confirmation), 0);
FillChar(response, sizeof(response), 0);

// Set request message configuration
FillChar(config, sizeof(config), 0);
config.can_id :=
    UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr := $0;
config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/deAuthenticate message
result := TUDSApi.SvcAuthenticationDA_2020(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, request);
if (TUDSApi.StatusIsOk_2013(result)) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
end;
if (TUDSApi.StatusIsOk_2013(result)) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```



**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function version:** [UDS\\_SvcAuthenticationDA\\_2020](#) on page 748.

### 3.7.117 SvcAuthenticationVCU\_2020

Writes a UDS request according to the Authentication service's specifications (ISO-14229-1:2020). The subfunction verifyCertificateUnidirectional is implicit.

#### Overloads

	Method	Description
	SvcAuthenticationVCU_2020(cantp_handle, uds_msgconfig, uds_msg, Byte, byte[], UInt16, byte[], UInt16)	Writes to the transmit queue a request for UDS service Authentication with verifyCertificateUnidirectional subfunction (ISO-14229-1:2020).
	SvcAuthenticationVCU_2020(cantp_handle, uds_msgconfig, uds_msg, Byte, byte[], UInt16)	Writes to the transmit queue a request for UDS service Authentication with verifyCertificateUnidirectional subfunction, without challenge client buffer (ISO-14229-1:2020).

Plain function version: `UDS_SvcAuthenticationVCU_2020` on page 749.

### 3.7.118 SvcAuthenticationVCU\_2020(cantp\_handle, uds\_msgconfig, uds\_msg, Byte, byte[], UInt16, byte[], UInt16)

Writes a UDS request according to the Authentication service's specifications (ISO-14229-1:2020). The subfunction verifyCertificateUnidirectional is implicit.

#### Syntax

##### Pascal OO

```
class function SvcAuthenticationVCU_2020(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    communication_configuration: Byte;
    certificate_client: PByte;
    certificate_client_size: UInt16;
    challenge_client: PByte;
    challenge_client_size: UInt16
): uds_status; overload;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcAuthenticationVCU_2020")]
public static extern uds_status SvcAuthenticationVCU_2020(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    Byte communication_configuration,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 5)]
    byte[] certificate_client,
    UInt16 certificate_client_size,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 7)]
    byte[] challenge_client,
    UInt16 challenge_client_size);
```

##### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcAuthenticationVCU_2020")]
static uds_status SvcAuthenticationVCU_2020(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    Byte communication_configuration,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 5)]
    array<Byte> ^certificate_client,
    UInt16 certificate_client_size,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 7)]
    array<Byte> ^challenge_client,
    UInt16 challenge_client_size);
```

##### Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcAuthenticationVCU_2020")>
Public S
hared Function SvcAuthenticationVCU_2020(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
```

```

ByVal request_config As uds_msgconfig,
ByRef out_msg_request As uds_msg,
ByVal communication_configuration As Byte,
<MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=5)>
ByVal certificate_client As Byte(),
ByVal certificate_client_size As UInt16,
<MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=7)>
ByVal challenge_client As Byte(),
ByVal challenge_client_size As UInt16) As uds_status
End Function

```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).
communication_configuration	Configuration information about communication.
certificate_client	Buffer containing the certificate of the client.
certificate_client_size	Size in bytes of the certificate buffer.
challenge_client	Buffer containing the challenge of the client.
challenge_client_size	Size in bytes of the challenge buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).


## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

The PCAN-UDS 2.x API provides `uds_svc_authentication_subfunction` (see on page 98) and `uds_svc_authentication_return_parameter` (see on page 99) enumerations to help user to decode Authentication service responses.

## Example

The following example shows the use of the service method `SvcAuthenticationVCU_2020(cantp_handle, uds_msgconfig, uds_msg, Byte, byte[], UInt16, byte[], UInt16)` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.



**C#**

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/verifyCertificateUnidirectional message
Byte communication_configuration = 0x00;
byte[] certificate_client = new byte[2] { 0x12, 0x34 };
UInt16 certificate_client_size = 2;
byte[] challenge_client = new byte[2] { 0x56, 0x78 };
UInt16 challenge_client_size = 2;
result = UDSApi.SvcAuthenticationVCU_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, communication_configuration, certificate_client, certificate_client_size,
    challenge_client, challenge_client_size);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

**C++/CLR**

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/verifyCertificateUnidirectional message
Byte communication_configuration = 0x00;
array<Byte>^ certificate_client = { 0x12, 0x34 };

```



```

UInt16 certificate_client_size = 2;
array<Byte>^ challenge_client = { 0x56, 0x78 };
UInt16 challenge_client_size = 2;
result = UDSApi::SvcAuthenticationVCU_2020(cantp_handle::PCANTP_HANDLE_USBBUS1, config,
    request, communication_configuration, certificate_client, certificate_client_size,
    challenge_client, challenge_client_size);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(cantp_handle::PCANTP_HANDLE_USBBUS1, request,
        response, request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

### Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical Authentication/verifyCertificateUnidirectional message
Dim communication_configuration As Byte = &H0
Dim certificate_client As Byte() = {&H12, &H34}
Dim certificate_client_size As UInt16 = 2
Dim challenge_client As Byte() = {&H56, &H78}
Dim challenge_client_size As UInt16 = 2
result = UDSApi.SvcAuthenticationVCU_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    communication_configuration, certificate_client, certificate_client_size, challenge_client,
    challenge_client_size)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

**Pascal OO**

```

var
  result: uds_status;
  request: uds_msg;
  request_confirmation: uds_msg;
  response: uds_msg;
  config: uds_msgconfig;
  communication_configuration: Byte;
  certificate_client: array [0 .. 1] of Byte;
  certificate_client_size: UInt16;
  challenge_client: array [0 .. 1] of Byte;
  challenge_client_size: UInt16;
begin
  FillChar(request, sizeof(request), 0);
  FillChar(request_confirmation, sizeof(request_confirmation), 0);
  FillChar(response, sizeof(response), 0);

  // Set request message configuration
  FillChar(config, sizeof(config), 0);
  config.can_id :=
    UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
  config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
  config.nai.extension_addr := $0;
  config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
  config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
  config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
  config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
  config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

  // Sends a physical Authentication/verifyCertificateUnidirectional message
  communication_configuration := $00;
  certificate_client[0] := $12;
  certificate_client[1] := $34;
  certificate_client_size := 2;
  challenge_client[0] := $56;
  challenge_client[1] := $78;
  challenge_client_size := 2;
  result := TUDSApi.SvcAuthenticationVCU_2020
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
     communication_configuration, PByte(@certificate_client),
     certificate_client_size, PByte(@challenge_client), challenge_client_size);
  if (TUDSApi.StatusIsOk_2013(result)) then
  begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
      @request, response, @request_confirmation);
  end;
  if (TUDSApi.StatusIsOk_2013(result)) then
  begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
  end
  else
  begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
  end;

  // Free structures

```

```
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;
```

**See also:** `WaitForService_2013` on page 248.

**Plain function version:** `UDS_SvcAuthenticationVCU_2020` on page 749.

### 3.7.119 `SvcAuthenticationVCU_2020(cantp_handle, uds_msgconfig, uds_msg, Byte, byte[], UInt16)`

Writes a UDS request according to the Authentication service's specifications (ISO-14229-1:2020) with the subfunction `verifyCertificateUnidirectional`, without challenge client parameter.

#### Syntax

##### Pascal OO

```
class function SvcAuthenticationVCU_2020(
  channel: cantp_handle;
  request_config: uds_msgconfig;
  var out_msg_request: uds_msg;
  communication_configuration: Byte;
  certificate_client: PByte;
  certificate_client_size: UInt16
): uds_status; overload;
```

##### C#

```
public static uds_status SvcAuthenticationVCU_2020(
  cantp_handle channel,
  uds_msgconfig request_config,
  out uds_msg out_msg_request,
  Byte communication_configuration,
  byte[] certificate_client,
  UInt16 certificate_client_size);
```

##### C++ / CLR

```
static uds_status SvcAuthenticationVCU_2020(
  cantp_handle channel,
  uds_msgconfig request_config,
  uds_msg %out_msg_request,
  Byte communication_configuration,
  array<Byte> ^certificate_client,
  UInt16 certificate_client_size);
```

##### Visual Basic

```
Public Shared Function SvcAuthenticationVCU_2020(
  ByVal channel As cantp_handle,
  ByVal request_config As uds_msgconfig,
  ByRef out_msg_request As uds_msg,
  ByVal communication_configuration As Byte,
  ByVal certificate_client As Byte(),
  ByVal certificate_client_size As UInt16) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).
communication_configuration	Configuration information about communication.
certificate_client	Buffer containing the certificate of the client.
certificate_client_size	Size in bytes of the certificate buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).


## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

The PCAN-UDS 2.x API provides `uds_svc_authentication_subfunction` (see on page 98) and `uds_svc_authentication_return_parameter` (see on page 99) enumerations to help user to decode Authentication service responses.

## Example

The following example shows the use of the service method `SvcAuthenticationVCU_2020(cantp_handle, uds_msgconfig, uds_msg, Byte, byte[], UInt16)` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
```

```

config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/verifyCertificateUnidirectional message
Byte communication_configuration = 0x00;
byte[] certificate_client = new byte[2] { 0x12, 0x34 };
UInt16 certificate_client_size = 2;
result = UDSApi.SvcAuthenticationVCU_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, communication_configuration, certificate_client, certificate_client_size);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

## C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/verifyCertificateUnidirectional message
Byte communication_configuration = 0x00;
array<Byte>^ certificate_client = { 0x12, 0x34 };
UInt16 certificate_client_size = 2;
result = UDSApi::SvcAuthenticationVCU_2020(cantp_handle::PCANTP_HANDLE_USBBUS1, config,
    request, communication_configuration, certificate_client, certificate_client_size);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(cantp_handle::PCANTP_HANDLE_USBBUS1, request,
        response, request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical Authentication/verifyCertificateUnidirectional message
Dim communication_configuration As Byte = &H0
Dim certificate_client As Byte() = {&H12, &H34}
Dim certificate_client_size As UInt16 = 2
result = UDSApi.SvcAuthenticationVCU_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
communication_configuration, certificate_client, certificate_client_size)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    communication_configuration: Byte;
    certificate_client: array [0 .. 1] of Byte;
    certificate_client_size: UInt16;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;

```

```

config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/verifyCertificateUnidirectional message
communication_configuration := $00;
certificate_client[0] := $12;
certificate_client[1] := $34;
certificate_client_size := 2;
result := TUDSApi.SvcAuthenticationVCU_2020
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    communication_configuration, PByte(@certificate_client),
    certificate_client_size);
if (TUDSApi.StatusIsOk_2013(result)) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
end;
if (TUDSApi.StatusIsOk_2013(result)) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function version:** [UDS\\_SvcAuthenticationVCU\\_2020](#) on page 749.

### 3.7.120 svcAuthenticationVCB\_2020

Writes a UDS request according to the Authentication service's specifications (ISO-14229-1:2020). The subfunction verifyCertificateBidirectional is implicit.

#### Syntax

##### Pascal OO

```

class function SvcAuthenticationVCB_2020(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    communication_configuration: Byte;
    certificate_client: PByte;
    certificate_client_size: UInt16;

```



```
challenge_client: PByte;
challenge_client_size: UInt16
): uds_status;
```

## C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcAuthenticationVCB_2020")]
public static extern uds_status SvcAuthenticationVCB_2020(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    Byte communication_configuration,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 5)]
    byte[] certificate_client,
    UInt16 certificate_client_size,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 7)]
    byte[] challenge_client,
    UInt16 challenge_client_size);
```

## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcAuthenticationVCB_2020")]
static uds_status SvcAuthenticationVCB_2020(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    Byte communication_configuration,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 5)]
    array<Byte> ^certificate_client,
    UInt16 certificate_client_size,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 7)]
    array<Byte> ^challenge_client,
    UInt16 challenge_client_size);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcAuthenticationVCB_2020")>
Public Shared Function SvcAuthenticationVCB_2020(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal communication_configuration As Byte,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=5)>
    ByVal certificate_client As Byte(),
    ByVal certificate_client_size As UInt16,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=7)>
    ByVal challenge_client As Byte(),
    ByVal challenge_client_size As UInt16) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
communication_configuration	Configuration information about communication.
certificate_client	Buffer containing the certificate of the client.



Parameter	Description
certificate_client_size	Size in bytes of the certificate buffer.
challenge_client	Buffer containing the challenge of the client.
challenge_client_size	Size in bytes of the challenge buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).


## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

The PCAN-UDS 2.x API provides `uds_svc_authentication_subfunction` (see on page 98) and `uds_svc_authentication_return_parameter` (see on page 99) enumerations to help user to decode Authentication service responses.

## Example

The following example shows the use of the service method `SvcAuthenticationVCB_2020` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x00;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/verifyCertificateBidirectional message
Byte communication_configuration = 0x00;

```

```

byte[] certificate_client = new byte[2] { 0x12, 0x34 };
UInt16 certificate_client_size = 2;
byte[] challenge_client = new byte[2] { 0x56, 0x78 };
UInt16 challenge_client_size = 2;
result = UDSApi.SvcAuthenticationVCB_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, communication_configuration, certificate_client, certificate_client_size,
    challenge_client, challenge_client_size);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

### C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/verifyCertificateBidirectional message
Byte communication_configuration = 0x00;
array<Byte>^ certificate_client = { 0x12, 0x34 };
UInt16 certificate_client_size = 2;
array<Byte>^ challenge_client = { 0x56, 0x78 };
UInt16 challenge_client_size = 2;
result = UDSApi::SvcAuthenticationVCB_2020(cantp_handle::PCANTP_HANDLE_USBBUS1, config,
    request, communication_configuration, certificate_client, certificate_client_size,
    challenge_client, challenge_client_size);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(cantp_handle::PCANTP_HANDLE_USBBUS1, request,
        response, request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical Authentication/verifyCertificateBidirectional message
Dim communication_configuration As Byte = &H0
Dim certificate_client As Byte() = {&H12, &H34}
Dim certificate_client_size As UInt16 = 2
Dim challenge_client As Byte() = {&H56, &H78}
Dim challenge_client_size As UInt16 = 2
result = UDSApi.SvcAuthenticationVCB_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    communication_configuration, certificate_client, certificate_client_size, challenge_client,
    challenge_client_size)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    communication_configuration: Byte;
    certificate_client: array [0 .. 1] of Byte;
    certificate_client_size: UInt16;
    challenge_client: array [0 .. 1] of Byte;
    challenge_client_size: UInt16;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration

```

```

FillChar(config, sizeof(config), 0);
config.can_id :=
    UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr := $0;
config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/verifyCertificateBidirectional message
communication_configuration := $00;
certificate_client[0] := $12;
certificate_client[1] := $34;
certificate_client_size := 2;
challenge_client[0] := $56;
challenge_client[1] := $78;
challenge_client_size := 2;
result := TUDSApi.SvcAuthenticationVCB_2020
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    communication_configuration, PByte(@certificate_client),
    certificate_client_size, PByte(@challenge_client), challenge_client_size);
if (TUDSApi.StatusIsOk_2013(result)) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    @request, response, @request_confirmation);
end;
if (TUDSApi.StatusIsOk_2013(result)) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK)
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```



**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function version:** [UDS\\_SvcAuthenticationVCB\\_2020](#) on page 752.

### 3.7.121 SvcAuthenticationPOWN\_2020

Writes a UDS request according to the Authentication service's specifications (ISO-14229-1:2020). The subfunction proofOfOwnership is implicit.

#### Overloads

	Method	Description
	SvcAuthenticationPOWN_2020(cantp_handle, uds_msgconfig, uds_msg, byte[], UInt16, byte[], UInt16)	Writes to the transmit queue a request for UDS service Authentication with proofOfOwnership subfunction (ISO-14229-1:2020).
	SvcAuthenticationPOWN_2020(cantp_handle, uds_msgconfig, uds_msg, byte[], UInt16)	Writes to the transmit queue a request for UDS service Authentication with proofOfOwnership subfunction, without ephemeral public key (ISO-14229-1:2020).

Plain function version: `UDS_SvcAuthenticationPOWN_2020` on page 754.

### 3.7.122 SvcAuthenticationPOWN\_2020(cantp\_handle, uds\_msgconfig, uds\_msg, byte[], UInt16, byte[], UInt16)

Writes a UDS request according to the Authentication service's specifications (ISO-14229-1:2020). The subfunction proofOfOwnership is implicit.

#### Syntax

##### Pascal OO

```
class function SvcAuthenticationPOWN_2020(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    proof_of_ownership_client: PByte;
    proof_of_ownership_client_size: UInt16;
    ephemeral_public_key_client: PByte;
    ephemeral_public_key_client_size: UInt16
): uds_status; overload;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcAuthenticationPOWN_2020")]
public static extern uds_status SvcAuthenticationPOWN_2020(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 4)]
    byte[] proof_of_ownership_client,
    UInt16 proof_of_ownership_client_size,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 6)]
    byte[] ephemeral_public_key_client,
    UInt16 ephemeral_public_key_client_size);
```

##### C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcAuthenticationPOWN_2020")]
static uds_status SvcAuthenticationPOWN_2020(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 4)]
    array<Byte> ^proof_of_ownership_client,
```

```

UInt16 proof_of_ownership_client_size,
[MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 6)]
array<Byte> ^ephemeral_public_key_client,
UInt16 ephemeral_public_key_client_size);

```

## Visual Basic

```

<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcAuthenticationPOWN_2020")>
Public Shared Function SvcAuthenticationPOWN_2020(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=4)>
    ByVal proof_of_ownership_client As Byte(),
    proof_of_ownership_client_size As UInt16,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=6)>
    ByVal ephemeral_public_key_client As Byte(),
    ephemeral_public_key_client_size As UInt16) As uds_status
End Function

```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).
proof_of_ownership_client	Buffer containing the proof of ownership of the client.
proof_of_ownership_client_size	Size in bytes of the proof of ownership buffer.
ephemeral_public_key_client	Buffer containing the ephemeral public key of the client.
ephemeral_public_key_client_size	Size in bytes of the ephemeral public key buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).


## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

The PCAN-UDS 2.x API provides `uds_svc_authentication_subfunction` (see on page 98) and `uds_svc_authentication_return_parameter` (see on page 99) enumerations to help user to decode Authentication service responses.

## Example

The following example shows the use of the service method `SvcAuthenticationPOWN_2020(cantp_handle, uds_msgconfig, uds_msg, byte[], UInt16, byte[], UInt16)` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/proofOfOwnership message
byte[] proof_of_ownership_client = new byte[2] { 0x12, 0x34 };
UInt16 proof_of_ownership_client_size = 2;
byte[] ephemeral_public_key_client = new byte[2] { 0x56, 0x78 };
UInt16 ephemeral_public_key_client_size = 2;
result = UDSApi.SvcAuthenticationPOWN_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, proof_of_ownership_client, proof_of_ownership_client_size,
    ephemeral_public_key_client, ephemeral_public_key_client_size);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

### C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
```



```

config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/proofOfOwnership message
array<Byte>^ proof_of_ownership_client = { 0x12, 0x34 };
UInt16 proof_of_ownership_client_size = 2;
array<Byte>^ ephemeral_public_key_client = { 0x56, 0x78 };
UInt16 ephemeral_public_key_client_size = 2;
result = UDSApi::SvcAuthenticationPOW_2020(cantp_handle::PCANTP_HANDLE_USBBUS1, config,
    request, proof_of_ownership_client, proof_of_ownership_client_size,
    ephemeral_public_key_client, ephemeral_public_key_client_size);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(cantp_handle::PCANTP_HANDLE_USBBUS1, request,
        response, request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical Authentication/proofOfOwnership message
Dim proof_of_ownership_client As Byte() = {&H12, &H34}
Dim proof_of_ownership_client_size As UInt16 = 2
Dim ephemeral_public_key_client As Byte() = {&H56, &H78}
Dim ephemeral_public_key_client_size As UInt16 = 2
result = UDSApi.SvcAuthenticationPOW_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    proof_of_ownership_client, proof_of_ownership_client_size, ephemeral_public_key_client,
    ephemeral_public_key_client_size)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")

```



End If

```
' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)
```

## Pascal OO

```
var
  result: uds_status;
  request: uds_msg;
  request_confirmation: uds_msg;
  response: uds_msg;
  config: uds_msgconfig;
  proof_of_ownership_client: array [0 .. 1] of Byte;
  proof_of_ownership_client_size: UInt16;
  ephemeral_public_key_client: array [0 .. 1] of Byte;
  ephemeral_public_key_client_size: UInt16;
begin
  FillChar(request, sizeof(request), 0);
  FillChar(request_confirmation, sizeof(request_confirmation), 0);
  FillChar(response, sizeof(response), 0);

  // Set request message configuration
  FillChar(config, sizeof(config), 0);
  config.can_id :=
    UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
  config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
  config.nai.extension_addr := $0;
  config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
  config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
  config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
  config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
  config.typem := uds_msgtype.PUDS_MSGTYPE_USDT;

  // Sends a physical Authentication/proofOfOwnership message
  proof_of_ownership_client[0] := $12;
  proof_of_ownership_client[1] := $34;
  proof_of_ownership_client_size := 2;
  ephemeral_public_key_client[0] := $56;
  ephemeral_public_key_client[1] := $78;
  ephemeral_public_key_client_size := 2;
  result := TUDSApi.SvcAuthenticationPOWN_2020
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
     PByte(@proof_of_ownership_client), proof_of_ownership_client_size,
     PByte(@ephemeral_public_key_client), ephemeral_public_key_client_size);
  if (TUDSApi.StatusIsOk_2013(result)) then
  begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
      @request, response, @request_confirmation);
  end;
  if (TUDSApi.StatusIsOk_2013(result)) then
  begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
  end
  else
  begin
```

```
// An error occurred
MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;
```

**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function version:** [UDS\\_SvcAuthenticationPOWN\\_2020](#) on page 754.

### 3.7.123 SvcAuthenticationPOWN\_2020(cantp\_handle, uds\_msgconfig, uds\_msg, byte[], UInt16)

Writes a UDS request according to the Authentication service's specifications (ISO-14229-1:2020) without the subfunction proofOfOwnership, without ephemeral public key.

#### Syntax

##### Pascal OO

```
class function SvcAuthenticationPOWN_2020(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    proof_of_ownership_client: PByte;
    proof_of_ownership_client_size: UInt16
): uds_status; overload;
```

##### C#

```
public static uds_status SvcAuthenticationPOWN_2020(
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    byte[] proof_of_ownership_client,
    UInt16 proof_of_ownership_client_size);
```

##### C++ / CLR

```
static uds_status SvcAuthenticationPOWN_2020(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    array<Byte> ^proof_of_ownership_client,
    UInt16 proof_of_ownership_client_size);
```

##### Visual Basic

```
Public Shared Function SvcAuthenticationPOWN_2020(
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal proof_of_ownership_client As Byte(),
    ByVal proof_of_ownership_client_size As UInt16) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>can_tp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).
proof_of_ownership_client	Buffer containing the proof of ownership of the client.
proof_of_ownership_client_size	Size in bytes of the proof of ownership buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).


## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

The PCAN-UDS 2.x API provides `uds_svc_authentication_subfunction` (see on page 98) and `uds_svc_authentication_return_parameter` (see on page 99) enumerations to help user to decode Authentication service responses.

## Example

The following example shows the use of the service method `SvcAuthenticationPOW_N_2020`(`can_tp_handle`, `uds_msgconfig`, `uds_msg`, `byte[]`, `UInt16`) on the channel `PCANTP_HANDLE_USBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = can_tp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
```

```

config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/proofOfOwnership message
byte[] proof_of_ownership_client = new byte[2] { 0x12, 0x34 };
UInt16 proof_of_ownership_client_size = 2;
result = UDSApi.SvcAuthenticationPOWN_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, proof_of_ownership_client, proof_of_ownership_client_size);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

### C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/proofOfOwnership message
array<Byte>^ proof_of_ownership_client = { 0x12, 0x34 };
UInt16 proof_of_ownership_client_size = 2;
result = UDSApi::SvcAuthenticationPOWN_2020(cantp_handle::PCANTP_HANDLE_USBBUS1, config,
    request, proof_of_ownership_client, proof_of_ownership_client_size);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(cantp_handle::PCANTP_HANDLE_USBBUS1, request,
        response, request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical Authentication/proofOfOwnership message
Dim proof_of_ownership_client As Byte() = {&H12, &H34}
Dim proof_of_ownership_client_size As UInt16 = 2
result = UDSApi.SvcAuthenticationPOWN_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    proof_of_ownership_client, proof_of_ownership_client_size)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    proof_of_ownership_client: array [0 .. 1] of Byte;
    proof_of_ownership_client_size: UInt16;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;

```

```

config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/proofOfOwnership message
proof_of_ownership_client[0] := $12;
proof_of_ownership_client[1] := $34;
proof_of_ownership_client_size := 2;
result := TUDSApi.SvcAuthenticationPOWN_2020
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    PByte(@proof_of_ownership_client), proof_of_ownership_client_size);
if (TUDSApi.StatusIsOk_2013(result)) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
end;
if (TUDSApi.StatusIsOk_2013(result)) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

See also: [WaitForService\\_2013](#) on page 248.

Plain function version: [UDS\\_SvcAuthenticationPOWN\\_2020](#) on page 754.

### 3.7.124 SvcAuthenticationRCFA\_2020

Writes a UDS request according to the Authentication service's specifications (ISO-14229-1:2020). The subfunction requestChallengeForAuthentication is implicit.

#### Syntax

##### Pascal OO

```

class function SvcAuthenticationRCFA_2020(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    communication_configuration: Byte;
    algorithm_indicator: PByte
): uds_status;

```

**C#**

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcAuthenticationRCFA_2020")]
public static extern uds_status SvcAuthenticationRCFA_2020(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    Byte communication_configuration,
    byte[] algorithm_indicator);
```

**C++ / CLR**

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcAuthenticationRCFA_2020")]
static uds_status SvcAuthenticationRCFA_2020(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    Byte communication_configuration,
    array<Byte> ^algorithm_indicator);
```

**Visual Basic**

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcAuthenticationRCFA_2020")>
Public Shared Function SvcAuthenticationRCFA_2020(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal communication_configuration As Byte,
    ByVal algorithm_indicator As Byte()) As uds_status
End Function
```

**Parameters**

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
communication_configuration	Configuration information about communication.
algorithm_indicator	Buffer of 16 bytes containing the algorithm indicator.

**Returns**

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is not valid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	The mapping given in the message configuration is unknown.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with Reset_2013 (see Reset_2013 on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see MsgFree_2013 on page 214).




## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see [MsgFree\\_2013](#) on page 214).

The PCAN-UDS 2.x API provides [uds\\_svc\\_authentication\\_subfunction](#) (see on page 98) and [uds\\_svc\\_authentication\\_return\\_parameter](#) (see on page 99) enumerations to help user to decode Authentication service responses.

## Example

The following example shows the use of the service method [SvcAuthenticationRCFA\\_2020](#) on the channel [PCANTP\\_HANDLE\\_USBBUS1](#). A UDS physical service request is transmitted, and the [WaitForService\\_2013](#) method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/requestChallengeForAuthentication message
Byte communication_configuration = 0x00;
byte[] algorithm_indicator = new byte[16] { 0x00, 0x01, 0x02, 0x03, 0x04, 0x05, 0x06, 0x07,
0x08, 0x09, 0x0A, 0x0B, 0x0C, 0x0D, 0x0E, 0x0F };
result = UDSApi.SvcAuthenticationRCFA_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, communication_configuration, algorithm_indicator);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

### C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
```



```

uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/requestChallengeForAuthentication message
Byte communication_configuration = 0x00;
array<Byte>^ algorithm_indicator = { 0x00, 0x01, 0x02, 0x03, 0x04, 0x05, 0x06, 0x07, 0x08,
    0x09, 0x0A, 0x0B, 0x0C, 0x0D, 0x0E, 0x0F };
result = UDSApi::SvcAuthenticationRCFA_2020(cantp_handle::PCANTP_HANDLE_USBBUS1, config,
    request, communication_configuration, algorithm_indicator);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(cantp_handle::PCANTP_HANDLE_USBBUS1, request,
        response, request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical Authentication/requestChallengeForAuthentication message
Dim communication_configuration As Byte = &H0
Dim algorithm_indicator As Byte() = {&H0, &H1, &H2, &H3, &H4, &H5, &H6, &H7, &H8, &H9, &HA,
    &HB, &HC, &HD, &HE, &HF}
result = UDSApi.SvcAuthenticationRCFA_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    communication_configuration, algorithm_indicator)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")

```

```

Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    communication_configuration: Byte;
    algorithm_indicator: array [0 .. 15] of Byte;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.typem := uds_msgtype.PUDS_MSGTYPE_USDT;

    // Sends a physical Authentication/requestChallengeForAuthentication message
    communication_configuration := $00;
    algorithm_indicator[0] := $00;
    algorithm_indicator[1] := $01;
    algorithm_indicator[2] := $02;
    algorithm_indicator[3] := $03;
    algorithm_indicator[4] := $04;
    algorithm_indicator[5] := $05;
    algorithm_indicator[6] := $06;
    algorithm_indicator[7] := $07;
    algorithm_indicator[8] := $08;
    algorithm_indicator[9] := $09;
    algorithm_indicator[10] := $0A;
    algorithm_indicator[11] := $0B;
    algorithm_indicator[12] := $0C;
    algorithm_indicator[13] := $0D;
    algorithm_indicator[14] := $0E;
    algorithm_indicator[15] := $0F;
    result := TUDSApi.SvcAuthenticationRCFA_2020
        (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
        communication_configuration, PByte(@algorithm_indicator));

```

```

if (TUDSApi.StatusIsOk_2013(result)) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
end;
if (TUDSApi.StatusIsOk_2013(result)) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```




**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function version:** [UDS\\_SvcAuthenticationRCFA\\_2020](#) on page 756.

### 3.7.125 SvcAuthenticationVPOWNU\_2020

Writes a UDS request according to the Authentication service's specifications (ISO-14229-1:2020). The subfunction `verifyProofOfOwnershipUnidirectional` is implicit.

#### Overloads

	Method	Description
	<code>SvcAuthenticationVPOWNU_2020(cantp_handle, uds_msgconfig, uds_msg, byte[], byte[], UInt16, byte[], UInt16, byte[], UInt16)</code>	Writes to the transmit queue a request for UDS service Authentication with <code>verifyProofOfOwnershipUnidirectional</code> subfunction (ISO-14229-1:2020).
	<code>SvcAuthenticationVPOWNU_2020(cantp_handle, uds_msgconfig, uds_msg, byte[], byte[], UInt16, byte[], UInt16)</code>	Writes to the transmit queue a request for UDS service Authentication with <code>verifyProofOfOwnershipUnidirectional</code> subfunction, without additional parameters (ISO-14229-1:2020).
	<code>SvcAuthenticationVPOWNU_2020(cantp_handle, uds_msgconfig, uds_msg, byte[], byte[], UInt16)</code>	Writes to the transmit queue a request for UDS service Authentication with <code>verifyProofOfOwnershipUnidirectional</code> subfunction, without additional parameters, without challenge client buffer (ISO-14229-1:2020).

**Plain function version:** [UDS\\_SvcAuthenticationVPOWNU\\_2020](#) on page 758.

### 3.7.126 SvcAuthenticationVPOWNU\_2020(cantp\_handle, uds\_msgconfig, uds\_msg, byte[], byte[], UInt16, byte[], UInt16, byte[], UInt16)

Writes a UDS request according to the Authentication service's specifications (ISO-14229-1:2020). The subfunction `verifyProofOfOwnershipUnidirectional` is implicit.

#### Syntax

##### Pascal OO

```

class function SvcAuthenticationVPOWNU_2020(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;

```

```

algorithm_indicator: PByte;
proof_of_ownership_client: PByte;
proof_of_ownership_client_size: UInt16;
challenge_client: PByte;
challenge_client_size: UInt16;
additional_parameter: PByte;
additional_parameter_size: UInt16
): uds_status; overload;

```

## C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcAuthenticationVPOWNU_2020")]
public static extern uds_status SvcAuthenticationVPOWNU_2020(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 4)]
    byte[] algorithm_indicator,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 5)]
    byte[] proof_of_ownership_client,
    UInt16 proof_of_ownership_client_size,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 7)]
    byte[] challenge_client,
    UInt16 challenge_client_size,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 9)]
    byte[] additional_parameter,
    UInt16 additional_parameter_size);

```

## C++ / CLR

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcAuthenticationVPOWNU_2020")]
static uds_status SvcAuthenticationVPOWNU_2020(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 4)]
    array<Byte> ^algorithm_indicator,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 5)]
    array<Byte> ^proof_of_ownership_client,
    UInt16 proof_of_ownership_client_size,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 7)]
    array<Byte> ^challenge_client,
    UInt16 challenge_client_size,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 9)]
    array<Byte> ^additional_parameter,
    UInt16 additional_parameter_size);

```

## Visual Basic

```

<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcAuthenticationVPOWNU_2020")>
Public Shared Function SvcAuthenticationVPOWNU_2020(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=4)>
    ByVal algorithm_indicator As Byte(),
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=5)>
    ByVal proof_of_ownership_client As Byte(),
    ByVal proof_of_ownership_client_size As UInt16,

```

```

<MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=7)>
ByVal challenge_client As Byte(),
ByVal challenge_client_size As UInt16,
<MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=9)>
ByVal additional_parameter As Byte(),
ByVal additional_parameter_size As UInt16) As uds_status
End Function

```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the method (see <code>uds_msg</code> on page 21).
algorithm_indicator	Buffer of 16 bytes containing the algorithm indicator
proof_of_ownership_client	Buffer containing the proof of ownership of the client.
proof_of_ownership_client_size	Size in bytes of the proof of ownership buffer.
challenge_client	Buffer containing the challenge of the client.
challenge_client_size	Size in bytes of the challenge buffer.
additional_parameter	Buffer containing additional parameters.
additional_parameter_size	Size in bytes of the additional parameter buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).


## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

The PCAN-UDS 2.x API provides `uds_svc_authentication_subfunction` (see on page 98) and `uds_svc_authentication_return_parameter` (see on page 99) enumerations to help user to decode Authentication service responses.

## Example

The following example shows the use of the service method `SvcAuthenticationVPOWNU_2020(cantp_handle, uds_msgconfig, uds_msg, byte[], byte[], UInt16, byte[], UInt16, byte[], UInt16)` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

**C#**

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/verifyProofOfOwnershipUnidirectional message
byte[] algorithm_indicator = new byte[16] { 0x00, 0x01, 0x02, 0x03, 0x04, 0x05, 0x06, 0x07,
    0x08, 0x09, 0x0A, 0x0B, 0x0C, 0x0D, 0x0E, 0x0F };
byte[] proof_of_ownership_client = new byte[2] { 0x12, 0x34 };
UInt16 proof_of_ownership_client_size = 2;
byte[] challenge_client = new byte[2] { 0x56, 0x78 };
UInt16 challenge_client_size = 2;
byte[] additional_parameter = new byte[2] { 0x9A, 0xBC };
UInt16 additional_parameter_size = 2;
result = UDSApi.SvcAuthenticationVPOWNU_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, algorithm_indicator, proof_of_ownership_client, proof_of_ownership_client_size,
    challenge_client, challenge_client_size, additional_parameter, additional_parameter_size);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

**C++/CLR**

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

```

```
// Sends a physical Authentication/verifyProofOfOwnershipUnidirectional message
array<Byte>^ algorithm_indicator = { 0x00, 0x01, 0x02, 0x03, 0x04, 0x05, 0x06, 0x07, 0x08,
    0x09, 0x0A, 0x0B, 0x0C, 0x0D, 0x0E, 0x0F };
array<Byte>^ proof_of_ownership_client = { 0x12, 0x34 };
UInt16 proof_of_ownership_client_size = 2;
array<Byte>^ challenge_client = { 0x56, 0x78 };
UInt16 challenge_client_size = 2;
array<Byte>^ additional_parameter = { 0x9A, 0xBC };
UInt16 additional_parameter_size = 2;
result = UDSApi::SvcAuthenticationVPOWNU_2020(cantp_handle::PCANTP_HANDLE_USBBUS1, config,
    request, algorithm_indicator, proof_of_ownership_client, proof_of_ownership_client_size,
    challenge_client, challenge_client_size, additional_parameter,
    additional_parameter_size);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(cantp_handle::PCANTP_HANDLE_USBBUS1, request,
        response, request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);
```

## Visual Basic

```
Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical Authentication/verifyProofOfOwnershipUnidirectional message
Dim algorithm_indicator As Byte() = {&H0, &H1, &H2, &H3, &H4, &H5, &H6, &H7, &H8, &H9, &HA,
    &HB, &HC, &HD, &HE, &HF}
Dim proof_of_ownership_client As Byte() = {&H12, &H34}
Dim proof_of_ownership_client_size As UInt16 = 2
Dim challenge_client As Byte() = {&H56, &H78}
Dim challenge_client_size As UInt16 = 2
Dim additional_parameter As Byte() = {&H9A, &HBC}
Dim additional_parameter_size As UInt16 = 2
result = UDSApi.SvcAuthenticationVPOWNU_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, algorithm_indicator, proof_of_ownership_client, proof_of_ownership_client_size,
    challenge_client, challenge_client_size, additional_parameter, additional_parameter_size)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
```



```

    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    algorithm_indicator: array [0 .. 15] of Byte;
    proof_of_ownership_client: array [0 .. 1] of Byte;
    proof_of_ownership_client_size: UInt16;
    challenge_client: array [0 .. 1] of Byte;
    challenge_client_size: UInt16;
    additional_parameter: array [0 .. 1] of Byte;
    additional_parameter_size: UInt16;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=
        cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
    config.type := uds_msgtype.PUDS_MSGTYPE_USDT;

    // Sends a physical Authentication/verifyProofOfOwnershipUnidirectional message
    algorithm_indicator[0] := $00;
    algorithm_indicator[1] := $01;
    algorithm_indicator[2] := $02;
    algorithm_indicator[3] := $03;
    algorithm_indicator[4] := $04;
    algorithm_indicator[5] := $05;
    algorithm_indicator[6] := $06;
    algorithm_indicator[7] := $07;
    algorithm_indicator[8] := $08;
    algorithm_indicator[9] := $09;
    algorithm_indicator[10] := $0A;
    algorithm_indicator[11] := $0B;
    algorithm_indicator[12] := $0C;
    algorithm_indicator[13] := $0D;

```



```

algorithm_indicator[14] := $0E;
algorithm_indicator[15] := $0F;
proof_of_ownership_client[0] := $12;
proof_of_ownership_client[1] := $34;
proof_of_ownership_client_size := 2;
challenge_client[0] := $56;
challenge_client[1] := $78;
challenge_client_size := 2;
additional_parameter[0] := $9A;
additional_parameter[1] := $BC;
additional_parameter_size := 2;
result := TUDSApi.SvcAuthenticationVPOWNU_2020
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    PByte(@algorithm_indicator), PByte(@proof_of_ownership_client),
    proof_of_ownership_client_size, PByte(@challenge_client),
    challenge_client_size, PByte(@additional_parameter),
    additional_parameter_size);
if (TUDSApi.StatusIsOk_2013(result)) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
end;
if (TUDSApi.StatusIsOk_2013(result)) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

See also: `WaitForService_2013` on page 248.

Plain function version: `UDS_SvcAuthenticationVPOWNU_2020` on page 758.

### 3.7.127 `SvcAuthenticationVPOWNU_2020(cantp_handle, uds_msgconfig, uds_msg, byte[], byte[], UInt16, byte[], UInt16)`

Writes a UDS request according to the Authentication service's specifications with `verifyProofOfOwnershipUnidirectional` subfunction, without additional parameters (ISO-14229-1:2020).

#### Syntax

##### Pascal OO

```

class function SvcAuthenticationVPOWNU_2020(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    algorithm_indicator: PByte;
    proof_of_ownership_client: PByte;
    proof_of_ownership_client_size: UInt16;
    challenge_client: PByte;
    challenge_client_size: UInt16
): uds_status; overload;

```

**C#**

```
public static uds_status SvcAuthenticationVPOWNU_2020(
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    byte[] algorithm_indicator,
    byte[] proof_of_ownership_client,
    UInt16 proof_of_ownership_client_size,
    byte[] challenge_client,
    UInt16 challenge_client_size);
```

**C++ / CLR**

```
static uds_status SvcAuthenticationVPOWNU_2020(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    array<Byte> ^algorithm_indicator,
    array<Byte> ^proof_of_ownership_client,
    UInt16 proof_of_ownership_client_size,
    array<Byte> ^challenge_client,
    UInt16 challenge_client_size);
```

**Visual Basic**

```
Public Shared Function SvcAuthenticationVPOWNU_2020(
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal algorithm_indicator As Byte(),
    ByVal proof_of_ownership_client As Byte(),
    ByVal proof_of_ownership_client_size As UInt16,
    ByVal challenge_client As Byte(),
    ByVal challenge_client_size As UInt16) As uds_status
End Function
```

**Parameters**

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
algorithm_indicator	Buffer of 16 bytes containing the algorithm indicator
proof_of_ownership_client	Buffer containing the proof of ownership of the client.
proof_of_ownership_client_size	Size in bytes of the proof of ownership buffer.
challenge_client	Buffer containing the challenge of the client.
challenge_client_size	Size in bytes of the challenge buffer.

**Returns**

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is not valid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	The mapping given in the message configuration is unknown.

PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

The PCAN-UDS 2.x API provides `uds_svc_authentication_subfunction` (see on page 98) and `uds_svc_authentication_return_parameter` (see on page 99) enumerations to help user to decode Authentication service responses.

## Example

The following example shows the use of the service method `SvcAuthenticationVPOWNU_2020(cantp_handle, uds_msgconfig, uds_msg, byte[], byte[], UInt16, byte[], UInt16)` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized.

### C#

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/verifyProofOfOwnershipUnidirectional message
byte[] algorithm_indicator = new byte[16] { 0x00, 0x01, 0x02, 0x03, 0x04, 0x05, 0x06, 0x07,
    0x08, 0x09, 0x0A, 0x0B, 0x0C, 0x0D, 0x0E, 0x0F };
byte[] proof_of_ownership_client = new byte[2] { 0x12, 0x34 };
UInt16 proof_of_ownership_client_size = 2;
byte[] challenge_client = new byte[2] { 0x56, 0x78 };
UInt16 challenge_client_size = 2;
result = UDSApi.SvcAuthenticationVPOWNU_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, algorithm_indicator, proof_of_ownership_client, proof_of_ownership_client_size,
    challenge_client, challenge_client_size);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else

```

```
// An error occurred
MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

## C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/verifyProofOfOwnershipUnidirectional message
array<Byte>^ algorithm_indicator = { 0x00, 0x01, 0x02, 0x03, 0x04, 0x05, 0x06, 0x07, 0x08,
    0x09, 0x0A, 0x0B, 0x0C, 0x0D, 0x0E, 0x0F };
array<Byte>^ proof_of_ownership_client = { 0x12, 0x34 };
UInt16 proof_of_ownership_client_size = 2;
array<Byte>^ challenge_client = { 0x56, 0x78 };
UInt16 challenge_client_size = 2;
result = UDSApi::SvcAuthenticationVPOWNU_2020(cantp_handle::PCANTP_HANDLE_USBBUS1, config,
    request, algorithm_indicator, proof_of_ownership_client, proof_of_ownership_client_size,
    challenge_client, challenge_client_size);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(cantp_handle::PCANTP_HANDLE_USBBUS1, request,
        response, request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);
```

## Visual Basic

```
Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
```

```

config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical Authentication/verifyProofOfOwnershipUnidirectional message
Dim algorithm_indicator As Byte() = {&H0, &H1, &H2, &H3, &H4, &H5, &H6, &H7, &H8, &H9, &HA,
    &HB, &HC, &HD, &HE, &HF}
Dim proof_of_ownership_client As Byte() = {&H12, &H34}
Dim proof_of_ownership_client_size As UInt16 = 2
Dim challenge_client As Byte() = {&H56, &H78}
Dim challenge_client_size As UInt16 = 2
result = UDSApi.SvcAuthenticationVPOWNU_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, algorithm_indicator, proof_of_ownership_client, proof_of_ownership_client_size,
    challenge_client, challenge_client_size)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;

    algorithm_indicator: array [0 .. 15] of Byte;
    proof_of_ownership_client: array [0 .. 1] of Byte;
    proof_of_ownership_client_size: UInt16;
    challenge_client: array [0 .. 1] of Byte;
    challenge_client_size: UInt16;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=

```

```

    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/verifyProofOfOwnershipUnidirectional message
algorithm_indicator[0] := $00;
algorithm_indicator[1] := $01;
algorithm_indicator[2] := $02;
algorithm_indicator[3] := $03;
algorithm_indicator[4] := $04;
algorithm_indicator[5] := $05;
algorithm_indicator[6] := $06;
algorithm_indicator[7] := $07;
algorithm_indicator[8] := $08;
algorithm_indicator[9] := $09;
algorithm_indicator[10] := $0A;
algorithm_indicator[11] := $0B;
algorithm_indicator[12] := $0C;
algorithm_indicator[13] := $0D;
algorithm_indicator[14] := $0E;
algorithm_indicator[15] := $0F;
proof_of_ownership_client[0] := $12;
proof_of_ownership_client[1] := $34;
proof_of_ownership_client_size := 2;
challenge_client[0] := $56;
challenge_client[1] := $78;
challenge_client_size := 2;
result := TUDSApi.SvcAuthenticationVPOWNU_2020
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    PByte(@algorithm_indicator), PByte(@proof_of_ownership_client),
    proof_of_ownership_client_size, PByte(@challenge_client),
    challenge_client_size);
if (TUDSApi.StatusIsOk_2013(result)) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
end;
if (TUDSApi.StatusIsOk_2013(result)) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function version:** [UDS\\_SvcAuthenticationVPOWNU\\_2020](#) on page 758.

### 3.7.128 SvcAuthenticationVPOWNU\_2020(cantp\_handle, uds\_msgconfig, uds\_msg, byte[], byte[], UInt16)

Writes a UDS request according to the Authentication service's specifications with verifyProofOfOwnershipUnidirectional subfunction, without additional parameters, without challenge client buffer (ISO-14229-1:2020).

#### Syntax

##### Pascal OO

```
class function SvcAuthenticationVPOWNU_2020(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    algorithm_indicator: PByte;
    proof_of_ownership_client: PByte;
    proof_of_ownership_client_size: UInt16
): uds_status; overload;
```

##### C#

```
public static uds_status SvcAuthenticationVPOWNU_2020(
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    byte[] algorithm_indicator,
    byte[] proof_of_ownership_client,
    UInt16 proof_of_ownership_client_size)
```

##### C++ / CLR

```
static uds_status SvcAuthenticationVPOWNU_2020(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    array<Byte> ^algorithm_indicator,
    array<Byte> ^proof_of_ownership_client,
    UInt16 proof_of_ownership_client_size);
```

##### Visual Basic

```
Public Shared Function SvcAuthenticationVPOWNU_2020(
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal algorithm_indicator As Byte(),
    ByVal proof_of_ownership_client As Byte(),
    ByVal proof_of_ownership_client_size As UInt16) As uds_status
End Function
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
algorithm_indicator	Buffer of 16 bytes containing the algorithm indicator
proof_of_ownership_client	Buffer containing the proof of ownership of the client.
proof_of_ownership_client_size	Size in bytes of the proof of ownership buffer.



## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

The PCAN-UDS 2.x API provides `uds_svc_authentication_subfunction` (see on page 98) and `uds_svc_authentication_return_parameter` (see on page 99) enumerations to help user to decode Authentication service responses.

## Example

The following example shows the use of the service method `SvcAuthenticationVPOWNU_2020(cantp_handle, uds_msgconfig, uds_msg, byte[], byte[], UInt16)` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized.

**C#**

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/verifyProofOfOwnershipUnidirectional message
byte[] algorithm_indicator = new byte[16] { 0x00, 0x01, 0x02, 0x03, 0x04, 0x05, 0x06, 0x07,
    0x08, 0x09, 0x0A, 0x0B, 0x0C, 0x0D, 0x0E, 0x0F };
byte[] proof_of_ownership_client = new byte[2] { 0x12, 0x34 };
UInt16 proof_of_ownership_client_size = 2;
result = UDSApi.SvcAuthenticationVPOWNU_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, algorithm_indicator, proof_of_ownership_client, proof_of_ownership_client_size);
```



```

if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

## C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDDS_MSGTYPE_USDT;

// Sends a physical Authentication/verifyProofOfOwnershipUnidirectional message
array<Byte>^ algorithm_indicator = { 0x00, 0x01, 0x02, 0x03, 0x04, 0x05, 0x06, 0x07, 0x08,
    0x09, 0x0A, 0x0B, 0x0C, 0x0D, 0x0E, 0x0F };
array<Byte>^ proof_of_ownership_client = { 0x12, 0x34 };
UInt16 proof_of_ownership_client_size = 2;
result = UDSApi::SvcAuthenticationVPOWNU_2020(cantp_handle::PCANTP_HANDLE_USBBUS1, config,
    request, algorithm_indicator, proof_of_ownership_client,
    proof_of_ownership_client_size);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(cantp_handle::PCANTP_HANDLE_USBBUS1, request,
        response, request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

```

```

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical Authentication/verifyProofOfOwnershipUnidirectional message
Dim algorithm_indicator As Byte() = {&H0, &H1, &H2, &H3, &H4, &H5, &H6, &H7, &H8, &H9, &HA,
    &HB, &HC, &HD, &HE, &HF}
Dim proof_of_ownership_client As Byte() = {&H12, &H34}
Dim proof_of_ownership_client_size As UInt16 = 2
result = UDSApi.SvcAuthenticationVPOWNU_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, algorithm_indicator, proof_of_ownership_client, proof_of_ownership_client_size)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    algorithm_indicator: array [0 .. 15] of Byte;
    proof_of_ownership_client: array [0 .. 1] of Byte;
    proof_of_ownership_client_size: UInt16;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
    config.nai.extension_addr := $0;
    config.nai.protocol :=
        uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
    config.nai.source_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
    config.nai.target_addr :=
        UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
    config.nai.target_type :=

```

```

cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/verifyProofOfOwnershipUnidirectional message
algorithm_indicator[0] := $00;
algorithm_indicator[1] := $01;
algorithm_indicator[2] := $02;
algorithm_indicator[3] := $03;
algorithm_indicator[4] := $04;
algorithm_indicator[5] := $05;
algorithm_indicator[6] := $06;
algorithm_indicator[7] := $07;
algorithm_indicator[8] := $08;
algorithm_indicator[9] := $09;
algorithm_indicator[10] := $0A;
algorithm_indicator[11] := $0B;
algorithm_indicator[12] := $0C;
algorithm_indicator[13] := $0D;
algorithm_indicator[14] := $0E;
algorithm_indicator[15] := $0F;
proof_of_ownership_client[0] := $12;
proof_of_ownership_client[1] := $34;
proof_of_ownership_client_size := 2;
result := TUDSApi.SvcAuthenticationVPOWNU_2020
  (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
   PByte(@algorithm_indicator), PByte(@proof_of_ownership_client),
   proof_of_ownership_client_size);
if (TUDSApi.StatusIsOk_2013(result)) then
begin
  result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
    @request, response, @request_confirmation);
end;
if (TUDSApi.StatusIsOk_2013(result)) then
begin
  MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
  // An error occurred
  MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```



**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function version:** [UDS\\_SvcAuthenticationVPOWNU\\_2020](#) on page 758.

### 3.7.129 SvcAuthenticationVPOWNB\_2020

Writes a UDS request according to the Authentication service's specifications (ISO-14229-1:2020). The subfunction verifyProofOfOwnershipBidirectional is implicit.

#### Overloads

	Method	Description
	SvcAuthenticationVPOWNB_2020(cantp_handle, uds_msgconfig, uds_msg, byte[], byte[], UInt16, byte[], UInt16, byte[], UInt16)	Writes to the transmit queue a request for UDS service Authentication with verifyProofOfOwnershipBidirectional subfunction (ISO-14229-1:2020).
	SvcAuthenticationVPOWNB_2020(cantp_handle, uds_msgconfig, uds_msg, byte[], byte[], UInt16, byte[], UInt16)	Writes to the transmit queue a request for UDS service Authentication with verifyProofOfOwnershipBidirectional subfunction, without additional parameters (ISO-14229-1:2020).

Plain function version: `UDS_SvcAuthenticationVPOWNB_2020` on page 760.

### 3.7.130 SvcAuthenticationVPOWNB\_2020(cantp\_handle, uds\_msgconfig, uds\_msg, byte[], byte[], UInt16, byte[], UInt16, byte[], UInt16)

Writes a UDS request according to the Authentication service's specifications (ISO-14229-1:2020). The subfunction verifyProofOfOwnershipBidirectional is implicit.

#### Syntax

##### Pascal OO

```
class function SvcAuthenticationVPOWNB_2020(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    algorithm_indicator: PByte;
    proof_of_ownership_client: PByte;
    proof_of_ownership_client_size: UInt16;
    challenge_client: PByte;
    challenge_client_size: UInt16;
    additional_parameter: PByte;
    additional_parameter_size: UInt16
): uds_status; overload;
```

##### C#

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcAuthenticationVPOWNB_2020")]
public static extern uds_status SvcAuthenticationVPOWNB_2020(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 4)]
    byte[] algorithm_indicator,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 5)]
    byte[] proof_of_ownership_client,
    UInt16 proof_of_ownership_client_size,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 7)]
    byte[] challenge_client,
    UInt16 challenge_client_size,
    [MarshalAs(UnmanagedType.LPArray, SizeParamIndex = 9)]
    byte[] additional_parameter,
    UInt16 additional_parameter_size);
```

## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcAuthenticationVPOWNB_2020")]
static uds_status SvcAuthenticationVPOWNB_2020(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 4)]
    array<Byte> ^algorithm_indicator,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 5)]
    array<Byte> ^proof_of_ownership_client,
    UInt16 proof_of_ownership_client_size,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 7)]
    array<Byte> ^challenge_client,
    UInt16 challenge_client_size,
    [MarshalAs(UnmanagedType::LPArray, SizeParamIndex = 9)]
    array<Byte> ^additional_parameter,
    UInt16 additional_parameter_size);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcAuthenticationVPOWNB_2020")>
Public Shared Function SvcAuthenticationVPOWNB_2020(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=4)>
    ByVal algorithm_indicator As Byte(),
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=5)>
    ByVal proof_of_ownership_client As Byte(),
    ByVal proof_of_ownership_client_size As UInt16,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=7)>
    ByVal challenge_client As Byte(),
    ByVal challenge_client_size As UInt16,
    <MarshalAs(UnmanagedType.LPArray, SizeParamIndex:=9)>
    ByVal additional_parameter As Byte(),
    ByVal additional_parameter_size As UInt16) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
algorithm_indicator	Buffer of 16 bytes containing the algorithm indicator.
proof_of_ownership_client	Buffer containing the proof of ownership of the client.
proof_of_ownership_client_size	Size in bytes of the proof of ownership buffer.
challenge_client	Buffer containing the challenge of the client.
challenge_client_size	Size in bytes of the challenge buffer.
additional_parameter	Buffer containing additional parameters.
additional_parameter	Size in bytes of the additional parameter buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

The PCAN-UDS 2.x API provides `uds_svc_authentication_subfunction` (see on page 98) and `uds_svc_authentication_return_parameter` (see on page 99) enumerations to help user to decode Authentication service responses.

## Example

The following example shows the use of the service method `SvcAuthenticationVPOWNB_2020(cantp_handle, uds_msgconfig, uds_msg, byte[], byte[], UInt16, byte[], UInt16, byte[], UInt16)` on the channel `PCANTP_HANDLE_USBUSB1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized.

### C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/verifyProofOfOwnershipBidirectional message
byte[] algorithm_indicator = new byte[16] { 0x00, 0x01, 0x02, 0x03, 0x04, 0x05, 0x06, 0x07,
    0x08, 0x09, 0x0A, 0x0B, 0x0C, 0x0D, 0x0E, 0x0F };
byte[] proof_of_ownership_client = new byte[2] { 0x12, 0x34 };
UInt16 proof_of_ownership_client_size = 2;
byte[] challenge_client = new byte[2] { 0x56, 0x78 };
UInt16 challenge_client_size = 2;
```

```

byte[] additional_parameter = new byte[2] { 0x9A, 0xBC };
UInt16 additional_parameter_size = 2;
result = UDSApi.SvcAuthenticationVPOWNB_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, algorithm_indicator, proof_of_ownership_client, proof_of_ownership_client_size,
    challenge_client, challenge_client_size, additional_parameter, additional_parameter_size);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

### C++/CLR

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/verifyProofOfOwnershipBidirectional message
array<Byte>^ algorithm_indicator = { 0x00, 0x01, 0x02, 0x03, 0x04, 0x05, 0x06, 0x07, 0x08,
    0x09, 0x0A, 0x0B, 0x0C, 0x0D, 0x0E, 0x0F };
array<Byte>^ proof_of_ownership_client = { 0x12, 0x34 };
UInt16 proof_of_ownership_client_size = 2;
array<Byte>^ challenge_client = { 0x56, 0x78 };
UInt16 challenge_client_size = 2;
array<Byte>^ additional_parameter = { 0x9A, 0xBC };
UInt16 additional_parameter_size = 2;
result = UDSApi::SvcAuthenticationVPOWNB_2020(cantp_handle::PCANTP_HANDLE_USBBUS1, config,
    request, algorithm_indicator, proof_of_ownership_client, proof_of_ownership_client_size,
    challenge_client, challenge_client_size, additional_parameter,
    additional_parameter_size);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(cantp_handle::PCANTP_HANDLE_USBBUS1, request,
        response, request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures

```



```
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);
```

## Visual Basic

```
Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical Authentication/verifyProofOfOwnershipBidirectional message
Dim algorithm_indicator As Byte() = {&H0, &H1, &H2, &H3, &H4, &H5, &H6, &H7, &H8, &H9, &HA,
    &HB, &HC, &HD, &HE, &HF}
Dim proof_of_ownership_client As Byte() = {&H12, &H34}
Dim proof_of_ownership_client_size As UInt16 = 2
Dim challenge_client As Byte() = {&H56, &H78}
Dim challenge_client_size As UInt16 = 2
Dim additional_parameter As Byte() = {&H9A, &HBC}
Dim additional_parameter_size As UInt16 = 2
result = UDSApi.SvcAuthenticationVPOWNB_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, algorithm_indicator, proof_of_ownership_client, proof_of_ownership_client_size,
    challenge_client, challenge_client_size, additional_parameter, additional_parameter_size)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)
```

## Pascal OO

```
var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
    algorithm_indicator: array [0 .. 15] of Byte;
    proof_of_ownership_client: array [0 .. 1] of Byte;
    proof_of_ownership_client_size: UInt16;
    challenge_client: array [0 .. 1] of Byte;
```



```

challenge_client_size: UInt16;
additional_parameter: array [0 .. 1] of Byte;
additional_parameter_size: UInt16;
begin
  FillChar(request, sizeof(request), 0);
  FillChar(request_confirmation, sizeof(request_confirmation), 0);
  FillChar(response, sizeof(response), 0);

  // Set request message configuration
  FillChar(config, sizeof(config), 0);
  config.can_id :=
    UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
  config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
  config.nai.extension_addr := $0;
  config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
  config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
  config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
  config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
  config.typem := uds_msgtype.PUDS_MSGTYPE_USDT;

  // Sends a physical Authentication/verifyProofOfOwnershipBidirectional message
  algorithm_indicator[0] := $00;
  algorithm_indicator[1] := $01;
  algorithm_indicator[2] := $02;
  algorithm_indicator[3] := $03;
  algorithm_indicator[4] := $04;
  algorithm_indicator[5] := $05;
  algorithm_indicator[6] := $06;
  algorithm_indicator[7] := $07;
  algorithm_indicator[8] := $08;
  algorithm_indicator[9] := $09;
  algorithm_indicator[10] := $0A;
  algorithm_indicator[11] := $0B;
  algorithm_indicator[12] := $0C;
  algorithm_indicator[13] := $0D;
  algorithm_indicator[14] := $0E;
  algorithm_indicator[15] := $0F;
  proof_of_ownership_client[0] := $12;
  proof_of_ownership_client[1] := $34;
  proof_of_ownership_client_size := 2;
  challenge_client[0] := $56;
  challenge_client[1] := $78;
  challenge_client_size := 2;
  additional_parameter[0] := $9A;
  additional_parameter[1] := $BC;
  additional_parameter_size := 2;
  result := TUDSApi.SvcAuthenticationVPOWNB_2020
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
     PByte(@algorithm_indicator), PByte(@proof_of_ownership_client),
     proof_of_ownership_client_size, PByte(@challenge_client),
     challenge_client_size, PByte(@additional_parameter),
     additional_parameter_size);
  if (TUDSApi.StatusIsOk_2013(result)) then
  begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
      @request, response, @request_confirmation);
  end;
  if (TUDSApi.StatusIsOk_2013(result)) then

```

```

begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function version:** [UDS\\_SvcAuthenticationVPOWNB\\_2020](#) on page 760.

### 3.7.131 SvcAuthenticationVPOWNB\_2020(cantp\_handle, uds\_msgconfig, uds\_msg, byte[], byte[], UInt16, byte[], UInt16)

Writes a UDS request according to the Authentication service's specifications with the subfunction verifyProofOfOwnershipBidirectional, without additional parameters (ISO-14229-1:2020).

#### Syntax

##### Pascal OO

```

class function SvcAuthenticationVPOWNB_2020(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg;
    algorithm_indicator: PByte;
    proof_of_ownership_client: PByte;
    proof_of_ownership_client_size: UInt16;
    challenge_client: PByte;
    challenge_client_size: UInt16
): uds_status; overload;

```

##### C#

```

public static uds_status SvcAuthenticationVPOWNB_2020(
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request,
    byte[] algorithm_indicator,
    byte[] proof_of_ownership_client,
    UInt16 proof_of_ownership_client_size,
    byte[] challenge_client,
    UInt16 challenge_client_size);

```

##### C++ / CLR

```

static uds_status SvcAuthenticationVPOWNB_2020(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request,
    array<Byte> ^algorithm_indicator,
    array<Byte> ^proof_of_ownership_client,

```

```
UInt16 proof_of_ownership_client_size,
array<Byte> ^challenge_client,
UInt16 challenge_client_size);
```

## Visual Basic

```
Public Shared Function SvcAuthenticationVPOWNB_2020(
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg,
    ByVal algorithm_indicator As Byte(),
    ByVal proof_of_ownership_client As Byte(),
    ByVal proof_of_ownership_client_size As UInt16,
    ByVal challenge_client As Byte(),
    ByVal challenge_client_size As UInt16) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).
algorithm_indicator	Buffer of 16 bytes containing the algorithm indicator.
proof_of_ownership_client	Buffer containing the proof of ownership of the client.
proof_of_ownership_client_size	Size in bytes of the proof of ownership buffer.
challenge_client	Buffer containing the challenge of the client.
challenge_client_size	Size in bytes of the challenge buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is not valid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	The mapping given in the message configuration is unknown.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with Reset_2013 (see Reset_2013 on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see MsgFree_2013 on page 214).

## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

The PCAN-UDS 2.x API provides `uds_svc_authentication_subfunction` (see on page 98) and `uds_svc_authentication_return_parameter` (see on page 99) enumerations to help user to decode Authentication service responses.

## Example

The following example shows the use of the service method `SvcAuthenticationVPOWNB_2020(cantp_handle, uds_msgconfig, uds_msg, byte[], byte[], UInt16, byte[], UInt16)` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical

service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized.

## C#

```
uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/verifyProofOfOwnershipBidirectional message
byte[] algorithm_indicator = new byte[16] { 0x00, 0x01, 0x02, 0x03, 0x04, 0x05, 0x06, 0x07,
    0x08, 0x09, 0x0A, 0x0B, 0x0C, 0x0D, 0x0E, 0x0F };
byte[] proof_of_ownership_client = new byte[2] { 0x12, 0x34 };
UInt16 proof_of_ownership_client_size = 2;
byte[] challenge_client = new byte[2] { 0x56, 0x78 };
UInt16 challenge_client_size = 2;
result = UDSApi.SvcAuthenticationVPOWNB_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request, algorithm_indicator, proof_of_ownership_client, proof_of_ownership_client_size,
    challenge_client, challenge_client_size);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);
```

## C++/CLR

```
uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
```

```

config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/verifyProofOfOwnershipBidirectional message
array<Byte>^ algorithm_indicator = { 0x00, 0x01, 0x02, 0x03, 0x04, 0x05, 0x06, 0x07, 0x08,
    0x09, 0x0A, 0x0B, 0x0C, 0x0D, 0x0E, 0x0F };
array<Byte>^ proof_of_ownership_client = { 0x12, 0x34 };
UInt16 proof_of_ownership_client_size = 2;
array<Byte>^ challenge_client = { 0x56, 0x78 };
UInt16 challenge_client_size = 2;
result = UDSApi::SvcAuthenticationVPOWNB_2020(cantp_handle::PCANTP_HANDLE_USBBUS1, config,
    request, algorithm_indicator, proof_of_ownership_client, proof_of_ownership_client_size,
    challenge_client, challenge_client_size);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(cantp_handle::PCANTP_HANDLE_USBBUS1, request,
        response, request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else
    // An error occurred
    MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);

```

## Visual Basic

```

Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical Authentication/verifyProofOfOwnershipBidirectional message
Dim algorithm_indicator As Byte() = {&H0, &H1, &H2, &H3, &H4, &H5, &H6, &H7, &H8, &H9, &HA,
    &HB, &HC, &HD, &HE, &HF}
Dim proof_of_ownership_client As Byte() = {&H12, &H34}
Dim proof_of_ownership_client_size As UInt16 = 2
Dim challenge_client As Byte() = {&H56, &H78}
Dim challenge_client_size As UInt16 = 2
result = UDSApi.SvcAuthenticationVPOWNB_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config,
    request, algorithm_indicator, proof_of_ownership_client, proof_of_ownership_client_size,
    challenge_client, challenge_client_size)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else

```

```

    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)

```

## Pascal OO

```

var
  result: uds_status;
  request: uds_msg;
  request_confirmation: uds_msg;
  response: uds_msg;
  config: uds_msgconfig;
  algorithm_indicator: array [0 .. 15] of Byte;
  proof_of_ownership_client: array [0 .. 1] of Byte;
  proof_of_ownership_client_size: UInt16;
  challenge_client: array [0 .. 1] of Byte;
  challenge_client_size: UInt16;
begin
  FillChar(request, sizeof(request), 0);
  FillChar(request_confirmation, sizeof(request_confirmation), 0);
  FillChar(response, sizeof(response), 0);

  // Set request message configuration
  FillChar(config, sizeof(config), 0);
  config.can_id :=
    UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
  config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
  config.nai.extension_addr := $0;
  config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
  config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
  config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
  config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
  config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

  // Sends a physical Authentication/verifyProofOfOwnershipBidirectional message
  algorithm_indicator[0] := $00;
  algorithm_indicator[1] := $01;
  algorithm_indicator[2] := $02;
  algorithm_indicator[3] := $03;
  algorithm_indicator[4] := $04;
  algorithm_indicator[5] := $05;
  algorithm_indicator[6] := $06;
  algorithm_indicator[7] := $07;
  algorithm_indicator[8] := $08;
  algorithm_indicator[9] := $09;
  algorithm_indicator[10] := $0A;
  algorithm_indicator[11] := $0B;
  algorithm_indicator[12] := $0C;
  algorithm_indicator[13] := $0D;
  algorithm_indicator[14] := $0E;
  algorithm_indicator[15] := $0F;
  proof_of_ownership_client[0] := $12;
  proof_of_ownership_client[1] := $34;

```

```

proof_of_ownership_client_size := 2;
challenge_client[0] := $56;
challenge_client[1] := $78;
challenge_client_size := 2;
result := TUDSApi.SvcAuthenticationVPOWNB_2020
    (cantp_handle.PCANTP_HANDLE_USBBUS1, config, request,
    PByte(@algorithm_indicator), PByte(@proof_of_ownership_client),
    proof_of_ownership_client_size, PByte(@challenge_client),
    challenge_client_size);
if (TUDSApi.StatusIsOk_2013(result)) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
end;
if (TUDSApi.StatusIsOk_2013(result)) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK);
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

**See also:** [WaitForService\\_2013](#) on page 248.

**Plain function version:** [UDS\\_SvcAuthenticationVPOWNB\\_2020](#) on page 760.

### 3.7.132 SvcAuthenticationAC\_2020

Writes a UDS request according to the Authentication service's specifications (ISO-14229-1:2020). The subfunction authenticationConfiguration is implicit.

#### Syntax

##### Pascal OO

```

class function SvcAuthenticationAC_2020(
    channel: cantp_handle;
    request_config: uds_msgconfig;
    var out_msg_request: uds_msg
): uds_status;

```

##### C#

```

[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcAuthenticationAC_2020")]
public static extern uds_status SvcAuthenticationAC_2020(
    [MarshalAs(UnmanagedType.U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    out uds_msg out_msg_request);

```



## C++ / CLR

```
[DllImport("PCAN-UDS.dll", EntryPoint = "UDS_SvcAuthenticationAC_2020")]
static uds_status SvcAuthenticationAC_2020(
    [MarshalAs(UnmanagedType::U4)]
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg %out_msg_request);
```

## Visual Basic

```
<DllImport("PCAN-UDS.dll", EntryPoint:="UDS_SvcAuthenticationAC_2020")>
Public Shared Function SvcAuthenticationAC_2020(
    <MarshalAs(UnmanagedType.U4)>
    ByVal channel As cantp_handle,
    ByVal request_config As uds_msgconfig,
    ByRef out_msg_request As uds_msg) As uds_status
End Function
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the method (see uds_msg on page 21).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The request configuration is not valid (see uds_msgconfig on page 27), or the given message buffer is null.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>Reset_2013</code> (see <code>Reset_2013</code> on page 234).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>MsgFree_2013</code> on page 214).


## Remarks

This method creates a new message using a given message configuration and set the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `MsgFree_2013` on page 214).

The PCAN-UDS 2.x API provides `uds_svc_authentication_subfunction` (see on page 98) and `uds_svc_authentication_return_parameter` (see on page 99) enumerations to help user to decode Authentication service responses.

## Example

The following example shows the use of the service method `SvcAuthenticationAC_2020` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `WaitForService_2013` method is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.



**C#**

```

uds_status result;
uds_msg request = new uds_msg();
uds_msg request_confirmation = new uds_msg();
uds_msg response = new uds_msg();
uds_msgconfig config = new uds_msgconfig();

// Set request message configuration
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/authenticationConfiguration message
result = UDSApi.SvcAuthenticationAC_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config, out
    request);
if (UDSApi.StatusIsOk_2013(result))
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, ref request, out
        response, out request_confirmation);
if (UDSApi.StatusIsOk_2013(result))
    MessageBox.Show("Response was received", "Success");
else
    // An error occurred
    MessageBox.Show("An error occurred", "Error");

// Free structures
UDSApi.MsgFree_2013(ref request);
UDSApi.MsgFree_2013(ref response);
UDSApi.MsgFree_2013(ref request_confirmation);

```

**C++/CLR**

```

uds_status result;
uds_msg request = {};
uds_msg request_confirmation = {};
uds_msg response = {};
uds_msgconfig config = {};

// Set request message configuration
config.can_id = PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/authenticationConfiguration message
result = UDSApi::SvcAuthenticationAC_2020(cantp_handle::PCANTP_HANDLE_USBBUS1, config,
    request);
if (UDSApi::StatusIsOk_2013(result))
    result = UDSApi::WaitForService_2013(cantp_handle::PCANTP_HANDLE_USBBUS1, request,
        response, request_confirmation);
if (UDSApi::StatusIsOk_2013(result))
    MessageBox::Show("Response was received", "Success");
else

```

```
// An error occurred
MessageBox::Show("An error occurred", "Error");

// Free structures
UDSApi::MsgFree_2013(request);
UDSApi::MsgFree_2013(response);
UDSApi::MsgFree_2013(request_confirmation);
```

## Visual Basic

```
Dim result As uds_status
Dim request As uds_msg = New uds_msg()
Dim request_confirmation As uds_msg = New uds_msg()
Dim response As uds_msg = New uds_msg()
Dim config As uds_msgconfig = New uds_msgconfig()

' Set request message configuration
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.extension_addr = &H0
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT

' Sends a physical Authentication/authenticationConfiguration message
result = UDSApi.SvcAuthenticationAC_2020(cantp_handle.PCANTP_HANDLE_USBBUS1, config, request)
If UDSApi.StatusIsOk_2013(result) Then
    result = UDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1, request, response,
        request_confirmation)
End If
If UDSApi.StatusIsOk_2013(result) Then
    MessageBox.Show("Response was received", "Success")
Else
    ' An error occurred
    MessageBox.Show("An error occurred", "Error")
End If

' Free structures
UDSApi.MsgFree_2013(request)
UDSApi.MsgFree_2013(response)
UDSApi.MsgFree_2013(request_confirmation)
```

## Pascal OO

```
var
    result: uds_status;
    request: uds_msg;
    request_confirmation: uds_msg;
    response: uds_msg;
    config: uds_msgconfig;
begin
    FillChar(request, sizeof(request), 0);
    FillChar(request_confirmation, sizeof(request_confirmation), 0);
    FillChar(response, sizeof(response), 0);

    // Set request message configuration
    FillChar(config, sizeof(config), 0);
    config.can_id :=
        UInt32(uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1);
    config.can_msgtype := cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
```

```

config.nai.extension_addr := $0;
config.nai.protocol :=
    uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT);
config.nai.target_addr :=
    UInt16(uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1);
config.nai.target_type :=
    cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.typeem := uds_msgtype.PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/authenticationConfiguration message
result := TUDSApi.SvcAuthenticationAC_2020(cantp_handle.PCANTP_HANDLE_USBBUS1,
    config, request);
if (TUDSApi.StatusIsOk_2013(result)) then
begin
    result := TUDSApi.WaitForService_2013(cantp_handle.PCANTP_HANDLE_USBBUS1,
        @request, response, @request_confirmation);
end;
if (TUDSApi.StatusIsOk_2013(result)) then
begin
    MessageBox(0, 'Response was received', 'Success', MB_OK)
end
else
begin
    // An error occurred
    MessageBox(0, 'An error occurred', 'Error', MB_OK);
end;

// Free structures
TUDSApi.MsgFree_2013(request);
TUDSApi.MsgFree_2013(response);
TUDSApi.MsgFree_2013(request_confirmation);
end;

```

See also: [WaitForService\\_2013](#) on page 248.

Plain function version: [UDS\\_SvcAuthenticationAC\\_2020](#) on page 763.

### 3.7.133 GetDataServiceId\_2013

This method is a C# and VB helper: it gets PUDS message data service identifier in a safe way.

#### Syntax

##### C#

```

public static bool GetDataServiceId_2013(
    ref uds_msg msg,
    out Byte val);

```

##### Visual Basic

```

Public Shared Function GetDataServiceId_2013(
    ByRef msg As uds_msg,
    ByRef val As Byte) As Boolean
End Function

```

## Parameters

Parameter	Description
msg	UDS message containing the service identifier (see <code>uds_msg</code> on page 21).
val	Output, service identifier value.

## Returns

True if ok, false if not ok.

## Example

The following example shows the use of the method `GetDataServiceId_2013`. It allocates a message, sets a service identifier, gets it, and prints it.

### C#

```
uds_msgconfig config = new uds_msgconfig();
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.extension_addr = 0;

uds_msg request = new uds_msg();
uds_status result;
result = UDSApi.MsgAlloc_2013(out request, config, 1);
if (UDSApi.StatusIsOk_2013(result))
{
    UDSApi.SetDataServiceId_2013(ref request,
        (byte)uds_service.PUDS_SERVICE_SI_ClearDiagnosticInformation);
    Byte service_id;
    if (UDSApi.GetDataServiceId_2013(ref request, out service_id))
    {
        MessageBox.Show("Set request service id = " + service_id, "Success");
    }
    else
    {
        MessageBox.Show("An error occurred", "Error");
    }
}
```

### Visual Basic

```
Dim config As uds_msgconfig = New uds_msgconfig()
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.extension_addr = 0

Dim request As uds_msg = New uds_msg()
Dim result As uds_status
result = UDSApi.MsgAlloc_2013(request, config, 1)
If UDSApi.StatusIsOk_2013(result) Then
    UDSApi.SetDataServiceId_2013(request,
```

```

    uds_service.PUDS_SERVICE_SI_ClearDiagnosticInformation)
Dim service_id As Byte
If UDSApi.GetDataServiceId_2013(request, service_id) Then
    MessageBox.Show("Set request service id = " + service_id.ToString(), "Success")
Else
    MessageBox.Show("An error occurred", "Error")
End If
End If

```

See also: [uds\\_msg](#) on page 21.

### 3.7.134 SetDataServiceId\_2013

This method is a C# and VB helper: it sets PUDS message data service id, in a safe way.

#### Syntax

##### C#

```

public static bool SetDataServiceId_2013(
    ref uds_msg msg,
    Byte val);

```

##### Visual Basic

```

Public Shared Function SetDataServiceId_2013(
    ByRef msg As uds_msg,
    ByVal val As Byte) As Boolean
End Function

```

#### Parameters

Parameter	Description
msg	UDS message containing the service identifier (see <a href="#">uds_msg</a> on page 21).
val	New service identifier value.

#### Returns

True if ok, false if not ok.

#### Example

The following example shows the use of the method [SetDataServiceId\\_2013](#). It allocates a message, sets a service identifier, gets it, and prints it.

##### C#

```

uds_msgconfig config = new uds_msgconfig();
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.extension_addr = 0;

uds_msg request = new uds_msg();
uds_status result;
result = UDSApi.MsgAlloc_2013(out request, config, 1);
if (UDSApi.StatusIsOk_2013(result))
{

```

```

UDSApi.SetDataServiceId_2013(ref request,
    (byte)uds_service.PUDS_SERVICE_SI_ClearDiagnosticInformation);
Byte service_id;
if (UDSApi.GetDataServiceId_2013(ref request, out service_id))
{
    MessageBox.Show("Set request service id = " + service_id, "Success");
}
else
{
    MessageBox.Show("An error occurred", "Error");
}
}

```

### Visual Basic

```

Dim config As uds_msgconfig = New uds_msgconfig()
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_REQUEST_1
config.can_msgtype = cantp_can_msgtype.PCAN_TP_CAN_MSGTYPE_STANDARD
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.target_type = cantp_isotp_addressing.PCAN_TP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.extension_addr = 0

Dim request As uds_msg = New uds_msg()
Dim result As uds_status
result = UDSApi.MsgAlloc_2013(request, config, 1)
If UDSApi.StatusIsOk_2013(result) Then
    UDSApi.SetDataServiceId_2013(request,
        uds_service.PUDS_SERVICE_SI_ClearDiagnosticInformation)
    Dim service_id As Byte
    If UDSApi.GetDataServiceId_2013(request, service_id) Then
        MessageBox.Show("Set request service id = " + service_id.ToString(), "Success")
    Else
        MessageBox.Show("An error occurred", "Error")
    End If
End If

```

See also: `uds_msg` on page 21.

### 3.7.135 GetDataNrc\_2013

This method is a C# and VB helper: it gets PUDS message data negative response code (nrc) in a safe way.

#### Syntax

##### C#

```

public static bool GetDataNrc_2013(
    ref uds_msg msg,
    out Byte val);

```

##### Visual Basic

```

Public Shared Function GetDataNrc_2013(
    ByRef msg As uds_msg,
    ByRef val As Byte) As Boolean
End Function

```

## Parameters

Parameter	Description
msg	UDS message containing the nrc (see uds_msg on page 21).
val	Output, nrc value.

## Returns

True if ok, false if not ok.

## Example

The following example shows the use of the method `GetDataNrc_2013`. It allocates a message, a nrc pointer, sets a new NRC value, then gets, and prints this value.

### C#

```
uds_msgconfig config = new uds_msgconfig();
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.extension_addr = 0;

uds_msg response = new uds_msg();
uds_status result = UDSApi.MsgAlloc_2013(out response, config, 2);
if (UDSApi.StatusIsOk_2013(result))
{
    // Set nrc pointer in message structure
    response.links.nrc = IntPtr.Add(response.links.param, 1);

    UDSApi.SetDataNrc_2013(ref response, UDSApi.PUDS_NRC_EXTENDED_TIMING);
    Byte nrc;
    if (UDSApi.GetDataNrc_2013(ref response, out nrc))
    {
        MessageBox.Show("Set NRC extended timing value = " + nrc, "Success");
    }
    else
    {
        MessageBox.Show("An error occurred", "Error");
    }
}
```

### Visual Basic

```
Dim config As uds_msgconfig = New uds_msgconfig()
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.extension_addr = 0

Dim response As uds_msg = New uds_msg()
Dim result As uds_status
result = UDSApi.MsgAlloc_2013(response, config, 2)
If UDSApi.StatusIsOk_2013(result) Then
```

```

' Set nrc pointer in message structure
response.links.nrc = IntPtr.Add(response.links.param, 1)

UDSApi.SetDataNrc_2013(response, UDSApi.PUDS_NRC_EXTENDED_TIMING)
Dim nrc As Byte
If UDSApi.GetDataNrc_2013(response, nrc) Then
    MessageBox.Show("Set NRC extended timing value = " + nrc.ToString(), "Success")
Else
    MessageBox.Show("An error occurred", "Error")
End If
End If

```

See also: `uds_msg` on page 21.

### 3.7.136 SetDataNrc\_2013

This method is a C# and VB helper: it sets PUDS message data negative response code (nrc) in a safe way.

#### Syntax

##### C#

```

public static bool SetDataNrc_2013(
    ref uds_msg msg,
    Byte val);

```

##### Visual Basic

```

Public Shared Function SetDataNrc_2013(
    ByRef msg As uds_msg,
    ByVal val As Byte) As Boolean
End Function

```

#### Parameters

Parameter	Description
msg	UDS message containing the nrc (see <code>uds_msg</code> on page 21).
val	New nrc value.

#### Returns

True if ok, false if not ok.

#### Example

The following example shows the use of the method `SetDataNrc_2013`. It allocates a message, a nrc pointer, sets a new NRC value, then gets, and prints this value. Depending on the result, a message will be shown to the user.

##### C#

```

uds_msgconfig config = new uds_msgconfig();
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.extension_addr = 0;

```



```

uds_msg response = new uds_msg();
uds_status result = UDSApi.MsgAlloc_2013(out response, config, 2);
if (UDSApi.StatusIsOk_2013(result))
{
    // Set nrc pointer in message structure
    response.links.nrc = IntPtr.Add(response.links.param, 1);

    UDSApi.SetDataNrc_2013(ref response, UDSApi.PUDS_NRC_EXTENDED_TIMING);
    Byte nrc;
    if (UDSApi.GetDataNrc_2013(ref response, out nrc))
    {
        MessageBox.Show("Set NRC extended timing value = " + nrc, "Success");
    }
    else
    {
        MessageBox.Show("An error occurred", "Error");
    }
}
}

```

### Visual Basic

```

Dim config As uds_msgconfig = New uds_msgconfig()
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.extension_addr = 0

Dim response As uds_msg = New uds_msg()
Dim result As uds_status
result = UDSApi.MsgAlloc_2013(response, config, 2)
If UDSApi.StatusIsOk_2013(result) Then

    ' Set nrc pointer in message structure
    response.links.nrc = IntPtr.Add(response.links.param, 1)

    UDSApi.SetDataNrc_2013(response, UDSApi.PUDS_NRC_EXTENDED_TIMING)
    Dim nrc As Byte
    If UDSApi.GetDataNrc_2013(response, nrc) Then
        MessageBox.Show("Set NRC extended timing value = " + nrc.ToString(), "Success")
    Else
        MessageBox.Show("An error occurred", "Error")
    End If
End If

```

**See also:** [uds\\_msg](#) on page 21.

### 3.7.137 GetDataParameter\_2013

This method is a C# and VB helper: it gets PUDS message data parameter in a safe way.

#### Syntax

##### C#

```
public static bool GetDataParameter_2013(
    ref uds_msg msg,
    int nump,
    out Byte val);
```

##### Visual Basic

```
Public Shared Function GetDataParameter_2013(
    ByRef msg As uds_msg,
    ByVal nump As Integer,
    ByRef val As Byte) As Boolean
End Function
```

#### Parameters

Parameter	Description
msg	UDS message containing the data parameter (see uds_msg on page 21).
nump	Data parameter number (index start from 0).
val	Output, data parameter value.

#### Returns

True if ok, false if not ok.

#### Example

The following example shows the use of the method `GetDataParameter_2013`. It sets a new data parameter, gets it, and prints it.

##### C#

```
uds_msgconfig config = new uds_msgconfig();
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.extension_addr = 0;

uds_msg response = new uds_msg();
uds_status result = UDSApi.MsgAlloc_2013(out response, config, 2);
if (UDSApi.StatusIsOk_2013(result))
{
    UDSApi.SetDataParameter_2013(ref response, 0, 42);
    Byte param;
    if (UDSApi.GetDataParameter_2013(ref response, 0, out param))
    {
        MessageBox.Show("Set param[0] = " + param, "Success");
    }
    else
    {
        MessageBox.Show("An error occurred", "Error");
    }
}
```

## Visual Basic

```
Dim config As uds_msgconfig = New uds_msgconfig()
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.extension_addr = 0

Dim response As uds_msg = New uds_msg()
Dim result As uds_status
result = UDSApi.MsgAlloc_2013(response, config, 2)
If UDSApi.StatusIsOk_2013(result) Then

    UDSApi.SetDataParameter_2013(response, 0, 42)
    Dim param As Byte
    If UDSApi.GetDataParameter_2013(response, 0, param) Then
        MessageBox.Show("Set param[0] = " + param.ToString(), "Success")
    Else
        MessageBox.Show("An error occurred", "Error")
    End If
End If
```

See also: `uds_msg` on page 21.

### 3.7.138 SetDataParameter\_2013

This method is a C# and VB helper: it sets PUDS message data parameter in a safe way.

## Syntax

### C#

```
public static bool SetDataParameter_2013(
    ref uds_msg msg,
    int nump,
    Byte val);
```

## Visual Basic

```
Public Shared Function SetDataParameter_2013(
    ByRef msg As uds_msg,
    ByVal nump As Integer,
    ByVal val As Byte) As Boolean
End Function
```

## Parameters

Parameter	Description
msg	PUDS message containing the data parameter (see <code>uds_msg</code> on page 21).
nump	Data parameter number (index start from 0).
val	New data parameter value.

## Returns

True if ok, false if not ok.

## Example

The following example shows the use of the method `SetDataParameter_2013`. It sets a new data parameter, gets it, and prints it.

### C#

```
uds_msgconfig config = new uds_msgconfig();
config.can_id = (UInt16)uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_1;
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = uds_msgtype.PUDS_MSGTYPE_USDT;
config.nai.source_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_addr = (UInt16)uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.extension_addr = 0;

uds_msg response = new uds_msg();
uds_status result = UDSApi.MsgAlloc_2013(out response, config, 2);
if (UDSApi.StatusIsOk_2013(result))
{
    UDSApi.SetDataParameter_2013(ref response, 0, 42);
    Byte param;
    if (UDSApi.GetDataParameter_2013(ref response, 0, out param))
    {
        MessageBox.Show("Set param[0] = " + param, "Success");
    }
    else
    {
        MessageBox.Show("An error occurred", "Error");
    }
}
```

### Visual Basic

```
Dim config As uds_msgconfig = New uds_msgconfig()
config.can_id = uds_can_id.PUDS_CAN_ID_ISO_15765_4_PHYSICAL_RESPONSE_1
config.can_msgtype = cantp_can_msgtype.PCANTP_CAN_MSGTYPE_STANDARD
config.nai.protocol = uds_msgprotocol.PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL
config.nai.target_type = cantp_isotp_addressing.PCANTP_ISOTP_ADDRESSING_PHYSICAL
config.type = uds_msgtype.PUDS_MSGTYPE_USDT
config.nai.source_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_ECU_1
config.nai.target_addr = uds_address.PUDS_ADDRESS_ISO_15765_4_ADDR_TEST_EQUIPMENT
config.nai.extension_addr = 0

Dim response As uds_msg = New uds_msg()
Dim result As uds_status
result = UDSApi.MsgAlloc_2013(response, config, 2)
If UDSApi.StatusIsOk_2013(result) Then




    UDSApi.SetDataParameter_2013(response, 0, 42)
    Dim param As Byte
    If UDSApi.GetDataParameter_2013(response, 0, param) Then
        MessageBox.Show("Set param[0] = " + param.ToString(), "Success")
    Else
        MessageBox.Show("An error occurred", "Error")
    End If
End If
```

**See also:** `uds_msg` on page 21.







## 3.8 Functions

The functions of the PCAN-UDS 2.x API are divided into 5 groups of functionalities.








### Connection

	Function	Description
	UDS_Initialize_2013	Initializes a PUDS channel based on a PCANTP Channel handle (without CAN FD support).
	UDS_InitializeFD_2013	Initializes a PUDS channel based on a PCANTP Channel handle (including CAN FD support).
	UDS_Uninitialize_2013	Uninitializes a PUDS channel





### Configuration

	Function	Description
	UDS_SetValue_2013	Sets a configuration or information value within a PUDS channel.
	UDS_AddMapping_2013	Adds a user-defined mapping between a CAN identifier and a network address information.
	UDS_RemoveMappingByCanId_2013	Removes all user defined PUDS mappings corresponding to a CAN identifier.
	UDS_RemoveMapping_2013	Removes a user defined PUDS mapping.
	UDS_AddCanIdFilter_2013	Adds an entry to the CAN identifier white-list filtering.
	UDS_RemoveCanIdFilter_2013	Removes an entry from the CAN identifier white-list filtering.














### Information

	Function	Description
	UDS_GetValue_2013	Retrieves information from a PUDS channel.
	UDS_GetCanBusStatus_2013	Gets information about the internal BUS status of a PUDS channel.
	UDS_GetMapping_2013	Retrieves a mapping matching the given CAN identifier and message type (11bits, 29 bits, FD, etc.).
	UDS_GetMappings_2013	Retrieves all the PUDS mappings defined for a PUDS channel.
	UDS_GetSessionInformation_2013	Gets current ECU session information.
	UDS_StatusIsOk_2013	Checks if a PUDS status matches an expected result (default is PUDS_STATUS_OK).
	UDS_GetErrorText_2013	Gets a descriptive text for a PUDS error code.















### Message handling

	Function	Description
	UDS_MsgAlloc_2013	Allocates a PUDS message using the given configuration.
	UDS_MsgFree_2013	Deallocates a PUDS message.
	UDS_MsgCopy_2013	Copies a PUDS message to another buffer.
	UDS_MsgMove_2013	Moves a PUDS message to another buffer (and cleans the original message structure).

## Communication

	Function	Description
	UDS_Read_2013	Reads a message from the receive queue of a PUDS channel.
	UDS_Write_2013	Transmits a message using a connected PUDS channel.
	UDS_Reset_2013	Resets the receive and transmit queues of a PUDS channel.
	UDS_WaitForSingleMessage_2013	Waits for a message (response or a transmit confirmation) based on a PUDS message request.
	UDS_WaitForFunctionalResponses_2013	Waits for multiple messages (multiple responses from a functional request for instance) based on a PUDS message request.
	UDS_WaitForService_2013	Handles the communication workflow for a UDS service expecting a single response.
	UDS_WaitForServiceFunctional_2013	Handles the communication workflow for a UDS service expecting multiple responses.
	UDS_SvcDiagnosticSessionControl_2013	Writes to the transmit queue a request for UDS service DiagnosticSessionControl.
	UDS_SvcECUReset_2013	Writes to the transmit queue a request for UDS service ECUReset.
	UDS_SvcSecurityAccess_2013	Writes to the transmit queue a request for UDS service SecurityAccess.
	UDS_SvcCommunicationControl_2013	Writes to the transmit queue a request for UDS service CommunicationControl.
	UDS_SvcTesterPresent_2013	Writes to the transmit queue a request for UDS service TesterPresent.
	UDS_SvcSecuredDataTransmission_2013	Writes to the transmit queue a request for UDS service SecuredDataTransmission(ISO-14229-1:2013).
	UDS_SvcSecuredDataTransmission_2020	Writes to the transmit queue a request for UDS service SecuredDataTransmission(ISO-14229-1:2020).
	UDS_SvcControlDTCSetting_2013	Writes to the transmit queue a request for UDS service ControlDTCSetting.
	UDS_SvcResponseOnEvent_2013	Writes to the transmit queue a request for UDS service ResponseOnEvent.
	UDS_SvcLinkControl_2013	Writes to the transmit queue a request for UDS service LinkControl.
	UDS_SvcReadDataByIdentifier_2013	Writes to the transmit queue a request for UDS service ReadDataByIdentifier.
	UDS_SvcReadMemoryByAddress_2013	Writes to the transmit queue a request for UDS service ReadMemoryByAddress.
	UDS_SvcReadScalingDataByIdentifier_2013	Writes to the transmit queue a request for UDS service ReadScalingDataByIdentifier.
	UDS_SvcReadDataByPeriodicIdentifier_2013	Writes to the transmit queue a request for UDS service ReadDataByPeriodicIdentifier.
	UDS_SvcDynamicallyDefineDataIdentifierDBID_2013	Writes to the transmit queue a request for UDS service DynamicallyDefineDataIdentifier.

	Function	Description
	UDS_SvcDynamicallyDefineDataIdentifierDBMA_2013	Writes to the transmit queue a request for UDS service DynamicallyDefineDataIdentifier.
	UDS_SvcDynamicallyDefineDataIdentifierCDDDI_2013	Writes to the transmit queue a request for UDS service DynamicallyDefineDataIdentifier.
	UDS_SvcDynamicallyDefineDataIdentifierClearAllDDDI_2013	Writes to the transmit queue a request for UDS service DynamicallyDefineDataIdentifier/clearDynamicallyDefinedDataIdentifier subfunction.
	UDS_SvcWriteDataByIdentifier_2013	Writes to the transmit queue a request for UDS service WriteDataByIdentifier.
	UDS_SvcWriteMemoryByAddress_2013	Writes to the transmit queue a request for UDS service WriteMemoryByAddress.
	UDS_SvcClearDiagnosticInformation_2013	Writes to the transmit queue a request for UDS service ClearDiagnosticInformation.
	UDS_SvcClearDiagnosticInformation_2020	Writes to the transmit queue a request for UDS service ClearDiagnosticInformation with memory selection parameter (ISO-14229-1:2020).
	UDS_SvcReadDTCInformation_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	UDS_SvcReadDTCInformationRDTCSBDTC_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	UDS_SvcReadDTCInformationRDTCSBRN_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	UDS_SvcReadDTCInformationReportExtended_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	UDS_SvcReadDTCInformationReportSeverity_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	UDS_SvcReadDTCInformationRSIODTC_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	UDS_SvcReadDTCInformationNoParam_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	UDS_SvcReadDTCInformationRDTCEDBR_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	UDS_SvcReadDTCInformationRUDMDTCBSM_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	UDS_SvcReadDTCInformationRUDMDTCSSBDTC_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	UDS_SvcReadDTCInformationRUDMDTCEDRBDN_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	UDS_SvcReadDTCInformationRDTCEDI_2020	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	UDS_SvcReadDTCInformationRWWHOBDDTCBMR_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	UDS_SvcReadDTCInformationRWWHOBDDTCWPS_2013	Writes to the transmit queue a request for UDS service ReadDTCInformation.
	UDS_SvcReadDTCInformationRDTCBGI_2020	Writes to the transmit queue a request for UDS service ReadDTCInformation.

	Function	Description
	UDS_SvcInputOutputControlByIdentifier_2013	Writes to the transmit queue a request for UDS service InputOutputControlByIdentifier.
	UDS_SvcRoutineControl_2013	Writes to the transmit queue a request for UDS service RoutineControl.
	UDS_SvcRequestDownload_2013	Writes to the transmit queue a request for UDS service RequestDownload.
	UDS_SvcRequestUpload_2013	Writes to the transmit queue a request for UDS service RequestUpload.
	UDS_SvcTransferData_2013	Writes to the transmit queue a request for UDS service TransferData.
	UDS_SvcRequestTransferExit_2013	Writes to the transmit queue a request for UDS service RequestTransferExit.
	UDS_SvcAccessTimingParameter_2013	Writes to the transmit queue a request for UDS service AccessTimingParameter.
	UDS_SvcRequestFileTransfer_2013	Writes to the transmit queue a request for UDS service RequestFileTransfer.
	UDS_SvcAuthenticationDA_2020	Writes to the transmit queue a request for UDS service Authentication with deAuthenticate subfunction (ISO-14229-1:2020).
	UDS_SvcAuthenticationVCU_2020	Writes to the transmit queue a request for UDS service Authentication with verifyCertificateUnidirectional subfunction (ISO-14229-1:2020).
	UDS_SvcAuthenticationVCB_2020	Writes to the transmit queue a request for UDS service Authentication with verifyCertificateBidirectional subfunction (ISO-14229-1:2020).
	UDS_SvcAuthenticationPOWN_2020	Writes to the transmit queue a request for UDS service Authentication with proofOfOwnership subfunction (ISO-14229-1:2020).
	UDS_SvcAuthenticationRCFA_2020	Writes to the transmit queue a request for UDS service Authentication with requestChallengeForAuthentication subfunction (ISO-14229-1:2020).
	UDS_SvcAuthenticationVPOWNU_2020	Writes to the transmit queue a request for UDS service Authentication with verifyProofOfOwnershipUnidirectional subfunction (ISO-14229-1:2020).
	UDS_SvcAuthenticationVPOWNB_2020	Writes to the transmit queue a request for UDS service Authentication with verifyProofOfOwnershipBidirectional subfunction (ISO-14229-1:2020).
	UDS_SvcAuthenticationAC_2020	Writes to the transmit queue a request for UDS service Authentication with authenticationConfiguration subfunction (ISO-14229-1:2020).

### 3.8.1 UDS\_Initialize\_2013

Initializes a PUDS channel based on a PCANTP channel handle (without CAN FD support).

#### Syntax

C

```
uds_status UDS_Initialize_2013(
    cantp_handle channel,
    cantp_baudrate baudrate,
    cantp_hwtype hw_type,
    uint32_t io_port,
    uint16_t interrupt);
```



## C++

```
uds_status UDS_Initialize_2013(
    cantp_handle channel,
    cantp_baudrate baudrate,
    cantp_hwtype hw_type = 0,
    uint32_t io_port = 0,
    uint16_t interrupt = 0);
```

## Parameters

Parameter	Description
channel	The handle of a PCANTP channel (see cantp_handle on page 105).
baudrate	The speed for the communication (see cantp_baudrate on page 116).
hw_type	Non-plug and play: the type of hardware (see cantp_hwtype on page 113).
io_port	Non-plug and play: the I/O address for the parallel port.
interrupt	Non-plug and play: interrupt number of the parallel port.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_ALREADY_INITIALIZED</code>	Indicates that the desired PUDS channel is already in use.
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory.
<code>PUDS_STATUS_NOT_INITIALIZED</code>	Channel not available.
<code>PUDS_STATUS_FLAG_PCAN_STATUS</code>	This error flag states that the error is composed of a more precise PCAN-Basic error.

## Remarks

As indicated by its name, the `UDS_Initialize_2013` function initiates a PUDS channel, preparing it for communication within the CAN bus connected to it. Calls to the other functions will fail if they are used with a channel handle, different than `PCANTP_HANDLE_NONEBUS`, that has not been initialized yet. Each initialized channel should be released when it is not needed anymore.

Initializing a PUDS channel means:

- to reserve the channel for the calling application/process
- to allocate channel resources, like receive and transmit queues
- to forward initialization to PCAN-ISO-TP 3.x API and PCAN-Basic API, hence registering/connecting the Hardware denoted by the channel handle
- To set up the default values of the different parameters (see `UDS_SetValue_2013` on page 629).
- To configure default standard ISO-TP mappings (see UDS and ISO-TP Network Addressing Information on page 770):
  - Functional request using 11 bits CAN identifier and normal addressing, from External Test Equipment address (`PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT`) to OBD functional address (`PUDS_ISO_15765_4_ADDR_OBD_FUNCTIONAL`),
  - Physical requests and responses using 11 bits CAN identifier and normal addressing, between the External Test Equipment address (`PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT`) and standard ECU addresses (ECU #1 to #8)
- To configure PCAN-ISO-TP 3.x to filter CAN frames to increase performance (frames that do not match a mapping or a CAN ID in the white-list filter are ignored and discarded).

The initialization process will fail if an application tries to initialize a PCANTP channel handle that has already been initialized within the same process.

Take into consideration that initializing a channel causes a reset of the CAN hardware. In this way errors like BUSOFF, BUSHEAVY, and BUSLIGHT, are removed.

## Example

The following example shows the initialize and uninitialized processes for a Plug-And-Play channel (channel 2 of the PCAN-PCI).

### C/C++

```
uds_status result;

// The Plug & Play channel (PCAN-PCI) is initialized
result = UDS_Initialize_2013(PCANTP_HANDLE_PCIBUS2, PCANTP_BAUDRATE_500K, (cantp_hwtype)0, 0, 0);
if (!UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Initialization failed\n");
else
    printf("PCAN-PCI (Ch-2) was initialized\n");

// All initialized channels are released
UDS_Uninitialize_2013(PCANTP_HANDLE_NONEBUS);
```

**See also:** [UDS\\_Uninitialize\\_2013](#) on page 628, [UDS\\_InitializeFD\\_2013](#) on page 626, [UDS\\_GetValue\\_2013](#) on page 630, [Understanding PCAN-UDS 2.x](#) on page 11.

**Class-method version:** [Initialize\\_2013](#) on page 142.

## 3.8.2 UDS\_InitializeFD\_2013

Initializes a PUDS channel based on a PCANTP channel handle (including CAN FD support).

### Syntax

#### C/C++

```
uds_status UDS_InitializeFD_2013(
    cantp_handle channel,
    const cantp_bitrate bitrate_fd);
```

### Parameters

Parameter	Description
channel	The handle of a FD capable PUDS channel (see <a href="#">cantp_handle</a> on page 105).
bitrate_fd	The speed for the communication (see <a href="#">cantp_bitrate</a> on page 101, <a href="#">FD Bit Rate Parameter Definitions</a> on page 102).

### Returns

The return value is a [uds\\_status](#) code. [PUDS\\_STATUS\\_OK](#) is returned on success. The typical errors in case of failure are:

PUDS_STATUS_ALREADY_INITIALIZED	Indicates that the desired PUDS channel is already in use.
PUDS_STATUS_NO_MEMORY	Failed to allocate memory.
PUDS_STATUS_NOT_INITIALIZED	Channel not available.
PUDS_STATUS_FLAG_PCAN_STATUS	This error flag states that the error is composed of a more precise PCAN-Basic error.

## Remarks

The `UDS_InitializeFD_2013` function initiates a FD capable PUDS channel, preparing it for communication within the CAN bus connected to it. Calls to the other functions will fail, if they are used with a channel handle, different than `PCANTP_HANDLE_NONEBUS`, that has not been initialized yet. Each initialized channel should be released when it is not needed anymore.

Initializing a PUDS channel means:

- └ To reserve the channel for the calling application/process.
- └ To allocate channel resources, like receive and transmit queues.
- └ To forward initialization to PCAN-ISO-TP 3.x API and PCAN-Basic API, hence registering/connecting the Hardware denoted by the channel handle.
- └ To set up the default values of the different parameters (see `UDS_SetValue_2013` on page 629).
- └ To configure default standard ISO-TP mappings (see UDS and ISO-TP Network Addressing Information on page 770):
  - Functional request using 11 bits CAN identifier and normal addressing, from External Test Equipment address (`PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT`) to OBD functional address (`PUDS_ISO_15765_4_ADDR_OBD_FUNCTIONAL`),
  - Physical requests and responses using 11 bits CAN identifier and normal addressing, between the External Test Equipment address (`PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT`) and standard ECU addresses (ECU #1 to #8)
- └ To configure PCAN-ISO-TP 3.x to filter CAN frames to increase performance (frames that do not match a mapping or a CAN ID in the white-list filter are ignored and discarded).

The initialization process will fail if an application tries to initialize a PCANTP channel handle that has already been initialized within the same process.

Take into consideration, that initializing a channel causes a reset of the CAN hardware. In this way errors like BUSOFF, BUSHEAVY, and BUSLIGHT, are removed.

## Example

The following example shows the initialize and uninitialized processes for a Plug and Play, FD capable channel (channel 2 of a PCAN-USB hardware).

### C/C++

```
uds_status result;

// The Plug and Play channel (PCAN-USB) is initialized @500kbps/2Mbps.
result = UDS_InitializeFD_2013(PCANTP_HANDLE_USBBUS2, "f_clock=80000000, nom_brp=10,
nom_tseg1=12, nom_tseg2=3, nom_sjw=1, data_brp=4, data_tseg1=7, data_tseg2=2, data_sjw=1");
if (!UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Initialization failed\n");
else
    printf("PCAN-USB (Ch-2) was initialized\n");

// All initialized channels are released.
UDS_Uninitialize_2013(PCANTP_HANDLE_NONEBUS);
```

**See also:** `UDS_Uninitialize_2013` on page 628, `Using PCAN-UDS 2.x` on page 12, `cantp_bitrate` on page 101, `FD Bit Rate Parameter Definitions` on page 102.

**Class-method version:** `InitializeFD_2013` on page 148.

### 3.8.3 UDS\_Uninitialize\_2013

Uninitializes a PUDS channel.

#### Syntax

C/C++

```
uds_status UDS_Uninitialize_2013(
    cantp_handle channel);
```

#### Parameters

Parameter	Description
channel	The handle of a PCANTP channel handle (see cantp_handle on page 105).

#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical error in case of failure is:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel cannot be uninitialized because it was not found in the list of reserved channels of the calling application.
--	---

#### Remarks

A PUDS channel can be released using one of these possibilities:

- **Single-Release:** Giving the handle of a PUDS channel initialized before with the function `UDS_Initialize_2013`. If the given channel cannot be found, then an error is returned.
- **Multiple-Release:** Giving the handle value `PCANTP_HANDLE_NONEBUS` which instructs the API to search for all channels initialized by the calling application and release them all. This option causes no errors if no hardware were uninitialized.

#### Example

The following example shows the initialize and uninitialized processes for a Plug-And-Play channel (channel 2 of a PCAN-PCI hardware).

C/C++

```
uds_status result;

// The Plug & Play channel (PCAN-PCI) is initialized
result = UDS_Initialize_2013(PCANTP_HANDLE_PCIBUS2, PCANTP_BAUDRATE_500K, (cantp_hwtype)0, 0, 0);
if (!UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Initialization failed\n");
else
    printf("PCAN-PCI (Ch-2) was initialized\n");

// Release channel
result = UDS_Uninitialize_2013(PCANTP_HANDLE_PCIBUS2);
if (!UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Uninitialization failed\n");
else
    printf("PCAN-PCI (Ch-2) was released\n");
```

**See also:** `UDS_Initialize_2013` on page 624, `UDS_InitializeFD_2013` on page 626.

**Class-method version:** `Uninitialize_2013` on page 148.

### 3.8.4 UDS\_SetValue\_2013

Sets a configuration or information value within a PUDS channel.

#### Syntax

#### C/C++

```
uds_status UDS_SetValue_2013(
    cantp_handle channel,
    uds_parameter parameter,
    void* buffer,
    uint32_t buffer_size);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
Parameter	The code of the value to be set (see uds_parameter on page 41).
Buffer	The buffer containing the value to be set.
Buffer_size	The size in bytes of the given buffer.

#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	Indicates that the parameters passed to the function are invalid. Check the value of the buffer and assert it is compatible with the buffer length.

#### Remarks

Use the function `UDS_SetValue_2013` to set configuration information or environment values of a PUDS channel.

**Note:** That any calls with non PCAN-UDS 2.x API parameters (i.e. `uds_parameter`) will be forwarded to PCAN-ISO-TP 3.x API or PCAN-Basic API.

More information about the parameters and values that can be set can be found in Detailed Parameters Characteristics on page 45.

#### Example

The following example shows the use of the function `UDS_SetValue_2013` on the channel `PCANTP_HANDLE_PCIBUS2` to enable debug mode.

**Note:** It is assumed that the channel was already initialized.

#### C/C++

```
uds_status result;
uint8_t buffer;

// Enable error messages
buffer = PUDS_DEBUG_LVL_ERROR;
result = UDS_SetValue_2013(PCANTP_HANDLE_PCIBUS2, PUDS_PARAMETER_DEBUG, &buffer,
    sizeof(uint8_t));
if (!UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Failed to set value\n");
else
    printf("Value changed successfully\n");
```

**See also:** `UDS_GetValue_2013` on page 630, `uds_parameter` on page 41, Detailed Parameters Characteristics on page 45.

**Class-method version:** `SetValue_2013` on page 153.

### 3.8.5 UDS\_GetValue\_2013

Retrieves information from a PUDS channel.

#### Syntax

##### C/C++

```
uds_status UDS_GetValue_2013(
    cantp_handle channel,
    uds_parameter parameter,
    void* buffer,
    uint32_t buffer_size);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
parameter	The code of the value to retrieve (see <code>uds_parameter</code> on page 41).
buffer	The buffer to return the required value.
buffer_size	The size in bytes of the given buffer.


#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	Indicates that the parameters passed to the function are invalid. Check the value of the buffer and assert it is compatible with the buffer length.

#### Example

The following example shows the use of the function `UDS_GetValue_2013` to retrieve the separation time parameter (STmin) on the USB channel 1. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

##### C/C++

```
uds_status result;
uint8_t buffer = 0;

// Get the value of the Separation Time (STmin) parameter
result = UDS_GetValue_2013(PCANTP_HANDLE_USBBUS1, PUDS_PARAMETER_SEPARATION_TIME, &buffer,
    sizeof(uint8_t));
if (!UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
{
    printf("Failed to get value\n");
}
else
{
    printf("%d\n", buffer);
}
```

**See also:** `UDS_SetValue_2013` on page 629, `uds_parameter` on page 41, Detailed Parameters Characteristics on page 45.

**Class-method version:** `GetValue_2013` on page 178.

### 3.8.6 UDS\_AddMapping\_2013

Adds a user-defined mapping between a CAN identifier and a network address information. Defining a mapping enables PCAN-ISO-TP 3.x communication with 11Bits CAN identifier or with opened Addressing Formats (like `PCANTP_ISOTP_FORMAT_NORMAL` or `PCANTP_ISOTP_FORMAT_EXTENDED`).

#### Syntax

##### C/C++

```
uds_status UDS_AddMapping_2013(
    cantp_handle channel,
    uds_mapping* mapping);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
Mapping	PUDS mapping to be added (see <code>uds_mapping</code> on page 25).

#### Remark

By default, some mappings are initialized in the PCAN-UDS 2.x API (see UDS and ISO-TP Network Addressing Information on page 770).

With version 1.0, to handle custom ISO-TP messages, support advised to use `CANTP_AddMapping` function in conjunction with PCAN-UDS. Updates of version 1 then added new parameters to manage mappings (like `PUDS_PARAM_ADD_MAPPING`). With version 2.0, PCAN-UDS will ignore ISO-TP messages that do not strictly correspond to the mappings and the configuration of the UDS node. It is now advised not to directly use lower APIs to define mappings for higher layer API. Nevertheless, to ensure retro-compatibility, an ISO-TP message (with no mapping defined in UDS) will still be readable in UDS if its target address matches the server address.


#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

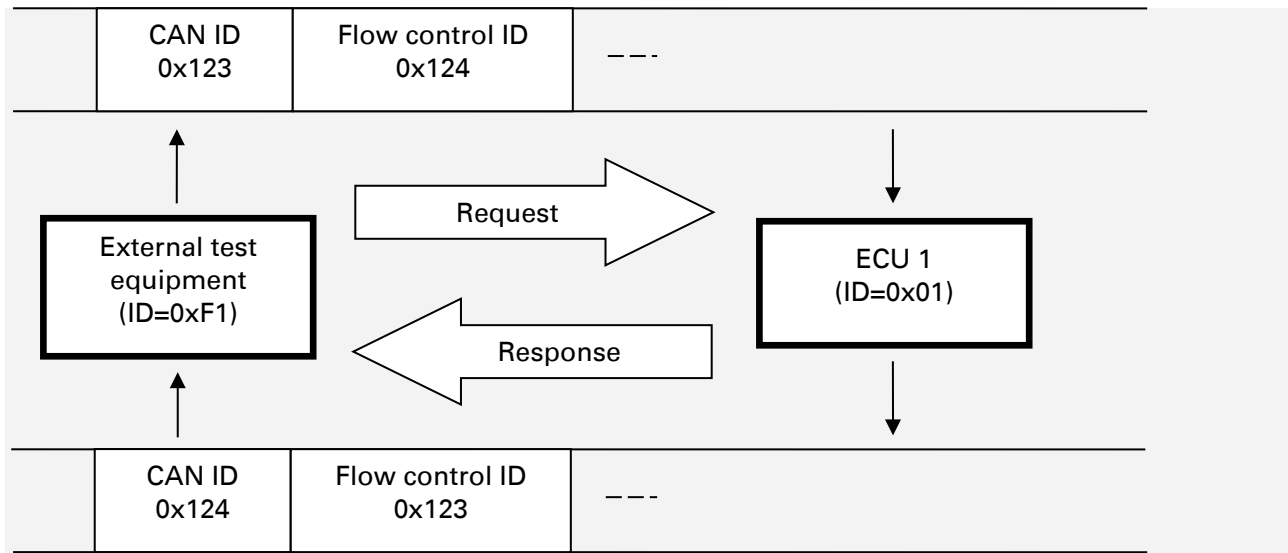
<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	Indicates that the given mapping is null.
<code>PUDS_STATUS_ALREADY_INITIALIZED</code>	A mapping with the same CAN identifier already exists.
<code>PUDS_STATUS_MAPPING_INVALID</code>	Mapping is not valid regarding the UDS standard.
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory to define mapping.

#### Example

The following example shows the use of the function `UDS_AddMapping_2013` on the USB channel 1. It creates mappings to communicate with custom CAN identifiers between test equipment and ECU 1 in ISO-15765-2 11bits normal addressing on initialized USB channel 1:

 **Note:** It is assumed that the channel was already initialized.

Set CAN identifier = 0x123 and flow control id = 0x124 for request and set CAN identifier = 0x124 and flow control id = 0x123 for response. Test equipment address corresponds to 0xF1 and ECU 1 address corresponds to 0x01. Here is a small scheme of the mapping:

**C/C++**

```

uds_mapping request_mapping;
memset(&request_mapping, 0, sizeof(request_mapping));
request_mapping.can_id = 0x123;
request_mapping.can_id_flow_ctrl = 0x124;
request_mapping.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
request_mapping.nai.extension_addr = 0;
request_mapping.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
request_mapping.can_tx_dlc = 8;
request_mapping.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
request_mapping.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
request_mapping.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;

uds_mapping response_mapping;
memset(&response_mapping, 0, sizeof(response_mapping));
response_mapping = request_mapping;
response_mapping.can_id = request_mapping.can_id_flow_ctrl;
response_mapping.can_id_flow_ctrl = request_mapping.can_id;
response_mapping.nai.source_addr = request_mapping.nai.target_addr;
response_mapping.nai.target_addr = request_mapping.nai.source_addr;

uds_status status;
status = UDS_AddMapping_2013(PCANTP_HANDLE_USBBUS1, &request_mapping);
if (UDS_StatusIsOk_2013(status, PUDS_STATUS_OK, false))
    printf("Add request mapping\n");
else
    printf("Failed to add request mapping\n");
status = UDS_AddMapping_2013(PCANTP_HANDLE_USBBUS1, &response_mapping);
if (UDS_StatusIsOk_2013(status, PUDS_STATUS_OK, false))
    printf("Add response mapping\n");
else
    printf("Failed to add response mapping\n");

```

**See also:** [UDS\\_RemoveMapping\\_2013](#) on page 634, [UDS\\_RemoveMappingByCanId\\_2013](#) on page 633.

**Class-method version:** [AddMapping\\_2013](#) on page 164.



### 3.8.7 UDS\_RemoveMappingByCanId\_2013

Removes all user defined PUDS mappings corresponding to a CAN identifier.

#### Syntax

#### C/C++

```
uds_status UDS_RemoveMappingByCanId_2013(
    cantp_handle channel,
    uint32_t can_id);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
can_id	The mapped CAN identifier to search for that identifies the mappings to remove (see predefined uds_can_id values on page 58).


#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The CAN identifier to remove is not specified in a mapping.

#### Example

The following example shows the use of the function `UDS_RemoveMappingByCanId_2013` on the USB channel 1. It creates a mapping then removes it using its CAN identifier on initialized USB channel 1:

 **Note:** It is assumed that the channel was already initialized.

#### C/C++

```
uds_mapping request_mapping;
memset(&request_mapping, 0, sizeof(request_mapping));
request_mapping.can_id = 0x123;
request_mapping.can_id_flow_ctrl = 0x124;
request_mapping.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
request_mapping.nai.extension_addr = 0;
request_mapping.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
request_mapping.can_tx_dlc = 8;
request_mapping.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
request_mapping.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
request_mapping.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;

uds_status status;
status = UDS_AddMapping_2013(PCANTP_HANDLE_USBBUS1, &request_mapping);
if (UDS_StatusIsOk_2013(status, PUDS_STATUS_OK, false))
{
    // Remove mapping using its can identifier
    status = UDS_RemoveMappingByCanId_2013(PCANTP_HANDLE_USBBUS1, 0x123);
    if (UDS_StatusIsOk_2013(status, PUDS_STATUS_OK, false))
        printf("Remove request mapping using its can identifier\n");
    else
        printf("Failed to remove request mapping\n");
}
else
```

```
{
    printf("Failed to add request mapping\n");
}
```

**See also:** `uds_mapping` on page 25, `UDS_RemoveMapping_2013` on page 634, `UDS_AddMapping_2013` on page 631.  
**Class-method version:** `RemoveMappingByCanId_2013` on page 171.

### 3.8.8 UDS\_RemoveMapping\_2013

Removes a user defined PUDS mapping.

#### Syntax

#### C/C++

```
uds_status UDS_RemoveMapping_2013(
    cantp_handle channel,
    uds_mapping mapping);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
mapping	The mapping to remove (see <code>uds_mapping</code> on page 25).


#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The mapping is not a valid mapping.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping is not in the mapping list.

#### Example

The following example shows the use of the function `UDS_RemoveMapping_2013` on the USB channel 1. It creates a mapping then removes it.

 **Note:** It is assumed that the channel was already initialized.

#### C/C++

```
uds_mapping request_mapping;
memset(&request_mapping, 0, sizeof(request_mapping));
request_mapping.can_id = 0x123;
request_mapping.can_id_flow_ctrl = 0x124;
request_mapping.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
request_mapping.nai.extension_addr = 0;
request_mapping.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
request_mapping.can_tx_dlc = 8;
request_mapping.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
request_mapping.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
request_mapping.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;

uds_status status;
status = UDS_AddMapping_2013(PCANTP_HANDLE_USBBUS1, &request_mapping);
if (UDS_StatusIsOk_2013(status, PUDS_STATUS_OK, false))
{
    // Remove the request mapping
```

```

status = UDS_RemoveMapping_2013(PCANTP_HANDLE_USBBUS1, request_mapping);
if (UDS_StatusIsOk_2013(status, PUDS_STATUS_OK, false))
{
    printf("Remove request mapping\n");
}
else
{
    printf("Failed to remove request mapping\n");
}
}
else
{
    printf("Failed to add request mapping\n");
}
}

```

**See also:** [uds\\_mapping](#) on page 25, [UDS\\_RemoveMappingByCanId\\_2013](#) on page 633, [UDS\\_AddMapping\\_2013](#) on page 631.

**Class-method version:** [RemoveMapping\\_2013](#) on page 168.

### 3.8.9 UDS\_AddCanIdFilter\_2013

Adds an entry to the CAN identifier white-list filtering. This function allows the user to listen to non-UDS CAN frames or UUDT messages with no configured mapping.

#### Syntax

##### C/C++

```

uds_status UDS_AddCanIdFilter_2013(
    cantp_handle channel,
    uint32_t can_id);

```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <a href="#">cantp_handle</a> on page 105).
can_id	CAN identifier to add in the white-list (see predefined <a href="#">uds_can_id</a> values on page 58).


#### Returns

The return value is a [uds\\_status](#) code. [PUDS\\_STATUS\\_OK](#) is returned on success. The typical errors in case of failure are:

<a href="#">PUDS_STATUS_NOT_INITIALIZED</a>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<a href="#">PUDS_STATUS_ALREADY_INITIALIZED</a>	The CAN identifier is already in the white list.
<a href="#">PUDS_STATUS_NO_MEMORY</a>	Memory allocation error when adding the new element in the white list.

#### Example

The following example shows the use of the function [UDS\\_AddCanIdFilter\\_2013](#) the channel [PCANTP\\_HANDLE\\_USBBUS1](#). It adds a filter on 0xD1 CAN identifier.

 **Note:** It is assumed that the channel was already initialized.

**C/C++**

```
uds_status result;
result = UDS_AddCanIdFilter_2013(PCANTP_HANDLE_USBBUS1, 0xD1);
if (!UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Error adding CAN ID filter.\n");
```

**See also:** `UDS_RemoveCanIdFilter_2013` on page 636, `uds_can_id` on page 58.

**Class-method version:** `AddCanIdFilter_2013` on page 175.

**3.8.10 UDS\_RemoveCanIdFilter\_2013**

Removes an entry from the CAN identifier white-list filtering.

**Syntax****C/C++**

```
uds_status UDS_RemoveCanIdFilter_2013(
    cantp_handle channel,
    uint32_t can_id);
```

**Parameters**

Parameter	Description
Channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
can_id	CAN identifier to remove (see predefined <code>uds_can_id</code> values on page 58).


**Returns**

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical error in case of failure is:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application. Or the CAN identifier is not in the white list.
--	--

**Example**

The following example shows the use of the function `UDS_RemoveCanIdFilter_2013` on the channel `PCANTP_HANDLE_USBBUS1`. It adds a filter on 0xD1 CAN identifier then removes it.

 **Note:** It is assumed that the channel was already initialized.

**C/C++**

```
uds_status result;
result = UDS_AddCanIdFilter_2013(PCANTP_HANDLE_USBBUS1, 0xD1);
if (!UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Error adding CAN ID filter.\n");

// Remove previously added can identifier filter
result = UDS_RemoveCanIdFilter_2013(PCANTP_HANDLE_USBBUS1, 0xD1);
if (!UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Error removing CAN ID filter.\n");
```

**See also:** `UDS_AddCanIdFilter_2013` on page 635.

**Class-method version:** `RemoveCanIdFilter_2013` on page 176.

### 3.8.11 UDS\_GetMapping\_2013

Retrieves a mapping matching the given CAN identifier and message type (11bits, 29 bits, FD, etc.).

#### Syntax

#### C/C++

```
uds_status UDS_GetMapping_2013(
    cantp_handle channel,
    uds_mapping* buffer,
    uint32_t can_id,
    cantp_can_msgtype can_msgtype);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
Buffer	Output, buffer to store the searched mapping (see uds_mapping on page 25).
Can_id	The CAN identifier to look for (see predefined uds_can_id values on page 58).
Can_msgtype	The CAN message type to look for (11bits, 29 bits, FD, etc.). See also cantp_can_msgtype on page 121.


#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical error in case of failure is:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The buffer is invalid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	Indicates that no matching mapping was found in the registered mapping list.

#### Example

The following example shows the use of the function `UDS_GetMapping_2013` on the channel `PCANTP_HANDLE_USBBUS1`. It gets the mapping for the 0x7E0 CAN identifier then print it.

 **Note:** It is assumed that the channel was already initialized.

#### C/C++

```
uds_status result;
uds_mapping result_mapping;
result = UDS_GetMapping_2013(PCANTP_HANDLE_USBBUS1, &result_mapping,
    PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1, PCANTP_CAN_MSGTYPE_STANDARD);

if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
{
    printf(« Mapping defined for the %d can identifier : », result_mapping.can_id) ;
    printf(« \n\t- Flow control identifier : %d », result_mapping.can_id_flow_ctrl) ;
    printf(« \n\t- Can message type : %d », result_mapping.can_msgtype) ;
    printf(« \n\t- TX DLC : %d », result_mapping.can_tx_dlc) ;
    printf(« \n\t- Extension address : %d », result_mapping.nai.extension_addr) ;
    printf(« \n\t- Protocol : %d », result_mapping.nai.protocol) ;
    printf(« \n\t- Source address : %d », result_mapping.nai.source_addr) ;
    printf(« \n\t- Target address : %d », result_mapping.nai.target_addr) ;
    printf(« \n\t- Target type : %d\n », result_mapping.nai.target_type) ;
}
else
{
    printf(« Error, cannot get mapping information.\n ») ;
}
```

**See also:** [uds\\_mapping](#) on page 25, [UDS\\_GetMappings\\_2013](#) on page 638.

**Class-method version:** [GetMapping\\_2013](#) on page 193.

### 3.8.12 UDS\_GetMappings\_2013

Retrieves all the mappings defined for a PUDS channel.

#### Syntax

C/C++

```
uds_status UDS_GetMappings_2013(
    cantp_handle channel,
    uds_mapping * buffer,
    uint16_t buffer_length,
    uint16_t* count);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <a href="#">cantp_handle</a> on page 105).
Buffer	Output, a buffer to store an array of <a href="#">uds_mapping</a> (see <a href="#">uds_mapping</a> on page 25).
Buffer_length	The number of <a href="#">uds_mapping</a> element the buffer can store.
Count	Output, the actual number of elements copied in the buffer.

#### Remark

By default, some mappings are initialized in the PCAN-UDS 2.x API (see UDS and ISO-TP Network Addressing Information on page 770).


#### Returns

The return value is a [uds\\_status](#) code. [PUDS\\_STATUS\\_OK](#) is returned on success. The typical errors in case of failure are:

<a href="#">PUDS_STATUS_NOT_INITIALIZED</a>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<a href="#">PUDS_STATUS_PARAM_BUFFER_TOO_SMALL</a>	The given buffer is too small to store all mappings.
<a href="#">PUDS_STATUS_PARAM_INVALID_VALUE</a>	The buffer is invalid.

#### Example

The following example shows the use of the function [UDS\\_GetMappings\\_2013](#) on [PCANTP\\_HANDLE\\_USBBUS1](#). It displays all mappings added on the channel.

 **Note:** It is assumed that the channel was already initialized.

C/C++

```
uds_status result;
uint16_t count = 256;
uds_mapping mappings[256];
result = UDS_GetMappings_2013(PCANTP_HANDLE_USBBUS1, mappings, count, &count);

if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
{
    for (int i = 0; i < count; i++)
    {
        printf("mappings[%d]:", i);
        printf("\n\t- Can identifier: %d", mappings[i].can_id);
        printf("\n\t- Flow control identifier: %d", mappings[i].can_id_flow_ctrl);
    }
}
```

```

        printf("\n\t- Can message type: %d", mappings[i].can_msgtype);
        printf("\n\t- TX DLC: %d", mappings[i].can_tx_dlc);
        printf("\n\t- Extension address: %d", mappings[i].nai.extension_addr);
        printf("\n\t- Protocol: %d", mappings[i].nai.protocol);
        printf("\n\t- Source address: %d", mappings[i].nai.source_addr);
        printf("\n\t- Target address: %d", mappings[i].nai.target_addr);
        printf("\n\t- Target type: %d\n", mappings[i].nai.target_type);
    }
}
else
{
    printf("Error, cannot get mappings\n");
}

```

**See also:** [uds\\_mapping](#) on page 25, [UDS\\_GetMapping\\_2013](#) on page 637.

**Class-method version:** [GetMappings\\_2013](#) on page 196.

### 3.8.13 UDS\_GetSessionInformation\_2013

Gets current ECU session information.

#### Syntax

C/C++

```

uds_status UDS_GetSessionInformation_2013(
    cantp_handle channel,
    uds_sessioninfo *session_info);

```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <a href="#">cantp_handle</a> on page 105).
session_info	Input, the mapping to search for. Output, the session filled if an ECU session exists (see <a href="#">uds_sessioninfo</a> on page 22).


#### Returns

The return value is a [uds\\_status](#) code. [PUDS\\_STATUS\\_OK](#) is returned on success. The typical errors in case of failure are:

<a href="#">PUDS_STATUS_NOT_INITIALIZED</a>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application. Or the ECU session information is not initialized.
<a href="#">PUDS_STATUS_PARAM_INVALID_VALUE</a>	One of the given parameters is invalid.

#### Example

The following example shows the use of the function [UDS\\_GetSessionInformation\\_2013](#) on the channel [PCANTP\\_HANDLE\\_USBBUS1](#). It gets the session information for a given mapping and prints it.

 **Note:** It is assumed that the channel was already initialized.

C/C++

```

uds_status result;
uds_sessioninfo session_info;

memset(&session_info, 0, sizeof(session_info));

// Mapping to search
session_info.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;

```

```

session_info.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
session_info.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
session_info.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
session_info.nai.extension_addr = 0;

result = UDS_GetSessionInformation_2013(PCANTP_HANDLE_USBBUS1, &session_info);

if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
{
    printf("Current session info:");
    printf("\n\t- Can message type: %d", session_info.can_msg_type);
    printf("\n\t- Extension address: %d", session_info.nai.extension_addr);
    printf("\n\t- Protocol: %d", session_info.nai.protocol);
    printf("\n\t- Source address: %d", session_info.nai.source_addr);
    printf("\n\t- Target address: %d", session_info.nai.target_addr);
    printf("\n\t- Target type: %d", session_info.nai.target_type);
    printf("\n\t- S3 client value: %d", session_info.s3_client_ms);
    printf("\n\t- Session type: %d", session_info.session_type);
    printf("\n\t- P2can server max timeout enhanced: %d",
           session_info.timeout_enhanced_p2can_server_max);
    printf("\n\t- P2can server max timeout: %d\n", session_info.timeout_p2can_server_max);
}
else
{
    printf("Error, cannot get session information.\n");
}

```

**See also:** [uds\\_sessioninfo](#) on page 22, [UDS\\_SetValue\\_2013](#) on page 629.

**Class-method version:** [GetSessionInformation\\_2013](#) on page 200.

### 3.8.14 UDS\_StatusIsOk\_2013

Checks if a PUDS status matches an expected result (default is [PUDS\\_STATUS\\_OK](#)).

#### Syntax

C

```

bool UDS_StatusIsOk_2013(
    const uds_status status,
    const uds_status status_expected,
    bool strict_mode);

```

C++

```

bool UDS_StatusIsOk_2013(
    const uds_status status,
    const uds_status status_expected = PUDS_STATUS_OK,
    bool strict_mode = false);

```

#### Parameters

Parameter	Description
status	The PUDS status to analyze (see <a href="#">uds_status</a> on page 32).
status_expected	The expected PUDS status (see <a href="#">uds_status</a> on page 32). The default value is <a href="#">PUDS_STATUS_OK</a> .
strict_mode	Enable strict mode (default is false). Strict mode ensures that bus or extra information are the same.

#### Returns

The return value is true if the status matches expected parameter.



## Remarks

When checking a `uds_status`, it is preferred to use `UDS_StatusIsOk_2013` instead of comparing it with the `==` operator because `UDS_StatusIsOk_2013` can remove information flag (in non-strict mode).

## Example

The following example shows the use of the function `UDS_StatusIsOk_2013` after initializing the channel `PCANTP_HANDLE_PCIBUS2`.

### C/C++

```
uds_status result;
result = UDS_Initialize_2013(PCANTP_HANDLE_PCIBUS2, PCANTP_BAUDRATE_500K, (cantp_hwtype)0, 0, 0);
if (!UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Initialization failed\n");
else
    printf("PCAN-PCI (Ch-2) was initialized\n");
```

See also: `uds_status` on page 32.

Class-method version: `StatusIsOk_2013` on page 203.

### 3.8.15 UDS\_GetErrorText\_2013

Gets a descriptive text for a PUDS error code.

## Syntax

### C/C++

```
uds_status UDS_GetErrorText_2013(
    uds_status error_code,
    uint16_t language,
    char* buffer,
    uint32_t buffer_size);
```

## Parameters

Parameter	Description
error_code	A <code>uds_status</code> error code (see <code>uds_status</code> on page 32).
Language	The current languages available for translation are: Neutral (0x00), German (0x07), English (0x09), Spanish (0x0A), Italian (0x10) and French (0x0C).
buffer	A buffer for a null-terminated char array.
Buffer_size	Buffer size in bytes.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical error in case of failure is:

PUDS_STATUS_PARAM_INVALID_VALUE	Indicates that the parameters passed to the function are invalid. Check the parameter 'buffer'; it should point to a char array, big enough to allocate the text for the given error code.
---------------------------------	--

## Remarks

The Primary Language IDs are codes used by Windows OS from Microsoft, to identify a human language. The API currently supports the following languages:

Language	Primary Language ID
Neutral (system-dependent)	00h (0)

Language	Primary Language ID
English	09h (9)
German	07h (7)
French	0Ch (12)
Italian	10h (16)
Spanish	0Ah (10)

**Note:** If the buffer is too small for the resulting text, the error 0x80008000 (`PUDS_STATUS_MASK_PCAN|PCAN_ERROR_ILLPARAMVAL`) is returned. Even when only short texts are being currently returned, a text within this function can have a maximum of 255 characters. For this reason, it is recommended to use a buffer with a length of at least 256 bytes.

## Example

The following example shows the use of the function `UDS_GetErrorText_2013` to get the description of an error. The language of the description's text will be the same used by the operating system (if its language is supported; otherwise English is used).

**Note:** It is assumed that the channel was NOT initialized (to generate an error).

### C/C++

```
char str_msg[256];
uds_status result;
uds_status error_result;
error_result = UDS_Uninitialize_2013(PCANTP_HANDLE_USBBUS1);
result = UDS_GetErrorText_2013(error_result, 0x0, str_msg, 256);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false) && !UDS_StatusIsOk_2013(error_result,
    PUDS_STATUS_OK, false))
    printf("%s\n", str_msg);
```

See also: `uds_status` on page 32.

Class-method version: `GetErrorText_2013` on page 209.

## 3.8.16 UDS\_GetCanBusStatus\_2013

Gets information about the internal CAN bus status of a PUDS channel.

### Syntax

#### C/C++

```
uds_status UDS_GetCanBusStatus_2013(
    cantp_handle channel);
```

### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).

### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_FLAG_BUS_LIGHT</code>	Indicates a bus error within the given PUDS channel. The hardware is in bus-light status.
<code>PUDS_STATUS_FLAG_BUS_HEAVY</code>	Indicates a bus error within the given PUDS channel. The hardware is in bus-heavy status.
<code>PUDS_STATUS_FLAG_BUS_OFF</code>	Indicates a bus error within the given PUDS channel. The hardware is in bus-off status.

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
-----------------------------	--


## Remarks

When the hardware status is bus-off, an application cannot communicate anymore. Consider using the PCAN-Basic property `PCAN_BUSOFF_AUTORESET` which instructs the API to automatically reset the CAN controller when a bus-off state is detected.

Another way to reset errors like bus-off, bus-heavy and bus-light, is to uninitialized and initialize again the channel used. This causes a hardware reset.

## Example

The following example shows the use of the function `UDS_GetCanBusStatus_2013` on the channel `PCANTP_HANDLE_PCIBUS1`. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;

// Check the status of the PCI channel
result = UDS_GetCanBusStatus_2013(PCANTP_HANDLE_PCIBUS1);
switch (result)
{
case PUDS_STATUS_FLAG_BUS_LIGHT:
    printf("PCAN-PCI (Ch-1): Handling a BUS-LIGHT status\n");
    break;
case PUDS_STATUS_FLAG_BUS_HEAVY:
    printf("PCAN-PCI (Ch-1): Handling a BUS-HEAVY status\n");
    break;
case PUDS_STATUS_FLAG_BUS_OFF:
    printf("PCAN-PCI (Ch-1): Handling a BUS-OFF status\n");
    break;
case PUDS_STATUS_OK:
    printf("PCAN-PCI (Ch-1): Status is OK\n");
    break;
default:
    // An error occurred
    printf("Failed to retrieve status\n");
    break;
}
```

**See also:** `uds_status` on page 32.

**Class-method version:** `GetCanBusStatus_2013` on page 189.

### 3.8.17 UDS\_MsgAlloc\_2013

Allocates a PUDS message using the given configuration.

## Syntax

### C/C++

```
uds_status UDS_MsgAlloc_2013(
    uds_msg* msg_buffer,
    uds_msgconfig msg_configuration,
    uint32_t msg_data_length
);
```

## Parameters

Parameter	Description
msg_buffer	A uds_msg structure buffer. It will be freed if required (see uds_msg on page 21).
msg_configuration	Configuration of the message to allocate (see uds_msgconfig on page 27).
msg_data_length	Length of the message data.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the parameters is not valid.
<code>PUDS_STATUS_CAUTION_INPUT_MODIFIED</code>	Extra information, the message has been modified by the API.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

The `uds_msg` structure is automatically initialized and allocated by the PCAN-UDS 2.x API using:

- `UDS_MsgAlloc_2013` function
- UDS services functions (suffixed `UDS_Svc`)
- `UDS_Read_2013` function
- `UDS_WaitFor` functions

Once processed, the `uds_msg` structure should be released using `UDS_MsgFree_2013` function.

## Example

The following example shows the use of the function `UDS_MsgAlloc_2013`. It allocates a ClearDiagnosticInformation service positive response (fixed length of one byte), with a physical configuration between ECU 1 and test equipment using in ISO15765-2 11bits normal addressing.

### C/C++

```
uds_msgconfig config_physical;
memset(&config_physical, 0, sizeof(config_physical));
config_physical.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_RESPONSE_1;
config_physical.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config_physical.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config_physical.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config_physical.type = PUDS_MSGTYPE_USDT;
config_physical.nai.source_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config_physical.nai.target_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config_physical.nai.extension_addr = 0;

uds_msg response_msg;
memset(&response_msg, 0, sizeof(uds_msg));
uds_status status = UDS_MsgAlloc_2013(&response_msg, config_physical, 1);
if (UDS_StatusIsOk_2013(status, PUDS_STATUS_OK, false))
    printf("Allocate ClearDiagnosticInformation response.\n");
else
    printf("Message allocation failed.\n");
```

**See also:** `uds_msg` on page 21, `UDS_MsgFree_2013` on page 645.

**Class-method version:** `MsgAlloc_2013` on page 211.

### 3.8.18 UDS\_MsgFree\_2013

Deallocates a PUDS message.

#### Syntax

##### C/C++

```
uds_status UDS_MsgFree_2013(
    uds_msg* msg_buffer
);
```

#### Parameters

Parameter	Description
msg_buffer	An allocated uds_msg structure buffer.


#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The uds_msg structure is invalid.
<code>PUDS_STATUS_CAUTION_BUFFER_IN_USE</code>	The message structure is currently in use. It cannot be deleted.

#### Example

The following example shows the use of the function `UDS_MsgFree_2013`. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the message was already allocated.

##### C/C++

```
uds_status result;
result = UDS_MsgFree_2013(&msg);
if (!UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Free message error\n");
else
    printf("Message released\n");
```

**See also:** `uds_msg` on page 21, `UDS_MsgAlloc_2013` on page 643.

**Class-method version:** `MsgFree_2013` on page 214.

### 3.8.19 UDS\_MsgCopy\_2013

Copies a PUDS message to another buffer.

#### Syntax

##### C/C++

```
uds_status UDS_MsgCopy_2013(
    uds_msg* msg_buffer_dst,
    const uds_msg* msg_buffer_src
);
```

## Parameters

Parameter	Description
msg_buffer_dst	A uds_msg structure buffer to store the copied message.
msg_buffer_src	The uds_msg structure to copy.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the uds_msg structure is invalid.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

When a message is copied, a new buffer is allocated. Once processed, user has to release the source and the destination messages (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the function `UDS_MsgCopy_2013`. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the source message was already allocated.

### C/C++

```
uds_msg destination;
memset(&destination, 0, sizeof(destination));
uds_status result = UDS_MsgCopy_2013(&destination, &source);
if (!UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Copy error\n");
else
    printf("Message copied\n");
```

**See also:** `uds_msg` on page 21.

**Class-method version:** `MsgCopy_2013` on page 216.

## 3.8.20 UDS\_MsgMove\_2013

Moves a PUDS message to another buffer (and cleans the original message structure).

## Syntax

### C/C++

```
uds_status UDS_MsgMove_2013(
    uds_msg* msg_buffer_dst,
    uds_msg* msg_buffer_src
);
```

## Parameters

Parameter	Description
msg_buffer_dst	A uds_msg structure buffer to store the message.
msg_buffer_src	The uds_msg structure buffer used as the source (will be cleaned).

## Remarks

When a message is moved, the source buffer is cleaned: once processed, user only has to release the destination message (see [UDS\\_MsgFree\\_2013](#) on page 645).


## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the <code>uds_msg</code> structure is invalid.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <a href="#">UDS_MsgFree_2013</a> on page 645).

## Example

The following example shows the use of the function [UDS\\_MsgMove\\_2013](#). Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the source message was already allocated.

### C/C++

```
uds_msg destination;
memset(&destination, 0, sizeof(destination));
uds_status result = UDS_MsgMove_2013(&destination, &source);
if (!UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Move error\n");
else
    printf("Message moved\n");
```

**See also:** [uds\\_msg](#) on page 21.

**Class-method version:** [MsgMove\\_2013](#) on page 218.

### 3.8.21 UDS\_Read\_2013

Reads a message from the receive queue of a PUDS channel.

#### Syntax

##### C

```
uds_status UDS_Read_2013(
    cantp_handle channel,
    uds_msg* out_msg_buffer,
    uds_msg* in_msg_request,
    cantp_timestamp* out_timestamp);
```

##### C++

```
uds_status UDS_Read_2013(
    cantp_handle channel,
    uds_msg* out_msg_buffer,
    uds_msg* in_msg_request = 0,
    cantp_timestamp* out_timestamp = 0);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
out_msg_buffer	A uds_msg buffer to store the PUDS message (see uds_msg on page 21).
in_msg_request	Optional, filters read message via a request message and its network address information (see uds_msg on page 21). If NULL the first available message is fetched, otherwise in_msg_request must represent a sent PUDS request. To look for the request confirmation, in_msg_request->type should not have the loopback flag; otherwise a response from the target ECU will be searched.
out_timestamp	A cantp_timestamp structure buffer to get the reception time of the message. If this value is not desired, this parameter should be passed as NULL (see cantp_timestamp on page 104).


#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NO_MESSAGE	Indicates that the receive queue of the channel is empty.
PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see UDS_MsgFree_2013 on page 645).

#### Remarks

- In addition to checking `uds_status` code, the `cantp_netstatus` should be checked as it contains the network status of the message (see field `msg.msgdata.any->netstatus` in `uds_msg` on page 21).
- In case of ISO-TP message, the message type contained in the message `cantp_netaddrinfo` which indicates if the message is a complete ISO-TP message (no pending message flag) should be checked too (see field `msg.msgdata.isotp->netaddrinfo` in `uds_msg` on page 21).
- Specifying a `NULL` value for the parameter `out_timestamp` causes reading a message without timestamp when the reception time is not desired.
- The message structure is automatically allocated and initialized in `UDS_Read_2013` function. So once the message is processed, the structure must be released (see `UDS_MsgFree_2013` on page 645).

 **Note:** Higher level functions like `UDS_WaitForService_2013` or `UDS_WaitForServiceFunctional_2013` should be preferred in cases where a client just has to read the response from a service request.



## Example

The following example shows the use of the function `UDS_Read_2013` on the channel `PCANTP_HANDLE_USBBUS1`. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized. This example is basic, the preferred way to read messages is Using Events (see on page 777).

### C/C++

```
uds_status result;
uds_msg msg;
memset(&msg, 0, sizeof(msg));
bool stop = false;

do
{
    // Read the first message in the queue
    result = UDS_Read_2013(PCANTP_HANDLE_USBBUS1, &msg, NULL, NULL);
    if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    {
        printf("A message was received\n");

        // Process the received message
        // ProcessMessage(msg);

        result = UDS_MsgFree_2013(&msg);
        if (!UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
            printf("Message free error\n");
    }
    else
    {
        // An error occurred
        printf("An error occurred\n");
        // Here can be decided if the loop has to be terminated
        // stop = HandleReadError(result);
    }
} while (!stop);
```

**See also:** `UDS_Write_2013` on page 649, `uds_msg` on page 21, UUDT Read/Write Example on page 775.

**Class-method version:** `Read_2013` on page 219.

## 3.8.22 UDS\_Write\_2013

Transmits a message using a connected PUDS channel.

### Syntax

#### C/C++

```
uds_status UDS_Write_2013(
    cantp_handle channel,
    uds_msg* msg_buffer);
```

### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
msg_buffer	A <code>uds_msg</code> buffer containing the message to be sent (see <code>uds_msg</code> on page 21).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of initialized channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The message is not a valid message.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_PARAM_INVALID_TYPE</code>	The message type is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The corresponding mapping is unknown.

## Remarks

The `UDS_Write_2013` function does not actually send the UDS message, the transmission is asynchronous. Should a message fail to be transmitted, it will be added to the reception queue with a specific network error code in the `msg.msgdata.any -> netstatus` value of the `uds_msg`.

**Note:** To transmit a standard UDS service request, it is recommended to use the corresponding API Service function starting with `UDS_Svc` (like `UDS_SvcDiagnosticSessionControl_2013`).

## Example

The following example shows the use of the function `UDS_Write_2013` on the channel `PCANTP_HANDLE_USBBUS1`. It adds to the transmit queue a UDS request then waits until a confirmation message is received. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized, mapping and message configuration receive event were configured. The content of data is not initialized in the example.

### C/C++

```
uds_status result;
uds_msg request_msg;
uds_msg loopback_msg;
int wait_result;

memset(&request_msg, 0, sizeof(request_msg));
memset(&loopback_msg, 0, sizeof(loopback_msg));

// Allocate and initialize message structure
result = UDS_MsgAlloc_2013(&request_msg, config, 4095);
if (!UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
{
    printf("Message initialization error: %d\n", result);
}
else
{
    // The message is sent using the PCAN-USB.
    result = UDS_Write_2013(PCANTP_HANDLE_USBBUS1, &request_msg);
    if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    {
        // Read the transmission confirmation.
        wait_result = WaitForSingleObject(receive_event, 5000);
        if (wait_result == WAIT_OBJECT_0)
        {
            result = UDS_Read_2013(PCANTP_HANDLE_USBBUS1, &loopback_msg, NULL, NULL);
            if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
            {

```

```

        printf("Read = %d, type=%d, netstatus=%d\n", result,
               loopback_msg.type, loopback_msg.msg.msgdata.any->netstatus);
        UDS_MsgFree_2013(&loopback_msg);
    }
    else
    {
        printf("Read error: %d\n", result);
    }
}
UDS_MsgFree_2013(&request_msg);
}
else
{
    printf("Write error: %d\n", result);
}
}

```

**See also:** [UDS\\_Read\\_2013](#) on page 648, UUDT Read/Write Example on page 775.

**Class-method version:** [Write\\_2013](#) on page 229.

### 3.8.23 UDS\_Reset\_2013

Resets the receive and transmit queues of a PUDS channel.

#### Syntax

C/C++

```

uds_status UDS_Reset_2013(
    cantp_handle channel);

```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <a href="#">cantp_handle</a> on page 105).

#### Returns

The return value is a [uds\\_status](#) code. [PUDS\\_STATUS\\_OK](#) is returned on success. The typical error in case of failure is:


<a href="#">PUDS_STATUS_NOT_INITIALIZED</a>	Indicates that the given PUDS channel was not found in the list of initialized channels of the calling application.
---	---

#### Remark

Calling this function ONLY clears the queues of a channel. A reset of the CAN controller does not take place.

#### Example

The following example shows the use of the function [UDS\\_Reset\\_2013](#) on the channel [PCANTP\\_HANDLE\\_PCIBUS1](#). Depending on the result, a message will be shown to the user

 **Note:** It is assumed that the channel was already initialized.

C/C++

```

uds_status result;

```

```
result = UDS_Reset_2013(PCANTP_HANDLE_PCIBUS1);
if (!UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("An error occurred\n");
else
    printf("PCAN-PCI (Ch-1) was reset\n");
```

See also: [UDS\\_Uninitialize\\_2013](#) on page 628.

Class-method version: [Reset\\_2013](#) on page 234.

### 3.8.24 UDS\_WaitForSingleMessage\_2013

Waits for a message (a response or a transmit confirmation) based on a PUDS message request.

#### Syntax

##### C/C++

```
uds_status UDS_WaitForSingleMessage_2013(
    cantp_handle channel,
    uds_msg* msg_request,
    bool is_waiting_for_tx,
    uint32_t timeout,
    uint32_t timeout_enhanced,
    uds_msg* out_msg_response);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <a href="#">cantp_handle</a> on page 105).
msg_request	A sent <a href="#">uds_msg</a> message used as a reference to find the waited message (see <a href="#">uds_msg</a> on page 21).
is_waiting_for_tx	States whether the message to wait for is a transmit confirmation or not.
timeout	Maximum time to wait (in milliseconds) for a message indication corresponding to the message request. <b>Note:</b> A zero value means unlimited time.
timeout_enhanced	Maximum time to wait (in milliseconds) for a message indication if ECU ask more time.
out_msg_response	A <a href="#">uds_msg</a> buffer to store the response message (see <a href="#">uds_msg</a> on page 21).

#### Returns

The return value is a [uds\\_status](#) code. [PUDS\\_STATUS\\_OK](#) is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of initialized channels of the calling application.
PUDS_STATUS_SERVICE_TIMEOUT_CONFIRMATION	Timeout while waiting for request confirmation (request message loopback).
PUDS_STATUS_SERVICE_TIMEOUT_RESPONSE	Timeout while waiting for response message.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is invalid.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <a href="#">UDS_MsgFree_2013</a> on page 645).

#### Remarks

The criteria to identify if a response matches the message request is based only on the network addressing information and the UDS service identifier: if the same service is requested multiple times with different parameters (like service [ReadDataByIdentifier](#) with different data identifiers), the user will have to ensure that the extra content matches the original request.


The timeout or timeout enhanced parameters are ignored once a message indication matching the request is received (i.e. the first frame of the message).

Since the duration of a message transmission/reception depends on various factors (bitrate, data length, FD support, dlc, STmin, BS, etc.) user can call PCAN-ISO-TP function `CANTP_GetMsgProgress_2016` to follow up the progress of the communication (the `cantp_msg` parameter to use will be `out_msg_response->msg`).

The parameters of `UDS_WaitFor*_2013` functions have a new order. They do not keep the order of the previous version.

## Example

The following example shows the use of the function `UDS_WaitForSingleMessage_2013` on the channel `PCANTP_HANDLE_USBBUS1`. It writes a PUDS message on the CAN Bus and waits for the confirmation of the transmission. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel and the mapping were already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg confirmation;

memset(&request, 0, sizeof(request));
memset(&confirmation, 0, sizeof(confirmation));

// Prepare an 11bit CAN ID, physically addressed UDS message containing 4 Bytes of data
uds_msgconfig config;
memset(&config, 0, sizeof(config));
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

result = UDS_MsgAlloc_2013(&request, config, 4);
if (!UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
{
    printf("Error occurred while allocating request message.\n");
}
else
{
    // The message is sent using the PCAN-USB
    result = UDS_Write_2013(PCANTP_HANDLE_USBBUS1, &request);
    if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    {
        // Wait for the transmit confirmation
        result = UDS_WaitForSingleMessage_2013(PCANTP_HANDLE_USBBUS1, &request, true, 10,
            100, &confirmation);
        if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
        {
            printf("Message was transmitted.\n");
            UDS_MsgFree_2013(&confirmation);
        }
        else
        {
            // An error occurred
            printf("Error occurred while waiting for transmit confirmation.\n");
        }
        UDS_MsgFree_2013(&request);
    }
}
```

```

    }
    else
    {
        // An error occurred
        printf("An error occurred\n");
    }
}

```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656, [UDS\\_WaitForServiceFunctional\\_2013](#) on page 659, [UDS\\_WaitForFunctionalResponses\\_2013](#) on page 654.

**Class-method version:** [WaitForSingleMessage\\_2013](#) on page 235.

### 3.8.25 UDS\_WaitForFunctionalResponses\_2013

Waits for multiple messages (multiple responses from a functional request for instance) based on a PUDS message request.

#### Syntax

##### C/C++

```

uds_status UDS_WaitForFunctionalResponses_2013(
    cantp_handle channel,
    uds_msg* msg_request,
    uint32_t timeout,
    uint32_t timeout_enhanced,
    bool wait_until_timeout,
    uint32_t max_msg_count,
    uds_msg* out_msg_responses,
    uint32_t* out_msg_count
);

```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <a href="#">cantp_handle</a> on page 105).
msg_request	A <a href="#">uds_msg</a> containing the PUDS request message that was previously sent (see <a href="#">uds_msg</a> on page 21).
timeout	Maximum time to wait (in milliseconds) for a message indication corresponding to the message request. <b>Note:</b> A zero value means unlimited time.
timeout_enhanced	Maximum time to wait (in milliseconds) for a message to be complete if ECU ask more time.
wait_until_timeout	if false the function is interrupted if <a href="#">out_msg_count</a> reaches <a href="#">max_msg_count</a> .
max_msg_count	Length of the responses buffer array (maximum messages that can be received).
out_msg_responses	A <a href="#">uds_msg</a> buffer array to store the responses messages (see <a href="#">uds_msg</a> on page 21).
out_msg_count	Output, number of read messages.

#### Returns

The return value is a [uds\\_status](#) code. [PUDS\\_STATUS\\_OK](#) is returned on success. The typical errors in case of failure are:

<a href="#">PUDS_STATUS_NOT_INITIALIZED</a>	Indicates that the given PUDS channel was not found in the list of initialized channels of the calling application.
<a href="#">PUDS_STATUS_NO_MESSAGE</a>	Indicates that no matching messages were received in the given time.
<a href="#">PUDS_STATUS_PARAM_INVALID_VALUE</a>	One of the given parameters is invalid.
<a href="#">PUDS_STATUS_SERVICE_RX_OVERFLOW</a>	Service received more messages than input buffer expected.
<a href="#">PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</a>	The given message buffer is already allocated, user must release the buffer before reusing it (see <a href="#">UDS_MsgFree_2013</a> on page 645).

## Remarks


The criteria to identify if a response matches the message request is based only on the network addressing information and the UDS service identifier: if the same service is requested multiple times with different parameters (like service ReadDataByIdentifier with different data identifiers), the user will have to ensure that the extra content matches the original request.

The timeout or timeout enhanced parameters are ignored once a message indication matching the request is received (i.e. the first frame of the message). They are re-enabled when the segmented message is fully received.

The parameters of `UDS_WaitFor*_2013` functions have a new order. They do not keep the order of the previous version.

## Example

The following example shows the use of the function `UDS_WaitForFunctionalResponses_2013` on the channel `PCANTP_HANDLE_USBBUS1`. It writes a UDS functional message on the CAN Bus, waits for the confirmation of the transmission, and then waits to receive responses from ECUs until a timeout occurs. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg confirmation;
uint32_t response_array_length = 5;
uds_msg response_array[5];
uint32_t count = 0;
int i;

memset(&request, 0, sizeof(request));
memset(&confirmation, 0, sizeof(confirmation));
for (i = 0; i < response_array_length; i++)
    memset(&response_array[i], 0, sizeof(uds_msg));

// prepare an 11bit CAN ID, functionally addressed UDS message
uds_msgconfig config;
memset(&config, 0, sizeof(config));
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_OBD_FUNCTIONAL;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_FUNCTIONAL;
config.type = PUDS_MSGTYPE_USDT;

result = UDS_MsgAlloc_2013(&request, config, 4);
if (!UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
{
    printf("Error occurred while allocating request message.\n");
}
else
{
    // [...] fill data (functional message is limited to 1 CAN frame)

    // The message is sent using the PCAN-USB
    result = UDS_Write_2013(PCANTP_HANDLE_USBBUS1, &request);
    if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
```

```

{
    // Wait for the transmit confirmation
    result = UDS_WaitForSingleMessage_2013(PCANTP_HANDLE_USBBUS1, &request, true, 10,
        100, &confirmation);
    if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false) &&
        confirmation.msg.msgdata.any->netstatus == PCANTP_NETSTATUS_OK)
    {
        printf("Message was transmitted.\n");
        // wait for the responses
        result = UDS_WaitForFunctionalResponses_2013(PCANTP_HANDLE_USBBUS1,
            &request, 10, 100, true, response_array_length, response_array,
            &count);
        if (count > 0)
        {
            printf("Responses were received\n");
            for (uint32_t i = 0; i < count; i++)
            {
                UDS_MsgFree_2013(&(response_array[i]));
            }
        }
        else
        {
            printf("No response was received\n");
        }
        UDS_MsgFree_2013(&confirmation);
    }
    else
    {
        // An error occurred
        printf("Error occurred while waiting for transmit confirmation.\n");
    }
    UDS_MsgFree_2013(&request);
}
else
{
    // An error occurred
    printf("An error occurred\n");
}
}
}

```

**See also:** [uds\\_msg](#) on page 21, [UDS\\_WaitForSingleMessage\\_2013](#) on page 652, [UDS\\_WaitForService\\_2013](#) on page 656, [UDS\\_WaitForServiceFunctional\\_2013](#) on page 659.

**Class-method version:** [WaitForFunctionalResponses\\_2013](#) on page 241.

### 3.8.26 UDS\_WaitForService\_2013

Handles the communication workflow for a UDS service expecting a single response. The function waits for a transmit confirmation then for a response message. Even if the [PUDS\\_MSGTYPE\\_FLAG\\_NO\\_POSITIVE\\_RESPONSE](#) flag is set, the function will still wait.

#### Syntax

#### C/C++

```

uds_status UDS_WaitForService_2013(
    cantp_handle channel,
    uds_msg* msg_request,
    uds_msg* out_msg_response,
    uds_msg* out_msg_request_confirmation);

```



## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
msg_request	A <code>uds_msg</code> containing the PUDS request message that was previously sent (see <code>uds_msg</code> on page 21).
out_msg_response	A <code>uds_msg</code> buffer to store the PUDS response message (see <code>uds_msg</code> on page 21).
out_msg_request_confirmation	A <code>uds_msg</code> buffer to store the PUDS request confirmation message also known as loopback message (see <code>uds_msg</code> on page 21).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of initialized channels of the calling application.
<code>PUDS_STATUS_SERVICE_TIMEOUT_CONFIRMATION</code>	Timeout while waiting for request confirmation (request message loopback).
<code>PUDS_STATUS_SERVICE_TIMEOUT_RESPONSE</code>	Timeout while waiting for response message.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is invalid.
<code>PUDS_STATUS_NO_MESSAGE</code>	Indicates that no matching message was received in the given time.
<code>PUDS_STATUS_NETWORK_ERROR</code>	A network error occurred.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

The `UDS_WaitForService_2013` function is a utility function that calls other PCAN-UDS 2.x API functions to simplify UDS communication workflow:

1. The function gets the defined timeouts (global API request and response timeouts and timeouts defined by the current session information with the ECU),
2. Waits for the confirmation of the request's transmission,
3. On success, waits for the response.
4. If a negative response code is received stating that the ECU requires extended timing (`PUDS_NRC_EXTENDED_TIMING`, 0x78), the function switches to the enhanced timeout (enhanced P2CAN server max timeout, see `uds_sessioninfo` on page 22) and waits for another response.
5. Fills the output message with response data.

Even if the `PUDS_MSGTYPE_FLAG_NO_POSITIVE_RESPONSE` flag is set in the PUDS request message, the function will still wait for an eventual Negative Response. If no error message is received the function will return `PUDS_STATUS_NO_MESSAGE`, although in this case it must not be considered as an error. Moreover, if a negative response code `PUDS_NRC_EXTENDED_TIMING` is received the `PUDS_MSGTYPE_FLAG_NO_POSITIVE_RESPONSE` flag is ignored as stated in ISO-14229-1.

The parameters of `UDS_WaitFor*_2013` functions have a new order. They do not keep the order of the previous version.

## Example

The following example shows the use of the function `UDS_WaitForService_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted (service ECUReset), and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel and the mapping were already initialized.

**C/C++**

```

uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ECUReset message
result = UDS_SvcECUReset_2013(PCANTP_HANDLE_USBBUS1, config, &request, PUDS_SVC_PARAM_ER_SR);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
{
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
    if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    {
        printf("Response was received\n");
        UDS_MsgFree_2013(&response);
        UDS_MsgFree_2013(&request_confirmation);
    }
    else
    {
        printf("An error occurred\n");
    }
    UDS_MsgFree_2013(&request);
}
else
{
    printf("An error occurred, while sending the request.\n");
}
}

```

**See also:** [UDS\\_WaitForServiceFunctional\\_2013](#) on page 659.

**Class-method version:** [WaitForService\\_2013](#) on page 248.

### 3.8.27 UDS\_WaitForServiceFunctional\_2013

Handles the communication workflow for a UDS service requested with functional addressing, i.e. multiple responses can be expected. The function waits for a transmit confirmation then for responses. Even if the `PUDS_MSGTYPE_FLAG_NO_POSITIVE_RESPONSE` flag is set, the function will still wait for eventual Negative Responses.

#### Syntax

#### C/C++

```
uds_status UDS_WaitForServiceFunctional_2013(
    cantp_handle channel,
    uds_msg* msg_request,
    uint32_t max_msg_count,
    bool wait_until_timeout,
    uds_msg* out_msg_responses,
    uint32_t* out_msg_count,
    uds_msg* out_msg_request_confirmation);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
Msg_request	A <code>uds_msg</code> containing the PUDS request message that was previously sent (see <code>uds_msg</code> on page 21).
Max_msg_count	Length of the responses buffer array (maximum messages that can be received).
Wait_until_timeout	If false, the function is interrupted if <code>out_msg_count</code> reaches <code>max_msg_count</code> .
Out_msg_responses	A <code>uds_msg</code> buffer array to store the responses messages (see <code>uds_msg</code> on page 21).
Out_msg_count	Output, number of read messages.
Out_msg_request_confirmation	A <code>uds_msg</code> buffer to store the UDS request confirmation message also known as loopback message (see <code>uds_msg</code> on page 21).

#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of initialized channels of the calling application.
<code>PUDS_STATUS_OVERFLOW</code>	Output responses buffer is too small.
<code>PUDS_STATUS_SERVICE_TX_ERROR</code>	An error occurred while transmitting the request.
<code>PUDS_STATUS_SERVICE_TIMEOUT_CONFIRMATION</code>	Timeout while waiting for request confirmation (request message loopback).
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is invalid.
<code>PUDS_STATUS_NO_MESSAGE</code>	Indicates that no matching message was received in the given time.
<code>PUDS_STATUS_NETWORK_ERROR</code>	A network error occurred.
<code>PUDS_STATUS_SERVICE_RX_OVERFLOW</code>	Service received more messages than input buffer expected.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

#### Remarks

The `UDS_WaitForServiceFunctional_2013` function is a utility function that calls other PCAN-UDS 2.x API functions to simplify UDS communication workflow when requests involve functional addressing:


1. The function gets the defined timeouts (global API request and response timeouts and timeouts defined by the current session information with the ECU),
2. Waits for the confirmation of request's transmission,

3. On success, it waits for the responses.
4. The function fills the output messages array with received responses.

The parameters of `UDS_WaitFor*_2013` functions have a new order. They do not keep the order of the previous version.

## Example

The following example shows the use of the function `UDS_WaitForServiceFunctional_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS functional service request is transmitted (service ECUReset), and the `UDS_WaitForServiceFunctional_2013` function is called to get the responses. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

## C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uint32_t response_array_length = 5;
uds_msg response_array[5];
uint32_t count;
uds_msgconfig config;
int i;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
for (i = 0; i < response_array_length; i++)
    memset(&response_array[i], 0, sizeof(uds_msg));

// Set request message configuration
memset(&config, 0, sizeof(config));
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_OBD_FUNCTIONAL;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_FUNCTIONAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ECUReset message
result = UDS_SvcECUReset_2013(PCANTP_HANDLE_USBBUS1, config, &request, PUDS_SVC_PARAM_ER_SR);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
{
    result = UDS_WaitForServiceFunctional_2013(PCANTP_HANDLE_USBBUS1, &request,
        response_array_length, true, response_array, &count, &request_confirmation);
    if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    {
        if (count > 0)
        {
            printf("Responses were received\n");
            for (uint32_t i = 0; i < count; i++)
            {
                UDS_MsgFree_2013(&(response_array[i]));
            }
        }
        else
        {
            printf("No response was received\n");
        }
    }
}
```

```

        }
        UDS_MsgFree_2013(&request_confirmation);
    }
    else
    {
        printf("An error occurred\n");
    }
    UDS_MsgFree_2013(&request);
}
else
{
    printf("An error occurred, while sending the request.\n");
}

```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656.

**Class-method version:** [WaitForServiceFunctional\\_2013](#) on page 252.

### 3.8.28 UDS\_SvcDiagnosticSessionControl\_2013

Writes a UDS request according to the DiagnosticSessionControl service's specifications. The DiagnosticSessionControl service is used to enable different diagnostic sessions in the server.

#### Syntax

#### C/C++

```

uds_status UDS_SvcDiagnosticSessionControl_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg* out_msg_request,
    uint8_t session_type);

```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <a href="#">cantp_handle</a> on page 105).
request_config	Message request configuration (see <a href="#">uds_msgconfig</a> on page 27).
out_msg_request	Output, request message created and sent by the function (see <a href="#">uds_msg</a> on page 21).
session_type	Subfunction parameter: type of the session (see <a href="#">uds_svc_param_dsc</a> on page 71).

#### Returns

The return value is a [uds\\_status](#) code. [PUDS\\_STATUS\\_OK](#) is returned on success. The typical errors in case of failure are:

<a href="#">PUDS_STATUS_NOT_INITIALIZED</a>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<a href="#">PUDS_STATUS_PARAM_INVALID_VALUE</a>	The request configuration is not valid (see <a href="#">uds_msgconfig</a> on page 27), or the given message buffer is null.
<a href="#">PUDS_STATUS_SERVICE_ALREADY_PENDING</a>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <a href="#">UDS_Reset_2013</a> (see <a href="#">UDS_Reset_2013</a> on page 651).
<a href="#">PUDS_STATUS_NO_MEMORY</a>	Failed to allocate memory and copy the new message in the transmission queue.
<a href="#">PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</a>	The given message buffer is already allocated, user must release the buffer before reusing it (see <a href="#">UDS_MsgFree_2013</a> on page 645).


## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see [UDS\\_MsgFree\\_2013](#) on page 645).

If this service is called with the [PUDS\\_MSGTYPE\\_FLAG\\_NO\\_POSITIVE\\_RESPONSE](#) parameter set to ignore responses, the API will automatically change the current session to the new one. Else the session information will be updated when the response is received (only if [UDS\\_WaitForService\\_2013](#) or [UDS\\_WaitForServiceFunctional\\_2013](#) is used).

## Example

The following example shows the use of the service function [UDS\\_SvcDiagnosticSessionControl\\_2013](#) on the channel [PCANTP\\_HANDLE\\_USBBUS1](#). A UDS physical service request is transmitted, and the [UDS\\_WaitForService\\_2013](#) function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical DiagnosticSessionControl message
result = UDS_SvcDiagnosticSessionControl_2013(PCANTP_HANDLE_USBBUS1, config, &request,
    PUDS_SVC_PARAM_DSC_DS);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);
```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656.

**Class-method version:** [SvcDiagnosticSessionControl\\_2013](#) on page 258.

### 3.8.29 UDS\_SvcECUReset\_2013

Writes a UDS request according to the ECUReset service's specifications. The ECUReset service is used by the client to request a server (ECU) reset.

#### Syntax

**C/C++**

```
uds_status UDS_SvcECUReset_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t reset_type);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <a href="#">cantp_handle</a> on page 105).
request_config	Message request configuration (see <a href="#">uds_msgconfig</a> on page 27).
out_msg_request	Output, request message created and sent by the function (see <a href="#">uds_msg</a> on page 21).
reset_type	Subfunction parameter: type of reset (see <a href="#">uds_svc_param_er</a> on page 72).

#### Returns

The return value is a [uds\\_status](#) code. [PUDS\\_STATUS\\_OK](#) is returned on success. The typical errors in case of failure are:

<a href="#">PUDS_STATUS_NOT_INITIALIZED</a>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<a href="#">PUDS_STATUS_PARAM_INVALID_VALUE</a>	The request configuration is not valid (see <a href="#">uds_msgconfig</a> on page 27), or the given message buffer is null.
<a href="#">PUDS_STATUS_SERVICE_ALREADY_PENDING</a>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <a href="#">UDS_Reset_2013</a> (see <a href="#">UDS_Reset_2013</a> on page 651).
<a href="#">PUDS_STATUS_NO_MEMORY</a>	Failed to allocate memory and copy the new message in the transmission queue.
<a href="#">PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</a>	The given message buffer is already allocated, user must release the buffer before reusing it (see <a href="#">UDS_MsgFree_2013</a> on page 645).


#### Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see [UDS\\_MsgFree\\_2013](#) on page 645).

After receiving a positive response to UDS request ECUReset with the help of function [UDS\\_WaitForService\\_2013](#), the API will revert the session information of that ECU to the default diagnostic session.

#### Example

The following example shows the use of the service function [UDS\\_SvcECUReset\\_2013](#) on the channel [PCANTP\\_HANDLE\\_USBBUS1](#). A UDS physical service request is transmitted, and the [UDS\\_WaitForService\\_2013](#) function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

**C/C++**

```

uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ECUReset message
result = UDS_SvcECUReset_2013(PCANTP_HANDLE_USBBUS1, config, &request, PUDS_SVC_PARAM_ER_SR);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
    &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656.

**Class-method version:** [SvcECUReset\\_2013](#) on page 262.

### 3.8.30 UDS\_SvcSecurityAccess\_2013

Writes a UDS request according to the SecurityAccess service's specifications. SecurityAccess service provides a mean to access data and/or diagnostic services which have restricted access for security, emissions, or safety reasons.

**Syntax****C/C++**

```

uds_status UDS_SvcSecurityAccess_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t security_access_type,
    uint8_t * security_access_data,
    uint32_t security_access_data_size);

```



## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).
security_access_type	Subfunction parameter: type of security access (see SecurityAccess Type Definitions on page 765)
security_access_data	If Requesting Seed, buffer is the optional data to transmit to a server/ECU (like identification). If Sending Key, data holds the value generated by the security algorithm corresponding to a specific "seed" value.
security_access_data_size	Size in bytes of the buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_OVERFLOW</code>	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data size.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the service function `UDS_SvcSecurityAccess_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
```

```

config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical SecurityAccess message
uint8_t data = 0x42;
result = UDS_SvcSecurityAccess_2013(PCANTP_HANDLE_USBBUS1, config, &request,
    PUDS_SVC_PARAM_SA_RSD_3, &data, 1);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656, [SecurityAccess Type Definitions](#) on page 765.

**Class-method version:** [SvcSecurityAccess\\_2013](#) on page 267.

### 3.8.31 UDS\_SvcCommunicationControl\_2013

Writes a UDS request according to the CommunicationControl service's specifications. CommunicationControl service's purpose is to switch on/off the transmission and/or the reception of certain messages of (a) server(s)/ECU(s).

#### Syntax

**C**

```

uds_status UDS_SvcCommunicationControl_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t control_type,
    uint8_t communication_type,
    uint16_t node_identification_number);

```

**C++**

```

uds_status UDS_SvcCommunicationControl_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t control_type,
    uint8_t communication_type,
    uint16_t node_identification_number = 0);

```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <a href="#">cantp_handle</a> on page 105).

Parameter	Description
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).
control_type	Subfunction parameter: type of communication control (see <code>uds_svc_param_cc</code> on page 74).
communication_type	A bit-code value to reference the kind of communication to be controlled (see CommunicationControl Communication Type Definitions on page 766).
node_identification_number	A two bytes value, identify a node on a sub-network, only used with <code>PUDS_SVC_PARAM_CC_ERXDTXWEAI</code> or <code>PUDS_SVC_PARAM_CC_ERXTXWEAI</code> control type)

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the service function `UDS_SvcCommunicationControl_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
```

```

config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical CommunicationControl message
result = UDS_SvcCommunicationControl_2013(PCANTP_HANDLE_USBBUS1, config, &request,
    PUDS_SVC_PARAM_CC_ERCTX, PUDS_SVC_PARAM_CC_FLAG_APPL | PUDS_SVC_PARAM_CC_FLAG_NWM |
    PUDS_SVC_PARAM_CC_FLAG_DENWRIRO, 0);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656, [CommunicationControl Communication Type Definitions](#) on page 766.

**Class-method version:** [SvcCommunicationControl\\_2013](#) on page 276.

### 3.8.32 UDS\_SvcTesterPresent\_2013

Writes a UDS request according to the TesterPresent service's specifications. TesterPresent service indicates to the server(s)/ECU(s) that a client is still connected to the vehicle and that certain diagnostic services and/or communications that have been previously activated are to remain active.

#### Syntax

##### C

```

uds_status UDS_SvcTesterPresent_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t testerpresent_type);

```

##### C++

```

uds_status UDS_SvcTesterPresent_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t testerpresent_type = PUDS_SVC_PARAM_TP_ZSUBF);

```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <a href="#">cantp_handle</a> on page 105).
request_config	Message request configuration (see <a href="#">uds_msgconfig</a> on page 27).
out_msg_request	Output, request message created and sent by the function (see <a href="#">uds_msg</a> on page 21).
testerpresent_type	No Subfunction parameter by default (see <a href="#">uds_svc_param_tp</a> on page 75).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the service function `UDS_SvcTesterPresent_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

## C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request)) ;
memset(&request_confirmation, 0, sizeof(request_confirmation)) ;
memset(&response, 0, sizeof(response)) ;
memset(&config, 0, sizeof(config)) ;

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;

// Sends a physical TesterPresent message with no positive response
config.type = PUDS_MSGTYPE_USDT | PUDS_MSGTYPE_FLAG_NO_POSITIVE_RESPONSE;
result = UDS_SvcTesterPresent_2013(PCANTP_HANDLE_USBBUS1, config, &request,
    PUDS_SVC_PARAM_TP_ZSUBF);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
```

```

        printf("Response was received\n");
else if (UDS_StatusIsOk_2013(result, PUDS_STATUS_NO_MESSAGE, false))
    printf("No error response\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

**See also:** `UDS_WaitForService_2013` on page 656, `uds_svc_param_tp` on page 75.

**Class-method version:** `SvcTesterPresent_2013` on page 285.

### 3.8.33 UDS\_SvcSecuredDataTransmission\_2013

Writes a UDS request according to the SecuredDataTransmission service's specifications(ISO-14229-1:2013). SecuredDataTransmission service's purpose is to transmit data that is protected against attacks from third parties, which could endanger data security.

#### Syntax

#### C/C++

```

uds_status UDS_SvcSecuredDataTransmission_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t * security_data_request_record,
    uint32_t security_data_request_record_size);

```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
Request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
Out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).
Security_data_request_record	Buffer containing the data as processed by the security sub-layer (See ISO-15764).
Security_data_request_record_size	Size in bytes of the buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_OVERFLOW</code>	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data size.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

When using SecuredDataTransmission service, user may need to construct a `security_data_request_record` that is equal to another UDS service request definition. That is why `UDS_Svc*` functions can be called with `PUDS_ONLY_PREPARE_REQUEST` as channel identifier (instead of using `cantp_handle`): it prepares the `uds_msg` structure without sending it.

## Example

The following example shows the use of the service function `UDS_SvcSecuredDataTransmission_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized. The example shows the use of a numeric buffer and points out the fact that Windows uses Little Endian Byte order and the `UDS_SvcXXX` functions expect data in Big Endian Byte Order.

## C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uint32_t dw_buffer;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
```

```

config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Note: next a function is called to set MSB as 1st byte in the buffer
// (Win32 uses little endian format, UDS expects big endian)
uint32_t value_little_endian = 0xF0A1B2C3;
dw_buffer = Reverse32(&value_little_endian);

// Sends a physical SecuredDataTransmission message
result = UDS_SvcSecuredDataTransmission_2013(PCANTP_HANDLE_USBBUS1, config, &request,
    (uint8_t*)&dw_buffer, 4);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

**See also:** `UDS_WaitForService_2013` on page 656.

**Class-method version:** `SvcSecuredDataTransmission_2013` on page 293.

### 3.8.34 UDS\_SvcSecuredDataTransmission\_2020

Writes a UDS request according to the SecuredDataTransmission service's specifications (ISO-14229-1:2020). SecuredDataTransmission service's purpose is to transmit data that is protected against attacks from third parties, which could endanger data security.

#### Syntax

#### C/C++

```

uds_status UDS_SvcSecuredDataTransmission_2020(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint16_t administrative_parameter,
    uint8_t signature_encryption_calculation,
    uint16_t anti_replay_counter,
    uint8_t internal_service_identfier,
    uint8_t *service_specific_parameters,
    uint32_t service_specific_parameters_size,
    uint8_t *signature_mac,
    uint16_t signature_size);

```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).



Parameter	Description
administrative_parameter	Security features used in the message (see SecuredDataTransmission Administrative Parameter Flags Definitions on page 767)
signature_encryption_calculation	Signature or encryption algorithm identifier.
anti_replay_counter	Anti-replay counter value.
internal_service_identifier	Internal message service request identifier (see uds_service on page 53).
service_specific_parameters	Buffer that contains internal message service request data.
service_specific_parameters_size	Internal message service request data size (in bytes).
signature_mac	Buffer that contains signature used to verify the message.
signature_size	Size in bytes of the signature.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_OVERFLOW</code>	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data size.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).


## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

When using `SecuredDataTransmission` service, user may need to construct a `security_data_request_record` that is equal to another UDS service request definition. That is why `UDS_Svc*` functions can be called with `PUDS_ONLY_PREPARE_REQUEST` as channel identifier (instead of using `cantp_handle`): it prepares the `uds_msg` structure without sending it.

## Example

The following example shows the use of the service function `UDS_SvcSecuredDataTransmission_2020` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;
uint16_t administrative_parameter;
uint8_t signature_encryption_calculation;
```

```

uint16_t anti_replay_counter;
uint8_t internal_service_identifier;
uint8_t service_specific_parameters[4];
uint32_t service_specific_parameters_size;
uint8_t signature_mac[6];
uint16_t signature_size;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical SecuredDataTransmission message
administrative_parameter = PUDS_SVC_PARAM_APAR_REQUEST_MSG_FLAG |
    PUDS_SVC_PARAM_APAR_REQUEST_RESPONSE_SIGNATURE_FLAG |
    PUDS_SVC_PARAM_APAR_SIGNED_MSG_FLAG;
signature_encryption_calculation = 0x0;
anti_replay_counter = 0x0124;
internal_service_identifier = 0x2E;
service_specific_parameters[0] = 0xF1;
service_specific_parameters[1] = 0x23;
service_specific_parameters[2] = 0xAA;
service_specific_parameters[3] = 0x55;
service_specific_parameters_size = 4;
signature_mac[0] = 0xDB;
signature_mac[1] = 0xD1;
signature_mac[2] = 0x0E;
signature_mac[3] = 0xDC;
signature_mac[4] = 0x55;
signature_mac[5] = 0xAA;
signature_size = 0x0006;
result = UDS_SvcSecuredDataTransmission_2020(PCANTP_HANDLE_USBBUS1, config, &request,
    administrative_parameter, signature_encryption_calculation, anti_replay_counter,
    internal_service_identifier, service_specific_parameters,
    service_specific_parameters_size, signature_mac, signature_size);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

**See also:** SecuredDataTransmission Administrative Parameter Flags Definitions on page 767,  
[UDS\\_WaitForService\\_2013](#) on page 656.

**Class-method version:** [SvcSecuredDataTransmission\\_2020](#) on page 298.

### 3.8.35 UDS\_SvcControlDTCSetting\_2013

Writes a UDS request according to the ControlDTCSetting service's specifications. ControlDTCSetting service shall be used by a client to stop or resume the setting of diagnostic trouble codes (DTCs) in the server(s).

#### Syntax

#### C/C++

```
uds_status UDS_SvcControlDTCSetting_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t dtc_setting_type,
    uint8_t * dtc_setting_control_option_record,
    uint32_t dtc_setting_control_option_record_size);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
Request_config	Message request configuration (see uds_msgconfig on page 27).
Out_msg_request	Output, request message created and sent by the function (see uds_msg on page 21).
Dtc_setting_type	Subfunction parameter (see uds_svc_param_cdtcs on page 76).
Dtc_setting_control_option_record	This parameter record is user-optional and transmits data to a server (ECU) when controlling the DTC setting. It can contain a list of DTCs to be turned on or off.
Dtc_setting_control_option_record_size	Size in bytes of the buffer.

#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is not valid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	The mapping given in the message configuration is unknown.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_OVERFLOW	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data size.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

#### Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

#### Example

The following example shows the use of the service function `UDS_SvcControlDTCSetting_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized. The example shows the use of a numeric buffer and points out the fact that Windows uses Little Endian Byte order and the `UDS_SvcXXX` functions expect data in Big Endian Byte Order.

## C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uint32_t dw_buffer;
uds_msgconfig config;

memset(&request, 0, sizeof(request)) ;
memset(&request_confirmation, 0, sizeof(request_confirmation)) ;
memset(&response, 0, sizeof(response)) ;
memset(&config, 0, sizeof(config)) ;

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Note: next a function is called to set MSB as 1st byte in the buffer
// (Win32 uses little endian format, UDS expects big endian)
uint32_t value_little_endian = 0xF0A1B2C3;
dw_buffer = Reverse32(&value_little_endian);
// Sends a physical ControlDTCSetting message
result = UDS_SvcControlDTCSetting_2013(PCANTP_HANDLE_USBBUS1, config, &request,
    PUDS_SVC_PARAM_CDTCS_OFF, (uint8_t*)&dw_buffer, 3);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);
```

**See also:** `UDS_WaitForService_2013` on page 656, `uds_svc_param_cdtcs` on page 76.

**Class-method version:** `SvcControlDTCSetting_2013` on page 305.

### 3.8.36 UDS\_SvcResponseOnEvent\_2013

Writes a UDS request according to the ResponseOnEvent service's specifications. The ResponseOnEvent service requests a server (ECU) to start or stop transmission of responses on a specified event.

#### Syntax

##### C

```
uds_status UDS_SvcResponseOnEvent_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t event_type,
    bool store_event,
    uint8_t event_window_time,
    uint8_t * event_type_record,
    uint32_t event_type_record_size,
    uint8_t * service_to_respond_to_record,
    uint32_t service_to_respond_to_record_size);
```

##### C++

```
uds_status UDS_SvcResponseOnEvent_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t event_type,
    bool store_event,
    uint8_t event_window_time,
    uint8_t * event_type_record = nullptr,
    uint32_t event_type_record_size = 0,
    uint8_t * service_to_respond_to_record = nullptr,
    uint32_t service_to_respond_to_record_size = 0);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the function (see uds_msg on page 21).
event_type	Subfunction parameter: event type (see uds_svc_param_roe on page 77).
store_event	Storage state (true to store event, false to do not store event).
event_window_time	Specify a window for the event logic to be active in the server/ECU (see ResponseOnEvent Service Definitions on page 766).
event_type_record	Additional parameters for the specified event type.
event_type_record_size	Size in bytes of the event type record (see ResponseOnEvent Service Definitions on page 766).
service_to_respond_to_record	Service parameters, with first byte as service identifier (see uds_svc_param_roe_recommended_service_id on page 78)
service_to_respond_to_record_size	Size in bytes of the service to respond to record.

#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is not valid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	The mapping given in the message configuration is unknown.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with UDS_Reset_2013 (see UDS_Reset_2013 on page 651).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_OVERFLOW	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data size.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see UDS_MsgFree_2013 on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see [UDS\\_MsgFree\\_2013](#) on page 645).

## Example

The following example shows the use of the service function [UDS\\_SvcResponseOnEvent\\_2013](#) on the channel [PCANTP\\_HANDLE\\_USBBUS1](#). A UDS physical service request is transmitted, and the [UDS\\_WaitForService\\_2013](#) function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

## C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uint8_t event_type_record[5];
uint8_t service_to_respond_to_record[5];
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ResponseOnEvent message
event_type_record[0] = PUDS_SVC_PARAM_RDTCTI_RNODTCBSM;
event_type_record[1] = 0x01;
service_to_respond_to_record[0] = 0x08;
service_to_respond_to_record[1] = PUDS_SI_ReadDTCInformation;
result = UDS_SvcResponseOnEvent_2013(PCANTP_HANDLE_USBBUS1, config, &request,
                                     PUDS_SVC_PARAM_ROE_ONDTCS, false, 0x08, event_type_record, 2,
```

```

        service_to_respond_to_record, 2);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656, [ResponseOnEvent Service Definitions](#) on page 766.

**Class-method version:** [SvcResponseOnEvent\\_2013](#) on page 314.

### 3.8.37 UDS\_SvcLinkControl\_2013

Writes a UDS request according to the LinkControl service's specifications. The LinkControl service is used to control the communication link baud rate between the client and the server(s)/ECU(s) for the exchange of diagnostic data.

#### Syntax

#### C

```

uds_status UDS_SvcLinkControl_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t link_control_type,
    uint8_t baudrate_identifier,
    uint32_t link_baudrate);

```

#### C++

```

uds_status UDS_SvcLinkControl_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t link_control_type,
    uint8_t baudrate_identifier,
    uint32_t link_baudrate = 0);

```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <a href="#">cantp_handle</a> on page 105).
request_config	Message request configuration (see <a href="#">uds_msgconfig</a> on page 27).
out_msg_request	Output, request message created and sent by the function (see <a href="#">uds_msg</a> on page 21).
link_control_type	Subfunction parameter: link control type (see <a href="#">uds_svc_param_lc</a> on page 79).
baudrate_identifier	Defined baud rate identifier (see <a href="#">uds_svc_param_lc_baudrate_identifier</a> on page 80).
link_baudrate	Used only with <a href="#">PUDS_SVC_PARAM_LC_VBTWSBR</a> parameter: a three-byte value baud rate (baud rate High, Middle and Low Bytes).



## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the service function `UDS_SvcLinkControl_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical LinkControl message (Verify Fixed Baudrate)
result = UDS_SvcLinkControl_2013(PCANTP_HANDLE_USBBUS1, config, &request,
    PUDS_SVC_PARAM_LC_VBTWFBF, PUDS_SVC_PARAM_LC_BAUDRATE_CAN_250K, 0);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
```



```

else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656.

**Class-method version:** [SvcLinkControl\\_2013](#) on page 328.

### 3.8.38 UDS\_SvcReadDataByIdentifier\_2013

Writes a UDS request according to the ReadDataByIdentifier service's specifications. The ReadDataByIdentifier service allows the client to request data record values from the server (ECU) identified by one or more data identifiers.

#### Syntax

#### C/C++

```

uds_status UDS_SvcReadDataByIdentifier_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint16_t * data_identifier,
    uint32_t data_identifier_length);

```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <a href="#">cantp_handle</a> on page 105).
request_config	Message request configuration (see <a href="#">uds_msgconfig</a> on page 27).
out_msg_request	Output, request message created and sent by the function (see <a href="#">uds_msg</a> on page 21).
data_identifier	Buffer containing a list of two-byte data identifiers (see <a href="#">uds_svc_param_di</a> on page 82).
data_identifier_length	Number of elements in the buffer (size in UInt16 of the buffer).

#### Returns

The return value is a [uds\\_status](#) code. [PUDS\\_STATUS\\_OK](#) is returned on success. The typical errors in case of failure are:


<a href="#">PUDS_STATUS_NOT_INITIALIZED</a>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<a href="#">PUDS_STATUS_PARAM_INVALID_VALUE</a>	One of the given parameters is not valid.
<a href="#">PUDS_STATUS_MAPPING_NOT_INITIALIZED</a>	The mapping given in the message configuration is unknown.
<a href="#">PUDS_STATUS_SERVICE_ALREADY_PENDING</a>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <a href="#">UDS_Reset_2013</a> (see <a href="#">UDS_Reset_2013</a> on page 651).
<a href="#">PUDS_STATUS_NO_MEMORY</a>	Failed to allocate memory and copy the new message in the transmission queue.
<a href="#">PUDS_STATUS_OVERFLOW</a>	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data length.
<a href="#">PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</a>	The given message buffer is already allocated, user must release the buffer before reusing it (see <a href="#">UDS_MsgFree_2013</a> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see [UDS\\_MsgFree\\_2013](#) on page 645).

## Example

The following example shows the use of the service function [UDS\\_SvcReadDataByIdentifier\\_2013](#) on the channel [PCANTP\\_HANDLE\\_USBBUS1](#). A UDS physical service request is transmitted, and the [UDS\\_WaitForService\\_2013](#) function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDataByIdentifier message
uint16_t buffer[2] = { PUDS_SVC_PARAM_DI_ADSDID, PUDS_SVC_PARAM_DI_ECUMDDID };
result = UDS_SvcReadDataByIdentifier_2013(PCANTP_HANDLE_USBBUS1, config, &request, buffer, 2);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
    &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);
```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656, [uds\\_svc\\_param\\_di](#) on page 82.

**Class-method version:** [SvcReadDataByIdentifier\\_2013](#) on page 337.

### 3.8.39 UDS\_SvcReadMemoryByAddress\_2013

Writes a UDS request according to the ReadMemoryByAddress service's specifications. The ReadMemoryByAddress service allows the client to request memory data from the server (ECU) via a provided starting address and to specify the size of memory to be read.

#### Syntax

##### C/C++

```
uds_status UDS_SvcReadMemoryByAddress_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t * memory_address_buffer,
    uint8_t memory_address_size,
    uint8_t * memory_size_buffer,
    uint8_t memory_size_size);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the function (see uds_msg on page 21).
memory_address_buffer	Starting address of server (ECU) memory from which data is to be retrieved.
memory_address_size	Size in bytes of the memory address buffer (max.: 0xF).
memory_size_buffer	Number of bytes to be read starting at the address specified by memory address.
memory_size_size	Size in bytes of the memory size buffer (max.: 0xF).

#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is not valid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	The mapping given in the message configuration is unknown.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with UDS_Reset_2013 (see UDS_Reset_2013 on page 651).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see UDS_MsgFree_2013 on page 645).

#### Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

#### Example

The following example shows the use of the service function `UDS_SvcReadMemoryByAddress_2013` on the channel `PCANTP_HANDLE_USBUS1`. A UDS physical service request is transmitted, and the

`UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized.

## C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uint8_t memory_address_buffer[10];
uint8_t memory_size_buffer[10];
uint8_t memory_address_size = 10;
uint8_t memory_size_size = 3;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Fill data
for (int i = 0; i < memory_address_size; i++)
{
    memory_address_buffer[i] = 'A' + i;
    memory_size_buffer[i] = '1' + i;
}

// Sends a physical ReadMemoryByAddress message
result = UDS_SvcReadMemoryByAddress_2013(PCANTP_HANDLE_USBBUS1, config, &request,
    memory_address_buffer, memory_address_size, memory_size_buffer, memory_size_size);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);
```

**See also:** `UDS_WaitForService_2013` on page 656.

**Class-method version:** `SvcReadMemoryByAddress_2013` on page 342.

### 3.8.40 UDS\_SvcReadScalingDataByIdentifier\_2013

Writes a UDS request according to the ReadScalingDataByIdentifier service's specifications. The ReadScalingDataByIdentifier service allows the client to request scaling data record information from the server (ECU) identified by a data identifier.

#### Syntax

#### C/C++

```
uds_status UDS_SvcReadScalingDataByIdentifier_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint16_t data_identifier);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the function (see uds_msg on page 21).
data_identifier	A two-byte data identifier (see uds_svc_param_di on page 82).

#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The request configuration is not valid (see uds_msgconfig on page 27), or the given message buffer is null.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with UDS_Reset_2013 (see UDS_Reset_2013 on page 651).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see UDS_MsgFree_2013 on page 645).

#### Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

#### Example

The following example shows the use of the service function `UDS_SvcReadScalingDataByIdentifier_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

**C/C++**

```

uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadScalingDataByIdentifier message
result = UDS_SvcReadScalingDataByIdentifier_2013(PCANTP_HANDLE_USBBUS1, config, &request,
    PUDS_SVC_PARAM_DI_BSFPDID);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656, [uds\\_svc\\_param\\_di](#) on page 82.

**Class-method version:** [SvcReadScalingDataByIdentifier\\_2013](#) on page 347.

### 3.8.41 UDS\_SvcReadDataByPeriodicIdentifier\_2013

Writes a UDS request according to the ReadDataByPeriodicIdentifier service's specifications. The ReadDataByPeriodicIdentifier service allows the client to request the periodic transmission of data record values from the server (ECU) identified by one or more periodic data identifiers.

**Syntax****C/C++**

```

uds_status UDS_SvcReadDataByPeriodicIdentifier_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t transmission_mode,
    uint8_t *periodic_data_identifier,
    uint32_t periodic_data_identifier_length);

```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).
transmission_mode	Transmission rate mode (see <code>uds_svc_param_rdbpi</code> on page 86).
periodic_data_identifier	Buffer containing a list of periodic data identifiers (see <code>uds_svc_param_di</code> on page 82).
periodic_data_identifier_length	Number of elements in the buffer (size in bytes of the buffer).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_OVERFLOW</code>	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data length.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the service function `UDS_SvcReadDataByPeriodicIdentifier_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uint8_t periodic_data_identifier[10];
uint16_t periodic_data_identifier_size = 10;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
```

```

config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Fill Data
for (int i = 0; i < periodic_data_identifier_size; i++)
{
    periodic_data_identifier[i] = 'A' + i;
}

// Sends a physical ReadDataByPeriodicIdentifier message
result = UDS_SvcReadDataByPeriodicIdentifier_2013(PCANTP_HANDLE_USBBUS1, config, &request,
    PUDS_SVC_PARAM_RDBPI_SAMR, periodic_data_identifier, periodic_data_identifier_size);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

**See also:** `UDS_WaitForService_2013` on page 656, `uds_svc_param_di` on page 82.

**Class-method version:** `SvcReadDataByPeriodicIdentifier_2013` on page 351.

### 3.8.42 UDS\_SvcDynamicallyDefineDataIdentifierDBID\_2013

Writes a UDS request according to the DynamicallyDefineDataIdentifier service's specifications. The DynamicallyDefineDataIdentifier service allows the client to dynamically define in a server (ECU) a data identifier that can be read via the ReadDataByIdentifier service later. The Define by identifier subfunction specifies that the definition of the dynamic data identifier shall occur via a data identifier reference.

#### Syntax

##### C/C++

```

uds_status UDS_SvcDynamicallyDefineDataIdentifierDBID_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint16_t dynamically_defined_data_identifier,
    uint16_t * source_data_identifier,
    uint8_t * memory_size,
    uint8_t * position_in_source_data_record,
    uint32_t number_of_elements);

```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).



Parameter	Description
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).
dynamically_defined_data_identifier	A two-byte data identifier (see <code>uds_svc_param_di</code> on page 82).
source_data_identifier	Buffer containing the sources of information to be included into the dynamic data record.
memory_size	Buffer containing the total numbers of bytes from the source data record address.
position_in_source_data_record	Buffer containing the starting byte positions of the excerpt of the source data record.
number_of_elements	Number of <code>source_data_identifier</code> / <code>position_in_source_data_record</code> / <code>memory_size</code> triplet.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_OVERFLOW</code>	The total buffer length is too big. The resulting UDS message data size is bigger than the maximum data length.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the service function `UDS_SvcDynamicallyDefineDataIdentifierDBID_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uint16_t source_data_identifier[10];
uint8_t memory_size[10];
uint8_t position_in_source_data_record[10];
uint16_t number_of_elements = 10;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
```

```

config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Fill Data
for (int i = 0; i < number_of_elements; i++)
{
    source_data_identifier[i] = ((0xF0 + i) << 8) + ('A' + i);
    memory_size[i] = i + 1;
    position_in_source_data_record[i] = 100 + i;
}

// Sends a physical DynamicallyDefineDataIdentifierDBID message
result = UDS_SvcDynamicallyDefineDataIdentifierDBID_2013(PCANTP_HANDLE_USBBUS1, config,
    &request, PUDS_SVC_PARAM_DI_CDDID, source_data_identifier, memory_size,
    position_in_source_data_record, number_of_elements);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656.

**Class-method version:** [SvcDynamicallyDefineDataIdentifierDBID\\_2013](#) on page 356.

### 3.8.43 UDS\_SvcDynamicallyDefineDataIdentifierDBMA\_2013

Writes a UDS request according to the DynamicallyDefineDataIdentifier service's specifications. The DynamicallyDefineDataIdentifier service allows the client to dynamically define in a server (ECU) a data identifier that can be read via the ReadDataByIdentifier service later. The define by memory Address subfunction specifies that the definition of the dynamic data identifier shall occur via an address reference.

#### Syntax

##### C/C++

```

uds_status UDS_SvcDynamicallyDefineDataIdentifierDBMA_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint16_t dynamically_defined_data_identifier,
    uint8_t memory_address_size,
    uint8_t memory_size_size,
    uint8_t * memory_address_buffer,
    uint8_t * Memory_size_buffer,
    uint32_t number_of_elements);

```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).
dynamically_defined_data_identifier	A two-byte data identifier (see <code>uds_svc_param_di</code> on page 82).
memory_address_size	Size in bytes of the memory address items in the memory address buffer (max.: 0xF).
memory_size_size	Size in bytes of the memory size items in the memory size buffer (max.: 0xF).
memory_address_buffer	buffer containing the MemoryAddress buffer, must be an array of 'number_of_elements' items whose size is 'memory_address_size' (size is 'number_of_elements * memory_address_size' bytes)
memory_size_buffer	buffer containing the MemorySize buffer, must be an array of 'number_of_elements' items whose size is 'memory_size_size' (size is 'number_of_elements * memory_size_size' bytes)
number_of_elements	Number of memory address/memory_size couple.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_OVERFLOW</code>	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data length.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the service function `UDS_SvcDynamicallyDefineDataIdentifierDBMA_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uint16_t number_of_elements = 3;
uint8_t memory_address_buffer[15];
uint8_t memory_size_buffer[9];
uint8_t memory_address_size = 5;
uint8_t memory_size_size = 3;
```

```

uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Fill data
for (int j = 0; j < number_of_elements; j++)
{
    for (int i = 0; i < memory_address_size; i++)
    {
        memory_address_buffer[memory_address_size*j + i] = (10 * j) + i + 1;
    }
    for (int i = 0; i < memory_size_size; i++)
    {
        memory_size_buffer[memory_size_size*j + i] = 100 + (10 * j) + i + 1;
    }
}

// Sends a physical DynamicallyDefineDataIdentifierDBMA message
result = UDS_SvcDynamicallyDefineDataIdentifierDBMA_2013(PCANTP_HANDLE_USBBUS1, config,
    &request, PUDS_SVC_PARAM_DI_CESWNDID, memory_address_size, memory_size_size,
    memory_address_buffer, memory_size_buffer, number_of_elements);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656, [uds\\_svc\\_param\\_di](#) on page 82.

**Class-method version:** [SvcDynamicallyDefineDataIdentifierDBMA\\_2013](#) on page 362.

### 3.8.44 UDS\_SvcDynamicallyDefineDataIdentifierCDDDI\_2013

Writes a UDS request according to the Clear Dynamically Defined Data Identifier service's specifications. The Clear Dynamically Defined Data Identifier subfunction shall be used to clear the specified dynamic data identifier.

#### Syntax

#### C/C++

```
uds_status UDS_SvcDynamicallyDefineDataIdentifierCDDDI_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint16_t dynamically_defined_data_identifier);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the function (see uds_msg on page 21).
dynamically_defined_data_identifier	A two-byte data identifier (see uds_svc_param_di on page 82).

#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The request configuration is not valid (see uds_msgconfig on page 27), or the given message buffer is null.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

#### Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

#### Example

The following example shows the use of the service function `UDS_SvcDynamicallyDefineDataIdentifierCDDDI_2013` on the channel `PCANTP_HANDLE_USBUSB1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

#### C/C++

```
uds_status result;
uds_msg request;
```

```

uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical DynamicallyDefineDataIdentifierCDDDI message
result = UDS_SvcDynamicallyDefineDataIdentifierCDDDI_2013(PCANTP_HANDLE_USBBUS1, config,
    &request, PUDS_SVC_PARAM_DI_CESWNDID);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656, [uds\\_svc\\_param\\_di](#) on page 82.

**Class-method version:** [SvcDynamicallyDefineDataIdentifierCDDDI\\_2013](#) on page 368.

### 3.8.45 UDS\_SvcDynamicallyDefineDataIdentifierClearAllDDDI\_2013

Writes a UDS request according to the Clear all Dynamically Defined Data Identifier service's specifications. The Clear Dynamically Defined Data Identifier subfunction (without data identifier parameter) shall be used to clear all the specified dynamic data identifier in the server.

#### Syntax

##### C/C++

```

uds_status UDS_SvcDynamicallyDefineDataIdentifierClearAllDDDI_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg* out_msg_request);

```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <a href="#">cantp_handle</a> on page 105).
request_config	Message request configuration (see <a href="#">uds_msgconfig</a> on page 27).

Parameter	Description
out_msg_request	Output, request message created and sent by the function (see uds_msg on page 21).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the service function `UDS_SvcDynamicallyDefineDataIdentifierClearAllDDDI_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

## C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical DynamicallyDefineDataIdentifierClearAllDDDI message
result = UDS_SvcDynamicallyDefineDataIdentifierClearAllDDDI_2013(PCANTP_HANDLE_USBBUS1, config,
&request);
```

```

if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);

UDS_MsgFree_2013(&request_confirmation);

```

**See also:** `UDS_WaitForService_2013` on page 656.

**Class-method version:** `SvcDynamicallyDefineDataIdentifierClearAllDDDI_2013` on page 372.

### 3.8.46 UDS\_SvcWriteDataByIdentifier\_2013

Writes a UDS request according to the WriteDataByIdentifier service's specifications. The WriteDataByIdentifier service allows the client to write information into the server (ECU) at an internal location specified by the provided data identifier.

#### Syntax

#### C/C++

```

uds_status UDS_SvcWriteDataByIdentifier_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint16_t data_identifier,
    uint8_t * data_record,
    uint32_t data_record_size);

```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).
data_identifier	A two-byte data identifier (see <code>uds_svc_param_di</code> on page 82).
data_record	Buffer containing the data to write.
data_record_size	Size in bytes of the buffer.

#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:




PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is not valid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	The mapping given in the message configuration is unknown.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_OVERFLOW	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data length.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the service function `UDS_SvcWriteDataByIdentifier_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

## C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uint8_t data_record[10];
uint16_t data_record_size = 10;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Fill Data
for (int i = 0; i < data_record_size; i++)
{
    data_record[i] = 'A' + i;
}

// Sends a physical WriteDataByIdentifier message
```

```

result = UDS_SvcWriteDataByIdentifier_2013(PCANTP_HANDLE_USBBUS1, config, &request,
    PUDS_SVC_PARAM_DI_ASFDPID, data_record, data_record_size);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656, [uds\\_svc\\_param\\_di](#) on page 82.

**Class-method version:** [SvcWriteDataByIdentifier\\_2013](#) on page 376.

### 3.8.47 UDS\_SvcWriteMemoryByAddress\_2013

Writes a UDS request according to the WriteMemoryByAddress service's specifications. The WriteMemoryByAddress service allows the client to write information into the server (ECU) at one or more contiguous memory locations.

#### Syntax

#### C/C++

```

uds_status UDS_SvcWriteMemoryByAddress_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t * memory_address_buffer,
    uint8_t memory_address_size,
    uint8_t * memory_size_buffer,
    uint8_t memory_size_size,
    uint8_t * data_record,
    uint32_t data_record_size);

```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <a href="#">cantp_handle</a> on page 105).
request_config	Message request configuration (see <a href="#">uds_msgconfig</a> on page 27).
out_msg_request	Output, request message created and sent by the function (see <a href="#">uds_msg</a> on page 21).
memory_address_buffer	Starting address buffer of server (ECU) memory to which data is to be written.
memory_address_size	Size in bytes of the memory address buffer (max.: 0xF).
memory_size_buffer	Number of bytes to be written starting at the address specified by memory address.
memory_size_size	Size in bytes of the memory size buffer (max.: 0xF).
data_record	Buffer containing the data to write.
data_record_size	Size in bytes of the buffer.

#### Returns

The return value is a [uds\\_status](#) code. [PUDS\\_STATUS\\_OK](#) is returned on success. The typical errors in case of failure are:


PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is not valid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	The mapping given in the message configuration is unknown.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with UDS_Reset_2013 (see UDS_Reset_2013 on page 651).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_OVERFLOW	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data length.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see UDS_MsgFree_2013 on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see [UDS\\_MsgFree\\_2013](#) on page 645).

## Example

The following example shows the use of the service function [UDS\\_SvcWriteMemoryByAddress\\_2013](#) on the channel [PCANTP\\_HANDLE\\_USBBUS1](#). A UDS physical service request is transmitted, and the [UDS\\_WaitForService\\_2013](#) function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uint8_t data_record[50];
uint8_t memory_address_buffer[50];
uint8_t memory_size_buffer[50];
uint16_t data_record_size = 50;
uint8_t memory_address_size = 5;
uint8_t memory_size_size = 3;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Fill Data
for (int i = 0; i < data_record_size; i++)
{
```

```

    data_record[i] = i + 1;
    memory_address_buffer[i] = 'A' + i;
    memory_size_buffer[i] = 10 + i;
}

// Sends a physical WriteMemoryByAddress message
result = UDS_SvcWriteMemoryByAddress_2013(PCANTP_HANDLE_USBBUS1, config, &request,
    memory_address_buffer, memory_address_size, memory_size_buffer, memory_size_size,
    data_record, data_record_size);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

See also: [UDS\\_WaitForService\\_2013](#) on page 656.

Class-method version: [SvcWriteMemoryByAddress\\_2013](#) on page 381.

### 3.8.48 UDS\_SvcClearDiagnosticInformation\_2013

Writes a UDS request according to the ClearDiagnosticInformation service's specifications. The ClearDiagnosticInformation service is used by the client to clear diagnostic information in one server's or multiple servers' memory.

#### Syntax

#### C/C++

```

uds_status UDS_SvcClearDiagnosticInformation_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint32_t group_of_dtc);

```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <a href="#">cantp_handle</a> on page 105).
request_config	Message request configuration (see <a href="#">uds_msgconfig</a> on page 27).
out_msg_request	Output, request message created and sent by the function (see <a href="#">uds_msg</a> on page 21).
group_of_dtc	A three-byte value indicating the group of DTCs (e.g. powertrain, body, chassis) or the particular DTC to be cleared (see ClearDiagnosticInformation Group of DTC Definitions on page 767).

#### Returns

The return value is a [uds\\_status](#) code. [PUDS\\_STATUS\\_OK](#) is returned on success. The typical errors in case of failure are:


PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the service function `UDS_SvcClearDiagnosticInformation_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

## C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ClearDiagnosticInformation message
result = UDS_SvcClearDiagnosticInformation_2013(PCANTP_HANDLE_USBBUS1, config, &request,
0xF1A2B3);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
&request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");
```

```
// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);
```

**See also:** `UDS_WaitForService_2013` on page 656, `ClearDiagnosticInformation` Group of DTC Definitions on page 767, `UDS_SvcClearDiagnosticInformation_2020` on page 702.

**Class-method version:** `SvcClearDiagnosticInformation_2013` on page 387.

### 3.8.49 UDS\_SvcClearDiagnosticInformation\_2020

Writes a UDS request according to the `ClearDiagnosticInformation` service's specifications with memory selection parameter (ISO-14229-1:2020). The `ClearDiagnosticInformation` service is used by the client to clear diagnostic information in one server's or multiple servers' memory.

#### Syntax

##### C/C++

```
uds_status UDS_SvcClearDiagnosticInformation_2020(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg* out_msg_request,
    uint32_t group_of_dtc,
    uint8_t memory_selection);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).
group_of_dtc	A three-byte value indicating the group of DTCs (e.g. powertrain, body, chassis) or the particular DTC to be cleared (see <code>ClearDiagnosticInformation</code> Group of DTC Definitions on page 767).
memory_selection	User defined DTC memory.

#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

#### Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the service function `UDS_SvcClearDiagnosticInformation_2020` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ClearDiagnosticInformation message
result = UDS_SvcClearDiagnosticInformation_2020(PCANTP_HANDLE_USBBUS1, config, &request,
        0xF1A2B3, 0x42);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);
```

**See also:** `UDS_WaitForService_2013` on page 656, `ClearDiagnosticInformation Group of DTC Definitions` on page 767, `UDS_SvcClearDiagnosticInformation_2013` on page 700.

**Class-method version:** `SvcClearDiagnosticInformation_2020` on page 391.

### 3.8.50 UDS\_SvcReadDTCInformation\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information.

#### Syntax

#### C/C++

```
uds_status UDS_SvcReadDTCInformation_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t PUDS_SVC_PARAM_RDTCI_Type,
    uint8_t dtc_status_mask);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the function (see uds_msg on page 21).
PUDS_SVC_PARAM_RDTCI_Type	Subfunction parameter, ReadDTCInformation type, use one of the following: PUDS_SVC_PARAM_RDTCI_RNODTCBSM, PUDS_SVC_PARAM_RDTCI_RDTCSM, PUDS_SVC_PARAM_RDTCI_RMMDTCBSM, PUDS_SVC_PARAM_RDTCI_RNOMMDTCBSM, PUDS_SVC_PARAM_RDTCI_RNOOBDDTCBSM, PUDS_SVC_PARAM_RDTCI_ROBDDTCBSM. See also uds_svc_param_rdtci on page 88.
dtc_status_mask	Contains eight DTC status bits.

#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The request configuration is not valid (see uds_msgconfig on page 27), or the given message buffer is null.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with UDS_Reset_2013 (see UDS_Reset_2013 on page 651).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see UDS_MsgFree_2013 on page 645).

#### Remarks


- This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).
- Only the following subfunctions are allowed:
  - reportNumberOfDTCByStatusMask,
  - reportDTCByStatusMask,
  - reportMirrorMemoryDTCByStatusMask,
  - reportNumberOfMirrorMemoryDTCByStatusMask,



- reportNumberOfEmissionsRelatedOBDDTCByStatusMask,
- reportEmissionsRelatedOBDDTCByStatusMask.

## Example

The following example shows the use of the service function `UDS_SvcReadDTCInformation_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformation message
result = UDS_SvcReadDTCInformation_2013(PCANTP_HANDLE_USBBUS1, config, &request,
    PUDS_SVC_PARAM_RDTCTI_RDTCSBM, 0xF0);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);
```

**See also:** `UDS_WaitForService_2013` on page 656, `uds_svc_param_rdtcti` on page 88.

**Class-method version:** `SvcReadDTCInformation_2013` on page 396.

### 3.8.51 UDS\_SvcReadDTCInformationRDTCSBDTC\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. The subfunction `reportDTCSnapshotRecordByDTCNumber` (`PUDS_SVC_PARAM_RDTCL_RDTCSBDTC`) is implicit.

#### Syntax

#### C/C++

```
uds_status UDS_SvcReadDTCInformationRDTCSBDTC_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint32_t dtc_mask,
    uint8_t dtc_snapshot_record_number);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).
dtc_mask	A unique identification number (three-byte value) for a specific diagnostic trouble code.
dtc_snapshot_record_number	The number of the specific DTCSnapshot data records.

#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

#### Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

#### Example

The following example shows the use of the service function `UDS_SvcReadDTCInformationRDTCSBDTC_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

#### C/C++

```

uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRDTCSBDTC message
result = UDS_SvcReadDTCInformationRDTCSBDTC_2013(PCANTP_HANDLE_USBBUS1, config, &request,
0x00A1B2B3, 0x12);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
&request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656.

**Class-method version:** [SvcReadDTCInformationRDTCSBDTC\\_2013](#) on page 400.

### 3.8.52 UDS\_SvcReadDTCInformationRDTCSBRN\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. The subfunction reportDTCsSnapshotByRecordNumber ([PUDS\\_SVC\\_PARAM\\_RDTCI\\_RDTCSBRN](#)) is implicit.

#### Syntax

##### C/C++

```

uds_status UDS_SvcReadDTCInformationRDTCSBRN_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t dtc_snapshot_record_number);

```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>can_tp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).
dtc_snapshot_record_number	The number of the specific DTCSnapshot data records.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the service function `UDS_SvcReadDTCInformationRDTCSBURN_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
```

```

config.nai.target_addr = PUDES_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDES_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRDTCSB RN message
result = UDS_SvcReadDTCInformationRDTCSB RN_2013(PCANTP_HANDLE_USBBUS1, config, &request,
0x12);
if (UDS_StatusIsOk_2013(result, PUDES_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
&request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDES_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656.

**Class-method version:** [SvcReadDTCInformationRDTCSB RN\\_2013](#) on page 404.

### 3.8.53 UDS\_SvcReadDTCInformationReportExtended\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. Only [reportDTCExtendedDataRecordByDTCNumber](#) and [reportMirrorMemoryDTCExtendedDataRecordByDTCNumber](#) subfunctions are allowed.

#### Syntax

#### C/C++

```

uds_status UDS_SvcReadDTCInformationReportExtended_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t PUDES_SVC_PARAM_RDTCI_Type,
    uint32_t dtc_mask,
    uint8_t dtc_extended_data_record_number);

```

#### Parameters

Parameter	Description
channel	The handle of a PUDES channel (see <a href="#">cantp_handle</a> on page 105).
request_config	Message request configuration (see <a href="#">uds_msgconfig</a> on page 27).
out_msg_request	Output, request message created and sent by the function (see <a href="#">uds_msg</a> on page 21).
PUDES_SVC_PARAM_RDTCI_Type	Subfunction parameter, ReadDTCInformation type, use one of the following: <a href="#">PUDES_SVC_PARAM_RDTCI_RDTCEDRBDN</a> , <a href="#">PUDES_SVC_PARAM_RDTCI_RMMDEDRBDN</a> . See also <a href="#">uds_svc_param_rdtci</a> on page 88.
dtc_mask	A unique identification number (three-byte value) for a specific diagnostic trouble code.
dtc_extended_data_record_number	The number of the specific DTCExtendedData record requested.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the service function `UDS_SvcReadDTCInformationReportExtended_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

## C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationReportExtended message
result = UDS_SvcReadDTCInformationReportExtended_2013(PCANTP_HANDLE_USBBUS1, config, &request,
    PUDS_SVC_PARAM_RDTCI_RDTCEDRBDN, 0x00A1B2B3, 0x12);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
```

```

if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

**See also:** `UDS_WaitForService_2013` on page 656, `uds_svc_param_rdtci` on page 88.

**Class-method version:** `SvcReadDTCInformationReportExtended_2013` on page 408.

### 3.8.54 UDS\_SvcReadDTCInformationReportSeverity\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. Only `reportNumberOfDTCBySeverityMaskRecord` and `reportDTCSeverityInformation` subfunctions are allowed.

#### Syntax

##### C/C++

```

uds_status UDS_SvcReadDTCInformationReportSeverity_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t PUDS_SVC_PARAM_RDTCI_Type,
    uint8_t dtc_severity_mask,
    uint8_t dtc_status_mask);

```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).
PUDS_SVC_PARAM_RDTCI_Type	Subfunction parameter, ReadDTCInformation type, use one of the following: PUDS_SVC_PARAM_RDTCI_RNODTCBSMR, PUDS_SVC_PARAM_RDTCI_RDTCBSMR See also <code>uds_svc_param_rdtci</code> on page 88.
dtc_severity_mask	A mask of eight (8) DTC severity bits (see <code>uds_svc_param_rdtci_dtcsvm</code> on page 91).
dtc_status_mask	A mask of eight (8) DTC status bits.

#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.


PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with UDS_Reset_2013 (see UDS_Reset_2013 on page 651).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see UDS_MsgFree_2013 on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see [UDS\\_MsgFree\\_2013](#) on page 645).

## Example

The following example shows the use of the service function [UDS\\_SvcReadDTCInformationReportSeverity\\_2013](#) on the channel [PCANTP\\_HANDLE\\_USBBUS1](#). A UDS physical service request is transmitted, and the [UDS\\_WaitForService\\_2013](#) function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

## C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationReportSeverity message
result = UDS_SvcReadDTCInformationReportSeverity_2013(PCANTP_HANDLE_USBBUS1, config, &request,
    PUDS_SVC_PARAM_RDTCI_RNODTCBSMR, 0xF1, 0x12);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
```



```
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);
```

**See also:** `UDS_WaitForService_2013` on page 656, `uds_svc_param_rdtci` on page 88, `uds_svc_param_rdtci_dtcsvm` on page 91.

**Class-method version:** `SvcReadDTCInformationReportSeverity_2013` on page 413.

### 3.8.55 UDS\_SvcReadDTCInformationRSIODTC\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. The subfunction `reportSeverityInformationOfDTC` (`PUDS_SVC_PARAM_RDTCI_RSIODTC`) is implicit.

## Syntax

### C/C++

```
uds_status UDS_SvcReadDTCInformationRSIODTC_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint32_t dtc_mask);
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).
dtc_mask	A unique identification number for a specific diagnostic trouble code.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the service function `UDS_SvcReadDTCInformationRSIODTC_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the

`UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized.

#### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRSIODTC message
result = UDS_SvcReadDTCInformationRSIODTC_2013(PCANTP_HANDLE_USBBUS1, config, &request,
0xF1A1B2B3);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
&request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);
```

**See also:** `UDS_WaitForService_2013` on page 656.

**Class-method version:** `SvcReadDTCInformationRSIODTC_2013` on page 418.

### 3.8.56 UDS\_SvcReadDTCInformationNoParam\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. Only theses following subfunctions are allowed:

- reportSupportedDTC
- reportFirstTestFailedDTC
- reportFirstConfirmedDTC
- reportMostRecentTestFailedDTC
- reportMostRecentConfirmedDTC

- reportDTCFaultDetectionCounter
- reportDTCWithPermanentStatus
- reportDTCSnapshotIdentification

## Syntax

### C/C++

```
uds_status UDS_SvcReadDTCInformationNoParam_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t PUDS_SVC_PARAM_RDTCI_Type);
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the function (see uds_msg on page 21).
PUDS_SVC_PARAM_RDTCI_Type	Subfunction parameter, ReadDTCInformation type, use one of the following: PUDS_SVC_PARAM_RDTCI_RFTFDTC, PUDS_SVC_PARAM_RDTCI_RFCDDTC, PUDS_SVC_PARAM_RDTCI_RMRTFDTC, PUDS_SVC_PARAM_RDTCI_RMRCDDTC, PUDS_SVC_PARAM_RDTCI_RSUPDDTC, PUDS_SVC_PARAM_RDTCI_RDTWCPS, PUDS_SVC_PARAM_RDTCI_RDTCSSE , PUDS_SVC_PARAM_RDTCI_RDTCFDDC. See also uds_svc_param_rdtci on page 88.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The request configuration is not valid (see uds_msgconfig on page 27), or the given message buffer is null.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with UDS_Reset_2013 (see UDS_Reset_2013 on page 651).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see UDS_MsgFree_2013 on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the service function `UDS_SvcReadDTCInformationNoParam_2013` on the channel `PCANTP_HANDLE_USBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized.

## C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationNoParam message
result = UDS_SvcReadDTCInformationNoParam_2013(PCANTP_HANDLE_USBBUS1, config, &request,
        PUDS_SVC_PARAM_RDTCI_RSUPDTC);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);
```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656, [uds\\_svc\\_param\\_rdtci](#) on page 88.

**Class-method version:** [SvcReadDTCInformationNoParam\\_2013](#) on page 422.

### 3.8.57 UDS\_SvcReadDTCInformationRDTCEDBR\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. The subfunction [reportDTCExtDataRecordByRecordNumber](#) ([PUDS\\_SVC\\_PARAM\\_RDTCI\\_RDTCEDBR](#)) is implicit.

## Syntax

## C/C++

```
uds_status UDS_SvcReadDTCInformationRDTCEDBR_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg* out_msg_request,
    uint8_t dtc_extended_data_record_number);
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).
dtc_extended_data_record_number	DTC extended data record number.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the service function `UDS_SvcReadDTCInformationRDTCEDBR_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;
uint8_t dtc_extended_data_record_number = 0x12;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
```

```

config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical SvcReadDTCInformationRDTCEDBR message
result = UDS_SvcReadDTCInformationRDTCEDBR_2013(PCANTP_HANDLE_USBBUS1, config, &request,
    dtc_extended_data_record_number);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

**See also:** `UDS_WaitForService_2013` on page 656.

**Class-method version:** `SvcReadDTCInformationRDTCEDBR_2013` on page 426.

### 3.8.58 UDS\_SvcReadDTCInformationRUDMDTCBSM\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. The subfunction `reportUserDefMemoryDTCByStatusMask` (`PUDS_SVC_PARAM_RDTCI_RUDMDTCBSM`) is implicit.

#### Syntax

##### C/C++

```

uds_status UDS_SvcReadDTCInformationRUDMDTCBSM_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg* out_msg_request,
    uint8_t dtc_status_mask,
    uint8_t memory_selection);

```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
Request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
Out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).
Dtc_status_mask	A mask of eight (8) DTC status bits.
Memory_selection	Memory selection.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the service function `UDS_SvcReadDTCInformationRUDMDTCBSM_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

## C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;
uint8_t dtc_status_mask = 0x12;
uint8_t memory_selection = 0x34;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRUDMDTCBSM message
result = UDS_SvcReadDTCInformationRUDMDTCBSM_2013(PCANTP_HANDLE_USBBUS1, config, &request,
    dtc_status_mask, memory_selection);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
```

```

        result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
            &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

**See also:** `UDS_WaitForService_2013` on page 656.

**Class-method version:** `SvcReadDTCInformationRUDMDTCBSM_2013` on page 431.

### 3.8.59 UDS\_SvcReadDTCInformationRUDMDTCSSBDTC\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. The subfunction `reportUserDefMemoryDTCsSnapshotRecordByDTCNumber` (`PUDS_SVC_PARAM_RDTCL_RUDMDTCSSBDTC`) is implicit.

#### Syntax

#### C/C++

```

uds_status UDS_SvcReadDTCInformationRUDMDTCSSBDTC_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg* out_msg_request,
    uint32_t dtc_mask,
    uint8_t user_def_dtc_snapshot_record_number,
    uint8_t memory_selection);

```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).
dtc_mask	A unique identification number (three-byte value) for a specific diagnostic trouble code.
user_def_dtc_snapshot_record_number	User DTC snapshot record number.
memory_selection	Memory selection.



## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the service function `UDS_SvcReadDTCInformationRUDMDTCSSBDTC_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

## C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;
uint32_t dtc_mask = 0x12345678;
uint8_t user_def_dtc_snapshot_record_number = 0x9A;
uint8_t memory_selection = 0xBC;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRUDMDTCSSBDTC message
result = UDS_SvcReadDTCInformationRUDMDTCSSBDTC_2013(PCANTP_HANDLE_USBBUS1, config, &request,
    dtc_mask, user_def_dtc_snapshot_record_number, memory_selection);
```

```

if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
    &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

See also: `UDS_WaitForService_2013` on page 656.

Class-method version: `SvcReadDTCInformationRUDMDTCSSBDTC_2013` on page 435.

### 3.8.60 UDS\_SvcReadDTCInformationRUDMDTCEDRBDN\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. The subfunction `reportUserDefMemoryDTCExtDataRecordByDTCNumber` (`PUDS_SVC_PARAM_RDTCI_RUDMDTCEDRBDN`) is implicit.

#### Syntax

#### C/C++

```

uds_status UDS_SvcReadDTCInformationRUDMDTCEDRBDN_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg* out_msg_request,
    uint32_t dtc_mask,
    uint8_t dtc_extended_data_record_number,
    uint8_t memory_selection);

```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).
dtc_mask	A unique identification number (three-byte value) for a specific diagnostic trouble code.
dtc_extended_data_record_number	DTC extended data record number.
memory_selection	Memory selection.

#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).


PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see UDS_MsgFree_2013 on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see UDS\_MsgFree\_2013 on page 645).

## Example

The following example shows the use of the service function UDS\_SvcReadDTCInformationRUDMDTCEDRBDN\_2013 on the channel PCANTP\_HANDLE\_USBBUS1. A UDS physical service request is transmitted, and the UDS\_WaitForService\_2013 function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;
uint32_t dtc_mask = 0x12345678;
uint8_t dtc_extended_data_record_number = 0x9A;
uint8_t memory_selection = 0xBC;

memset(&request, 0, sizeof(request)) ;
memset(&request_confirmation, 0, sizeof(request_confirmation)) ;
memset(&response, 0, sizeof(response)) ;
memset(&config, 0, sizeof(config)) ;

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRUDMDTCEDRBDN message
result = UDS_SvcReadDTCInformationRUDMDTCEDRBDN_2013(PCANTP_HANDLE_USBBUS1, config, &request,
    dtc_mask, dtc_extended_data_record_number, memory_selection);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);
```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656.

**Class-method version:** [SvcReadDTCInformationRUDMDTCEDRBDN\\_2013](#) on page 440.

### 3.8.61 UDS\_SvcReadDTCInformationRDTCEdi\_2020

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. The subfunction [reportSupportedDTCExtDataRecord](#) ([PUDS\\_SVC\\_PARAM\\_RDTCEdi](#)) is implicit.

#### Syntax

#### C/C++

```
uds_status UDS_SvcReadDTCInformationRDTCEdi_2020(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg* out_msg_request,
    uint8_t dtc_extended_data_record_number);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <a href="#">cantp_handle</a> on page 105).
request_config	Message request configuration (see <a href="#">uds_msgconfig</a> on page 27).
out_msg_request	Output, request message created and sent by the function (see <a href="#">uds_msg</a> on page 21).
dtc_extended_data_record_number	DTC extended data record number.

#### Returns

The return value is a [uds\\_status](#) code. [PUDS\\_STATUS\\_OK](#) is returned on success. The typical errors in case of failure are:


<a href="#">PUDS_STATUS_NOT_INITIALIZED</a>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<a href="#">PUDS_STATUS_PARAM_INVALID_VALUE</a>	The request configuration is not valid (see <a href="#">uds_msgconfig</a> on page 27), or the given message buffer is null.
<a href="#">PUDS_STATUS_SERVICE_ALREADY_PENDING</a>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <a href="#">UDS_Reset_2013</a> (see <a href="#">UDS_Reset_2013</a> on page 651).
<a href="#">PUDS_STATUS_NO_MEMORY</a>	Failed to allocate memory and copy the new message in the transmission queue.
<a href="#">PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</a>	The given message buffer is already allocated, user must release the buffer before reusing it (see <a href="#">UDS_MsgFree_2013</a> on page 645).

#### Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see [UDS\\_MsgFree\\_2013](#) on page 645).

#### Example

The following example shows the use of the service function [UDS\\_SvcReadDTCInformationRDTCEdi\\_2020](#) on the channel [PCANTP\\_HANDLE\\_USBBUS1](#). A UDS physical service request is transmitted, and the [UDS\\_WaitForService\\_2013](#) function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

**C/C++**

```

uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;
uint8_t dtc_extended_data_record_number = 0x12;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRDTCEdi message
result = UDS_SvcReadDTCInformationRDTCEdi_2020(PCANTP_HANDLE_USBBUS1, config, &request,
    dtc_extended_data_record_number);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

See also: [UDS\\_WaitForService\\_2013](#) on page 656.

Class-method version: [SvcReadDTCInformationRDTCEdi\\_2020](#) on page 444.

### 3.8.62 UDS\_SvcReadDTCInformationRWWHOBDDTCBMR\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. The subfunction [reportWWHOBDDTCByMaskRecord](#) ([PUDS\\_SVC\\_PARAM\\_RDTCl\\_RWWHOBDDTCBMR](#)) is implicit.

**Syntax****C/C++**

```

uds_status UDS_SvcReadDTCInformationRWWHOBDDTCBMR_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg* out_msg_request,

```

```
uint8_t functional_group_identifier,
uint8_t dtc_status_mask,
uint8_t dtc_severity_mask);
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).
functional_group_identifier	Functional group identifier.
dtc_status_mask	A mask of eight (8) DTC status bits.
dtc_severity_mask	A mask of eight (8) DTC severity bits (see <code>uds_svc_param_rdtci_dtcsvm</code> on page 91).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see <code>uds_msgconfig</code> on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the service function `UDS_SvcReadDTCInformationRWWHOBDDTCBMR_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;
uint8_t functional_group_identifier = 0x12;
uint8_t dtc_status_mask = 0x34;
uint8_t dtc_severity_mask = 0x78;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
```

```
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRWWHOBDDTCBMR message
result = UDS_SvcReadDTCInformationRWWHOBDDTCBMR_2013(PCANTP_HANDLE_USBBUS1, config, &request,
    functional_group_identifier, dtc_status_mask, dtc_severity_mask);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);
```

**See also:** `UDS_WaitForService_2013` on page 656.

**Class-method version:** `SvcReadDTCInformationRWWHOBDDTCBMR_2013` on page 449.

### 3.8.63 UDS\_SvcReadDTCInformationRWWHOBDDTCWPS\_2013

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. The subfunction `reportWWHOBDDTCWithPermanentStatus` (`PUDS_SVC_PARAM_RDTCI_RWWHOBDDTCWPS`) is implicit.

#### Syntax

#### C/C++

```
uds_status UDS_SvcReadDTCInformationRWWHOBDDTCWPS_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg* out_msg_request,
    uint8_t functional_group_identifier);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).
functional_group_identifier	Functional group identifier.

#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:




PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	The request configuration is not valid (see <a href="#">uds_msgconfig</a> on page 27), or the given message buffer is null.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <a href="#">UDS_Reset_2013</a> (see <a href="#">UDS_Reset_2013</a> on page 651).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <a href="#">UDS_MsgFree_2013</a> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see [UDS\\_MsgFree\\_2013](#) on page 645).

## Example

The following example shows the use of the service function [UDS\\_SvcReadDTCInformationRWWHOBDDTCWPS\\_2013](#) on the channel [PCANTP\\_HANDLE\\_USBBUS1](#). A UDS physical service request is transmitted, and the [UDS\\_WaitForService\\_2013](#) function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;
uint8_t functional_group_identifier = 0x12;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRWWHOBDDTCWPS message
result = UDS_SvcReadDTCInformationRWWHOBDDTCWPS_2013(PCANTP_HANDLE_USBBUS1, config, &request,
functional_group_identifier);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
&request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
```



```
printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);
```

See also: [UDS\\_WaitForService\\_2013](#) on page 656.

Class-method version: [SvcReadDTCInformationRWWHOBDDTCWPS\\_2013](#) on page 453.

### 3.8.64 UDS\_SvcReadDTCInformationRDTCBRI\_2020

Writes a UDS request according to the ReadDTCInformation service's specifications. This service allows a client to read the status of server-resident Diagnostic Trouble Code (DTC) information. The subfunction [reportDTCInformationByDTCReadinessGroupIdentifier](#) ([PUDS\\_SVC\\_PARAM\\_RDTCI\\_RDTCBRI](#)) is implicit.

## Syntax

### C/C++

```
uds_status UDS_SvcReadDTCInformationRDTCBRI_2020(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg* out_msg_request,
    uint8_t functional_group_identifier,
    uint8_t dtc_readiness_group_identifier);
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <a href="#">cantp_handle</a> on page 105).
request_config	Message request configuration (see <a href="#">uds_msgconfig</a> on page 27).
out_msg_request	Output, request message created and sent by the function (see <a href="#">uds_msg</a> on page 21).
functional_group_identifier	Functional group identifier.
dtc_readiness_group_identifier	DTC readiness group identifier.

## Returns

The return value is a [uds\\_status](#) code. [PUDS\\_STATUS\\_OK](#) is returned on success. The typical errors in case of failure are:

<a href="#">PUDS_STATUS_NOT_INITIALIZED</a>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<a href="#">PUDS_STATUS_PARAM_INVALID_VALUE</a>	The request configuration is not valid (see <a href="#">uds_msgconfig</a> on page 27), or the given message buffer is null.
<a href="#">PUDS_STATUS_SERVICE_ALREADY_PENDING</a>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <a href="#">UDS_Reset_2013</a> (see <a href="#">UDS_Reset_2013</a> on page 651).
<a href="#">PUDS_STATUS_NO_MEMORY</a>	Failed to allocate memory and copy the new message in the transmission queue.
<a href="#">PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</a>	The given message buffer is already allocated, user must release the buffer before reusing it (see <a href="#">UDS_MsgFree_2013</a> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see [UDS\\_MsgFree\\_2013](#) on page 645).

## Example

The following example shows the use of the service function `UDS_SvcReadDTCInformationRDTCBRGI_2020` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

**Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;
uint8_t functional_group_identifier = 0x12;
uint8_t dtc_readiness_group_identifier = 0x34;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical ReadDTCInformationRDTCBRGI message
result = UDS_SvcReadDTCInformationRDTCBRGI_2020(PCANTP_HANDLE_USBBUS1, config, &request,
    functional_group_identifier, dtc_readiness_group_identifier);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);
```

**See also:** `UDS_WaitForService_2013` on page 656.

**Class-method version:** `SvcReadDTCInformationRDTCBRGI_2020` on page 458.

### 3.8.65 UDS\_SvcInputOutputControlByIdentifier\_2013

Writes a UDS request according to the InputOutputControlByIdentifier service's specifications. The InputOutputControlByIdentifier service is used by the client to substitute a value for an input signal, internal server (ECU) function and/or control an output (actuator) of an electronic system.

#### Syntax

##### C

```
uds_status UDS_SvcInputOutputControlByIdentifier_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint16_t data_identifier,
    uint8_t * control_option_record,
    uint32_t control_option_record_size,
    uint8_t * control_enable_mask_record,
    uint32_t control_enable_mask_record_size);
```

##### C++

```
uds_status UDS_SvcInputOutputControlByIdentifier_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint16_t data_identifier,
    uint8_t * control_option_record,
    uint32_t control_option_record_size,
    uint8_t * control_enable_mask_record = nullptr,
    uint32_t control_enable_mask_record_size = 0);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the function (see uds_msg on page 21).
data_identifier	A two-byte data identifier (see uds_svc_param_di on page 82).
control_option_record	First byte can be used as either an input output control parameter that describes how the server (ECU) shall control its inputs or outputs (see uds_svc_param_iocbi on page 92), or as an additional control state byte.
control_option_record_size	Size in bytes of the control option record buffer.
control_enable_mask_record	The control enable mask shall only be supported when the input output control parameter is used and the data identifier to be controlled consists of more than one parameter (i.e. the data identifier is bit-mapped or packed by definition). There shall be one bit in the control enable mask corresponding to each individual parameter defined within the data identifier.
control_enable_mask_record_size	Size in bytes of the control enable mask record buffer.

#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is not valid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	The mapping given in the message configuration is unknown.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with UDS_Reset_2013 (see UDS_Reset_2013 on page 651).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_OVERFLOW	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data size.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see UDS_MsgFree_2013 on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see [UDS\\_MsgFree\\_2013](#) on page 645).

## Example

The following example shows the use of the service function [UDS\\_SvcInputOutputControlByIdentifier\\_2013](#) on the channel [PCANTP\\_HANDLE\\_USBBUS1](#). A UDS physical service request is transmitted, and the [UDS\\_WaitForService\\_2013](#) function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uint8_t control_option_record[10];
uint8_t control_enable_mask_record[10];
uint16_t control_option_record_size = 10;
uint16_t control_enable_mask_record_size = 5;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Fill Data
for (int i = 0; i < control_option_record_size; i++)
{
    control_option_record[i] = 'A' + i;
    control_enable_mask_record[i] = 10 + i;
}
```

```

}

// Sends a physical InputOutputControlByIdentifier message
result = UDS_SvcInputOutputControlByIdentifier_2013(PCANTP_HANDLE_USBBUS1, config, &request,
    PUDS_SVC_PARAM_DI_SSECUSWVNDID, control_option_record, control_option_record_size,
    control_enable_mask_record, control_enable_mask_record_size);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656, [uds\\_svc\\_param\\_iocbi](#) on page 92.

**Class-method version:** [SvcInputOutputControlByIdentifier\\_2013](#) on page 462.

### 3.8.66 UDS\_SvcRoutineControl\_2013

Writes a UDS request according to the RoutineControl service's specifications. The RoutineControl service is used by the client to start/stop a routine and request routine results.

#### Syntax

**C**

```

uds_status UDS_SvcRoutineControl_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t routine_control_type,
    uint16_t routine_identifier,
    uint8_t * routine_control_option_record,
    uint32_t routine_control_option_record_size);

```

**C++**

```

uds_status UDS_SvcRoutineControl_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t routine_control_type,
    uint16_t routine_identifier,
    uint8_t * routine_control_option_record = nullptr,
    uint32_t routine_control_option_record_size = 0);

```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).
routine_control_type	Subfunction parameter: routine control type (see <code>uds_svc_param_rc</code> on page 93).
routine_identifier	Server local routine identifier (see <code>uds_svc_param_rc_rid</code> on page 94).
routine_control_option_record	Buffer containing the routine control options (only with start and stop routine subfunctions).
routine_control_option_record_size	Size in bytes of the buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_OVERFLOW</code>	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data size.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the service function `UDS_SvcRoutineControl_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uint8_t routine_control_option_record[10];
uint16_t routine_control_option_record_size = 10;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));
```

```
// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Fill data
for (int i = 0; i < routine_control_option_record_size; i++)
{
    routine_control_option_record[i] = 'A' + i;
}

// Sends a physical RoutineControl message
result = UDS_SvcRoutineControl_2013(PCANTP_HANDLE_USBBUS1, config, &request,
    PUDS_SVC_PARAM_RC_RRR, 0xF1A2, routine_control_option_record,
    routine_control_option_record_size);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);
```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656, [uds\\_svc\\_param\\_rc](#) on page 93, [uds\\_svc\\_param\\_rc\\_rid](#) on page 94.  
**Class-method version:** [SvcRoutineControl\\_2013](#) on page 473.

### 3.8.67 UDS\_SvcRequestDownload\_2013

Writes a UDS request according to the RequestDownload service's specifications. The RequestDownload service is used by the client to initiate a data transfer from the client to the server/ECU (download).

#### Syntax

##### C/C++

```
uds_status UDS_SvcRequestDownload_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t compression_method,
    uint8_t encrypting_method,
    uint8_t * memory_address_buffer,
    uint8_t memory_address_size,
    uint8_t * memory_size_buffer,
    uint8_t memory_size_size);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <a href="#">cantp_handle</a> on page 105).

Parameter	Description
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).
compression_method	A nibble-value that specifies the compression method, the value 0x0 specifies that no compression method is used.
encrypting_method	A nibble-value that specifies the encrypting method, the value 0x0 specifies that no encrypting method is used.
memory_address_buffer	Starting address of server (ECU) memory to which data is to be written.
memory_address_size	Size in bytes of the memory address buffer (max.: 0xF).
memory_size_buffer	Used by the server (ECU) to compare the uncompressed memory size with the total amount of data transferred during the TransferData service.
memory_size_size	Size in bytes of the memory size buffer (max.: 0xF).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the service function `UDS_SvcRequestDownload_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uint8_t memory_address_buffer[8];
uint8_t memory_size_buffer[8];
uint8_t memory_address_size = 8;
uint8_t memory_size_size = 8;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));
```



```
// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Fill data
for (int i = 0; i < memory_address_size; i++)
{
    memory_address_buffer[i] = 'A' + i;
    memory_size_buffer[i] = 10 + i;
}

// Sends a physical RequestDownload message
result = UDS_SvcRequestDownload_2013(PCANTP_HANDLE_USBBUS1, config, &request, 0x01, 0x02,
    memory_address_buffer, memory_address_size, memory_size_buffer, memory_size_size);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);
```

See also: [UDS\\_WaitForService\\_2013](#) on page 656.

Class-method version: [SvcRequestDownload\\_2013](#) on page 483.

### 3.8.68 UDS\_SvcRequestUpload\_2013

Writes a UDS request according to the RequestUpload service's specifications. The RequestUpload service is used by the client to initiate a data transfer from the server/ECU to the client (upload).

#### Syntax

##### C/C++

```
uds_status UDS_SvcRequestUpload_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t compression_method,
    uint8_t encrypting_method,
    uint8_t * memory_address_buffer,
    uint8_t memory_address_size,
    uint8_t * memory_size_buffer,
    uint8_t memory_size_size);
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>can_tp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).
compression_method	A nibble-value that specifies the compression method, the value 0x0 specifies that no compression method is used.
encrypting_method	A nibble-value that specifies the encrypting method, the value 0x0 specifies that no encrypting method is used.
memory_address_buffer	Starting address of server (ECU) memory from which data is to be retrieved.
memory_address_size	Size in bytes of the memory address buffer (max.: 0xF).
memory_size_buffer	Used by the server (ECU) to compare the uncompressed memory size with the total amount of data transferred during the TransferData service.
memory_size_size	Size in bytes of the memory size buffer (max.: 0xF).

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the service function `UDS_SvcRequestUpload_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uint8_t memory_address_buffer[4];
uint8_t memory_size_buffer[4];
uint8_t memory_address_size = 4;
uint8_t memory_size_size = 4;
uds_msgconfig config;
int i;
```

```
memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));
for (i = 0; i < 4; i++) {
    memory_address_buffer[i] = 0;
    memory_size_buffer[i] = 0;
}

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical RequestUpload message
result = UDS_SvcRequestUpload_2013(PCANTP_HANDLE_USBBUS1, config, &request, 0x01, 0x02,
    memory_address_buffer, memory_address_size, memory_size_buffer, memory_size_size);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);
```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656.

**Class-method version:** [SvcRequestUpload\\_2013](#) on page 489.

### 3.8.69 UDS\_SvcTransferData\_2013

Writes a UDS request according to the TransferData service's specifications. The TransferData service is used by the client to transfer data either from the client to the server/ECU (download) or from the server/ECU to the client (upload).

#### Syntax

**C**

```
uds_status UDS_SvcTransferData_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t block_sequence_counter,
    uint8_t * transfer_request_parameter_record,
    uint32_t transfer_request_parameter_record_size);
```

## C++

```
uds_status UDS_SvcTransferData_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t block_sequence_counter,
    uint8_t * transfer_request_parameter_record = nullptr,
    uint32_t transfer_request_parameter_record_size = 0);
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).
block_sequence_counter	The <code>block_sequence_counter</code> parameter value starts at 0x01 with the first <code>TransferData</code> request that follows the <code>RequestDownload</code> (0x34) or <code>RequestUpload</code> (0x35) service. Its value is incremented by 1 for each subsequent <code>TransferData</code> request. At the value of 0xFF, the <code>block_sequence_counter</code> rolls over and starts at 0x00 with the next <code>TransferData</code> request message.
transfer_request_parameter_record	Buffer containing the required transfer parameters.
transfer_request_parameter_record_size	Size in bytes of the buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_OVERFLOW</code>	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data size.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the service function `UDS_SvcTransferData_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

## C/C++

```

uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uint8_t record[50];
uint8_t record_size = 50;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDES_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDES_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDES_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDES_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDES_MSGTYPE_USDT;

// Fill data
for (int i = 0; i < record_size; i++)
{
    record[i] = 'A' + i;
}

// Sends a physical TransferData message
result = UDS_SvcTransferData_2013(PCANTP_HANDLE_USBBUS1, config, &request, 0x01, record,
    record_size);
if (UDS_StatusIsOk_2013(result, PUDES_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDES_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

**See also:** `UDS_WaitForService_2013` on page 656.

**Class-method version:** `SvcTransferData_2013` on page 494.

### 3.8.70 UDS\_SvcRequestTransferExit\_2013

Writes a UDS request according to the RequestTransferExit service's specifications. The RequestTransferExit service is used by the client to terminate a data transfer between the client and server/ECU (upload or download).

#### Syntax

C

```
uds_status UDS_SvcRequestTransferExit_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t * transfer_request_parameter_record,
    uint32_t transfer_request_parameter_record_size);
```

C++

```
uds_status UDS_SvcRequestTransferExit_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t * transfer_request_parameter_record = nullptr,
    uint32_t transfer_request_parameter_record_size = 0);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the function (see uds_msg on page 21).
transfer_request_parameter_record	Buffer containing the required transfer parameters.
transfer_request_parameter_record_size	Size in bytes of the buffer.

#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is not valid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	The mapping given in the message configuration is unknown.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with UDS_Reset_2013 (see UDS_Reset_2013 on page 651).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_OVERFLOW	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data size.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see UDS_MsgFree_2013 on page 645).

#### Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the service function `UDS_SvcRequestTransferExit_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uint8_t transfer_request_parameter_record[20];
uint8_t transfer_request_parameter_record_size = 20;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Fill data
for (int i = 0; i < transfer_request_parameter_record_size; i++)
{
    transfer_request_parameter_record[i] = 'A' + i;
}

// Sends a physical RequestTransferExit message
result = UDS_SvcRequestTransferExit_2013(PCANTP_HANDLE_USBBUS1, config, &request,
    transfer_request_parameter_record, transfer_request_parameter_record_size);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);
```

**See also:** `UDS_WaitForService_2013` on page 656.

**Class-method version:** `SvcRequestTransferExit_2013` on page 503.

### 3.8.71 UDS\_SvcAccessTimingParameter\_2013

Writes a UDS request according to the AccessTimingParameter service's specifications.

#### Syntax

#### C/C++

```
uds_status UDS_SvcAccessTimingParameter_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t access_type,
    uint8_t* request_record,
    uint32_t request_record_size);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the function (see uds_msg on page 21).
access_type	Access type (see uds_svc_param_atp on page 95).
request_record	Timing parameter request record.
request_record_size	Size in bytes of the request record.

#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is not valid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	The mapping given in the message configuration is unknown.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_OVERFLOW	The given buffer size is too big, the resulting UDS message data size is bigger than the maximum data size.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

#### Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

#### Example

The following example shows the use of the service function `UDS_SvcAccessTimingParameter_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

#### C/C++



```

uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical SvcAccessTimingParameter message
uint8_t request_record[2] = { 0xAB, 0xCD };
uint32_t request_record_length = 2;
result = UDS_SvcAccessTimingParameter_2013(PCANTP_HANDLE_USBBUS1, config, &request,
    PUDS_SVC_PARAM_ATP_RCATP, request_record, request_record_length);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

**See also:** [uds\\_svc\\_param\\_atp](#) on page 95, [UDS\\_WaitForService\\_2013](#) on page 656.

**Class-method version:** [SvcAccessTimingParameter\\_2013](#) on page 512.

### 3.8.72 UDS\_SvcRequestFileTransfer\_2013

Writes a UDS request according to the SvcRequestFileTransfer service's specifications.

#### Syntax

**C**

```

uds_status UDS_SvcRequestFileTransfer_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t mode_of_operation,
    uint16_t file_path_and_name_size,
    uint8_t *file_path_and_name,
    uint8_t compression_method,
    uint8_t encrypting_method,
    uint8_t file_size_parameter_size,
    uint8_t *file_size_uncompressed,

```

```
uint8_t *file_size_compressed);
```

## C++

```
uds_status UDS_SvcRequestFileTransfer_2013(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t mode_of_operation,
    uint16_t file_path_and_name_size,
    uint8_t *file_path_and_name,
    uint8_t compression_method = 0,
    uint8_t encrypting_method = 0,
    uint8_t file_size_parameter_size = 0,
    uint8_t *file_size_uncompressed = 0,
    uint8_t *file_size_compressed = 0);
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).
mode_of_operation	Mode of operation (see <code>uds_svc_param_rft_moop</code> on page 96).
file_path_and_name_size	Size in bytes of <code>file_path_and_name</code> buffer
file_path_and_name	File path and name string.
compression_method	A nibble-value that specifies the compression method, the value 0x0 specifies that no compression method is used.
encrypting_method	A nibble-value that specifies the encrypting method, the value 0x0 specifies that no encrypting method is used.
file_size_parameter_size	Size in byte of <code>file_size_uncompressed</code> and <code>file_size_compressed</code> parameters
file_size_uncompressed	Uncompressed file size.
file_size_compressed	Compressed file size.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:


<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

## Example

The following example shows the use of the service function `UDS_SvcRequestFileTransfer_2013` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical RequestFileTransfer message
uint8_t file_name[9] = "toto.txt";
uint16_t file_size_uncompressed = 0xD;
uint16_t file_size_compressed = 0xA;
result = UDS_SvcRequestFileTransfer_2013(PCANTP_HANDLE_USBBUS1, config, &request,
    PUDS_SVC_PARAM_RFT_MOOP_ADDFILE, 8, file_name, 0, 0, 2,
    (uint8_t*)&file_size_uncompressed, (uint8_t*)&file_size_compressed);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);
```

**See also:** `uds_svc_param_rft_moop` on page 96, `UDS_WaitForService_2013` on page 656.

**Class-method version:** `SvcRequestFileTransfer_2013` on page 517.

### 3.8.73 UDS\_SvcAuthenticationDA\_2020

Writes a UDS request according to the Authentication service's specifications (ISO-14229-1:2020). The subfunction deAuthenticate is implicit.

#### Syntax

#### C/C++

```
uds_status UDS_SvcAuthenticationDA_2020(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the function (see uds_msg on page 21).

#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see uds_msgconfig on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).


#### Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

The PCAN-UDS 2.x API provides `uds_svc_authentication_subfunction` (see on page 98) and `uds_svc_authentication_return_parameter` (see on page 99) enumerations to help user to decode Authentication service responses.

#### Example

The following example shows the use of the service function `UDS_SvcAuthenticationDA_2020` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

**C/C++**

```

uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/deAuthenticate message
result = UDS_SvcAuthenticationDA_2020(PCANTP_HANDLE_USBBUS1, config, &request);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
    &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656.

**Class-method version:** [SvcAuthenticationDA\\_2020](#) on page 545.

### 3.8.74 UDS\_SvcAuthenticationVCU\_2020

Writes a UDS request according to the Authentication service's specifications (ISO-14229-1:2020). The subfunction verifyCertificateUnidirectional is implicit.

**Syntax****C**

```

uds_status UDS_SvcAuthenticationVCU_2020(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t communication_configuration,
    uint8_t *certificate_client,
    uint16_t certificate_client_size,
    uint8_t *challenge_client,
    uint16_t challenge_client_size);

```

**C++**

```
uds_status UDS_SvcAuthenticationVCU_2020(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t communication_configuration,
    uint8_t *certificate_client,
    uint16_t certificate_client_size,
    uint8_t *challenge_client = nullptr,
    uint16_t challenge_client_size = 0);
```

**Parameters**

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the function (see uds_msg on page 21).
communication_configuration	Configuration information about communication.
certificate_client	Buffer containing the certificate of the client.
certificate_client_size	Size in bytes of the certificate buffer.
challenge_client	Buffer containing the challenge of the client.
challenge_client_size	Size in bytes of the challenge buffer.

**Returns**

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is not valid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	The mapping given in the message configuration is unknown.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).


**Remarks**

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

The PCAN-UDS 2.x API provides `uds_svc_authentication_subfunction` (see on page 98) and `uds_svc_authentication_return_parameter` (see on page 99) enumerations to help user to decode Authentication service responses.

**Example**

The following example shows the use of the service function `UDS_SvcAuthenticationVCU_2020` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

**C/C++**

```

uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/verifyCertificateUnidirectional message
uint8_t communication_configuration = 0x00;
uint8_t certificate_client[2] = { 0x12, 0x34 };
uint16_t certificate_client_size = 2;
uint8_t challenge_client[2] = { 0x56, 0x78 };
uint16_t challenge_client_size = 2;
result = UDS_SvcAuthenticationVCU_2020(PCANTP_HANDLE_USBBUS1, config, &request,
    communication_configuration, certificate_client, certificate_client_size,
    challenge_client, challenge_client_size);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656.

**Class-method version:** [SvcAuthenticationVCU\\_2020](#) on page 549.

### 3.8.75 UDS\_SvcAuthenticationVCB\_2020

Writes a UDS request according to the Authentication service's specifications (ISO-14229-1:2020). The subfunction `verifyCertificateBidirectional` is implicit.

#### Syntax

#### C/C++

```
uds_status UDS_SvcAuthenticationVCB_2020(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t communication_configuration,
    uint8_t *certificate_client,
    uint16_t certificate_client_size,
    uint8_t *challenge_client,
    uint16_t challenge_client_size) ;
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
Request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
Out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).
Communication_configuration	Configuration information about communication.
Certificate_client	Buffer containing the certificate of the client.
Certificate_client_size	Size in bytes of the certificate buffer.
Challenge_client	Buffer containing the challenge of the client.
Challenge_client_size	Size in bytes of the challenge buffer.

#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).

#### Remarks


This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

The PCAN-UDS 2.x API provides `uds_svc_authentication_subfunction` (see on page 98) and `uds_svc_authentication_return_parameter` (see on page 99) enumerations to help user to decode Authentication service responses.



## Example

The following example shows the use of the service function `UDS_SvcAuthenticationVCB_2020` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/verifyCertificateBidirectional message
uint8_t communication_configuration = 0x00;
uint8_t certificate_client[2] = { 0x12, 0x34 };
uint16_t certificate_client_size = 2;
uint8_t challenge_client[2] = { 0x56, 0x78 };
uint16_t challenge_client_size = 2;
result = UDS_SvcAuthenticationVCB_2020(PCANTP_HANDLE_USBBUS1, config, &request,
    communication_configuration, certificate_client, certificate_client_size,
    challenge_client, challenge_client_size);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);
```

**See also:** `UDS_WaitForService_2013` on page 656.

**Class-method version:** `SvcAuthenticationVCB_2020` on page 559.

### 3.8.76 UDS\_SvcAuthenticationPOWN\_2020

Writes a UDS request according to the Authentication service's specifications (ISO-14229-1:2020). The subfunction proofOfOwnership is implicit.

#### Syntax

##### C

```
uds_status UDS_SvcAuthenticationPOWN_2020(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t *proof_of_ownership_client,
    uint16_t proof_of_ownership_client_size,
    uint8_t *ephemeral_public_key_client,
    uint16_t ephemeral_public_key_client_size);
```

##### C++

```
uds_status UDS_SvcAuthenticationPOWN_2020(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t *proof_of_ownership_client,
    uint16_t proof_of_ownership_client_size,
    uint8_t *ephemeral_public_key_client = nullptr,
    uint16_t ephemeral_public_key_client_size = 0);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
request_config	Message request configuration (see uds_msgconfig on page 27).
out_msg_request	Output, request message created and sent by the function (see uds_msg on page 21).
proof_of_ownership_client	Buffer containing the proof of ownership of the client.
proof_of_ownership_client_size	Size in bytes of the proof of ownership buffer.
ephemeral_public_key_client	Buffer containing the ephemeral public key of the client.
ephemeral_public_key_client_size	Size in bytes of the ephemeral public key buffer.

#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

PUDS_STATUS_NOT_INITIALIZED	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
PUDS_STATUS_PARAM_INVALID_VALUE	One of the given parameters is not valid.
PUDS_STATUS_MAPPING_NOT_INITIALIZED	The mapping given in the message configuration is unknown.
PUDS_STATUS_SERVICE_ALREADY_PENDING	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
PUDS_STATUS_NO_MEMORY	Failed to allocate memory and copy the new message in the transmission queue.
PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).


## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see [UDS\\_MsgFree\\_2013](#) on page 645).

The PCAN-UDS 2.x API provides [uds\\_svc\\_authentication\\_subfunction](#) (see on page 98) and [uds\\_svc\\_authentication\\_return\\_parameter](#) (see on page 99) enumerations to help user to decode Authentication service responses.

## Example

The following example shows the use of the service function [UDS\\_SvcAuthenticationPOWN\\_2020](#) on the channel [PCANTP\\_HANDLE\\_USBBUS1](#). A UDS physical service request is transmitted, and the [UDS\\_WaitForService\\_2013](#) function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/proofOfOwnership message
uint8_t proof_of_ownership_client[2] = { 0x12, 0x34 };
uint16_t proof_of_ownership_client_size = 2;
uint8_t ephemeral_public_key_client[2] = { 0x56, 0x78 };
uint16_t ephemeral_public_key_client_size = 2;
result = UDS_SvcAuthenticationPOWN_2020(PCANTP_HANDLE_USBBUS1, config, &request,
    proof_of_ownership_client, proof_of_ownership_client_size, ephemeral_public_key_client,
    ephemeral_public_key_client_size);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);
```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656.

**Class-method version:** [SvcAuthenticationPOWN\\_2020](#) on page 565.

### 3.8.77 UDS\_SvcAuthenticationRCFA\_2020

Writes a UDS request according to the Authentication service's specifications (ISO-14229-1:2020). The subfunction requestChallengeForAuthentication is implicit.

#### Syntax

#### C/C++

```
uds_status UDS_SvcAuthenticationRCFA_2020(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t communication_configuration,
    uint8_t *algorithm_indicator);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <a href="#">cantp_handle</a> on page 105).
request_config	Message request configuration (see <a href="#">uds_msgconfig</a> on page 27).
out_msg_request	Output, request message created and sent by the function (see <a href="#">uds_msg</a> on page 21).
communication_configuration	Configuration information about communication.
algorithm_indicator	Buffer of 16 bytes containing the algorithm indicator.

#### Returns

The return value is a [uds\\_status](#) code. [PUDS\\_STATUS\\_OK](#) is returned on success. The typical errors in case of failure are:

<a href="#">PUDS_STATUS_NOT_INITIALIZED</a>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<a href="#">PUDS_STATUS_PARAM_INVALID_VALUE</a>	One of the given parameters is not valid.
<a href="#">PUDS_STATUS_MAPPING_NOT_INITIALIZED</a>	The mapping given in the message configuration is unknown.
<a href="#">PUDS_STATUS_SERVICE_ALREADY_PENDING</a>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <a href="#">UDS_Reset_2013</a> (see <a href="#">UDS_Reset_2013</a> on page 651).
<a href="#">PUDS_STATUS_NO_MEMORY</a>	Failed to allocate memory and copy the new message in the transmission queue.
<a href="#">PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</a>	The given message buffer is already allocated, user must release the buffer before reusing it (see <a href="#">UDS_MsgFree_2013</a> on page 645).


#### Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see [UDS\\_MsgFree\\_2013](#) on page 645).

The PCAN-UDS 2.x API provides [uds\\_svc\\_authentication\\_subfunction](#) (see on page 98) and [uds\\_svc\\_authentication\\_return\\_parameter](#) (see on page 99) enumerations to help user to decode Authentication service responses.

## Example

The following example shows the use of the service function `UDS_SvcAuthenticationRCFA_2020` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result ;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/requestChallengeForAuthentication message
uint8_t communication_configuration = 0x00;
uint8_t algorithm_indicator[16] = { 0x00, 0x01, 0x02, 0x03, 0x04, 0x05, 0x06, 0x07, 0x08, 0x09,
    0x0A, 0x0B, 0x0C, 0x0D, 0x0E, 0x0F };
result = UDS_SvcAuthenticationRCFA_2020(PCANTP_HANDLE_USBBUS1, config, &request,
    communication_configuration, algorithm_indicator);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);
```

**See also:** `UDS_WaitForService_2013` on page 656.

**Class-method version:** `SvcAuthenticationRCFA_2020` on page 574.

### 3.8.78 UDS\_SvcAuthenticationVPOWNU\_2020

Writes a UDS request according to the Authentication service's specifications (ISO-14229-1:2020). The subfunction verifyProofOfOwnershipUnidirectional is implicit.

#### Syntax

##### C

```
uds_status UDS_SvcAuthenticationVPOWNU_2020(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t *algorithm_indicator,
    uint8_t *proof_of_ownership_client,
    uint16_t proof_of_ownership_client_size,
    uint8_t *challenge_client,
    uint16_t challenge_client_size,
    uint8_t *additional_parameter,
    uint16_t additional_parameter_size);
```

##### C++

```
uds_status UDS_SvcAuthenticationVPOWNU_2020(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t *algorithm_indicator,
    uint8_t *proof_of_ownership_client,
    uint16_t proof_of_ownership_client_size,
    uint8_t *challenge_client = nullptr,
    uint16_t challenge_client_size = 0,
    uint8_t *additional_parameter = nullptr,
    uint16_t additional_parameter_size = 0);
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
Request_config	Message request configuration (see uds_msgconfig on page 27).
Out_msg_request	Output, request message created and sent by the function (see uds_msg on page 21).
Algorithm_indicator	Buffer of 16 bytes containing the algorithm indicator
proof_of_ownership_client	Buffer containing the proof of ownership of the client.
Proof_of_ownership_client_size	Size in bytes of the proof of ownership buffer.
Challenge_client	Buffer containing the challenge of the client.
Challenge_client_size	Size in bytes of the challenge buffer.
Additional_parameter	Buffer containing additional parameters.
Additional_parameter_size	Size in bytes of the additional parameter buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).


## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

The PCAN-UDS 2.x API provides `uds_svc_authentication_subfunction` (see on page 98) and `uds_svc_authentication_return_parameter` (see on page 99) enumerations to help user to decode Authentication service responses.

## Example

The following example shows the use of the service function `UDS_SvcAuthenticationVPOWNU_2020` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

### C/C++

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/verifyProofOfOwnershipUnidirectional message
```

```
uint8_t algorithm_indicator[16] = { 0x00, 0x01, 0x02, 0x03, 0x04, 0x05, 0x06, 0x07, 0x08, 0x09,
    0x0A, 0x0B, 0x0C, 0x0D, 0x0E, 0x0F };
uint8_t proof_of_ownership_client[2] = { 0x12, 0x34 };
uint16_t proof_of_ownership_client_size = 2;
uint8_t challenge_client[2] = { 0x56, 0x78 };
uint16_t challenge_client_size = 2;
uint8_t additional_parameter[2] = { 0x9A, 0xBC };
uint16_t additional_parameter_size = 2;
result = UDS_SvcAuthenticationVPOWNU_2020(PCANTP_HANDLE_USBBUS1, config, &request,
    algorithm_indicator, proof_of_ownership_client, proof_of_ownership_client_size,
    challenge_client, challenge_client_size, additional_parameter,
    additional_parameter_size);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);
```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656.

**Class-method version:** [SvcAuthenticationVPOWNU\\_2020](#) on page 579.

### 3.8.79 UDS\_SvcAuthenticationVPOWNB\_2020

Writes a UDS request according to the Authentication service's specifications (ISO-14229-1:2020). The subfunction verifyProofOfOwnershipBidirectional is implicit.

#### Syntax

**C**

```
uds_status UDS_SvcAuthenticationVPOWNB_2020(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t *algorithm_indicator,
    uint8_t *proof_of_ownership_client,
    uint16_t proof_of_ownership_client_size,
    uint8_t *challenge_client,
    uint16_t challenge_client_size,
    uint8_t *additional_parameter,
    uint16_t additional_parameter_size);
```

**C++**

```
uds_status UDS_SvcAuthenticationVPOWNB_2020(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request,
    uint8_t *algorithm_indicator,
    uint8_t *proof_of_ownership_client,
    uint16_t proof_of_ownership_client_size,
    uint8_t *challenge_client,
```



```
uint16_t challenge_client_size,
uint8_t *additional_parameter = nullptr,
uint16_t additional_parameter_size = 0);
```

## Parameters

Parameter	Description
channel	The handle of a PUDS channel (see <code>cantp_handle</code> on page 105).
request_config	Message request configuration (see <code>uds_msgconfig</code> on page 27).
out_msg_request	Output, request message created and sent by the function (see <code>uds_msg</code> on page 21).
algorithm_indicator	Buffer of 16 bytes containing the algorithm indicator.
proof_of_ownership_client	Buffer containing the proof of ownership of the client.
proof_of_ownership_client_size	Size in bytes of the proof of ownership buffer.
challenge_client	Buffer containing the challenge of the client.
challenge_client_size	Size in bytes of the challenge buffer.
additional_parameter	Buffer containing additional parameters.
additional_parameter	Size in bytes of the additional parameter buffer.

## Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	One of the given parameters is not valid.
<code>PUDS_STATUS_MAPPING_NOT_INITIALIZED</code>	The mapping given in the message configuration is unknown.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).


## Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

The PCAN-UDS 2.x API provides `uds_svc_authentication_subfunction` (see on page 98) and `uds_svc_authentication_return_parameter` (see on page 99) enumerations to help user to decode Authentication service responses.

## Example

The following example shows the use of the service function `UDS_SvcAuthenticationVPOWNB_2020` on the channel `PCANTP_HANDLE_USBUSB1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

**C/C++**

```

uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/verifyProofOfOwnershipBidirectional message
uint8_t algorithm_indicator[16] = { 0x00, 0x01, 0x02, 0x03, 0x04, 0x05, 0x06, 0x07, 0x08, 0x09,
    0x0A, 0x0B, 0x0C, 0x0D, 0x0E, 0x0F };
uint8_t proof_of_ownership_client[2] = { 0x12, 0x34 };
uint16_t proof_of_ownership_client_size = 2;
uint8_t challenge_client[2] = { 0x56, 0x78 };
uint16_t challenge_client_size = 2;
uint8_t additional_parameter[2] = { 0x9A, 0xBC };
uint16_t additional_parameter_size = 2;
result = UDS_SvcAuthenticationVPOWNB_2020(PCANTP_HANDLE_USBBUS1, config, &request,
    algorithm_indicator, proof_of_ownership_client, proof_of_ownership_client_size,
    challenge_client, challenge_client_size, additional_parameter,
    additional_parameter_size);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
        &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);

```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656.

**Class-method version:** [SvcAuthenticationVPOWNB\\_2020](#) on page 596.

### 3.8.80 UDS\_SvcAuthenticationAC\_2020

Writes a UDS request according to the Authentication service's specifications (ISO-14229-1:2020). The subfunction authenticationConfiguration is implicit.

#### Syntax

#### C/C++

```
uds_status UDS_SvcAuthenticationAC_2020(
    cantp_handle channel,
    uds_msgconfig request_config,
    uds_msg *out_msg_request) ;
```

#### Parameters

Parameter	Description
channel	The handle of a PUDS channel (see cantp_handle on page 105).
Request_config	Message request configuration (see uds_msgconfig on page 27).
Out_msg_request	Output, request message created and sent by the function (see uds_msg on page 21).

#### Returns

The return value is a `uds_status` code. `PUDS_STATUS_OK` is returned on success. The typical errors in case of failure are:

<code>PUDS_STATUS_NOT_INITIALIZED</code>	Indicates that the given PUDS channel was not found in the list of reserved channels of the calling application.
<code>PUDS_STATUS_PARAM_INVALID_VALUE</code>	The request configuration is not valid (see uds_msgconfig on page 27), or the given message buffer is null.
<code>PUDS_STATUS_SERVICE_ALREADY_PENDING</code>	A message with the same service identifier is already pending in the reception queue, the user must read a response for his previous request before or clear the reception queues with <code>UDS_Reset_2013</code> (see <code>UDS_Reset_2013</code> on page 651).
<code>PUDS_STATUS_NO_MEMORY</code>	Failed to allocate memory and copy the new message in the transmission queue.
<code>PUDS_STATUS_MESSAGE_BUFFER_ALREADY_USED</code>	The given message buffer is already allocated, user must release the buffer before reusing it (see <code>UDS_MsgFree_2013</code> on page 645).


#### Remarks

This function creates a new message using the given message configuration and sets the given data according to the service's specifications. It then writes the message to the transmit queue. Once processed, this request message should be released (see `UDS_MsgFree_2013` on page 645).

The PCAN-UDS 2.x API provides `uds_svc_authentication_subfunction` (see on page 98) and `uds_svc_authentication_return_parameter` (see on page 99) enumerations to help user to decode Authentication service responses.

#### Example

The following example shows the use of the service function `UDS_SvcAuthenticationAC_2020` on the channel `PCANTP_HANDLE_USBBUS1`. A UDS physical service request is transmitted, and the `UDS_WaitForService_2013` function is called to get the response. Depending on the result, a message will be shown to the user.

 **Note:** It is assumed that the channel was already initialized.

**C/C++**

```
uds_status result;
uds_msg request;
uds_msg request_confirmation;
uds_msg response;
uds_msgconfig config;

memset(&request, 0, sizeof(request));
memset(&request_confirmation, 0, sizeof(request_confirmation));
memset(&response, 0, sizeof(response));
memset(&config, 0, sizeof(config));

// Set request message configuration
config.can_id = PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.nai.extension_addr = 0x0;
config.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
config.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
config.type = PUDS_MSGTYPE_USDT;

// Sends a physical Authentication/authenticationConfiguration message
result = UDS_SvcAuthenticationAC_2020(PCANTP_HANDLE_USBBUS1, config, &request);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    result = UDS_WaitForService_2013(PCANTP_HANDLE_USBBUS1, &request, &response,
    &request_confirmation);
if (UDS_StatusIsOk_2013(result, PUDS_STATUS_OK, false))
    printf("Response was received\n");
else
    // An error occurred
    printf("An error occurred\n");

// Free structures
UDS_MsgFree_2013(&request);
UDS_MsgFree_2013(&response);
UDS_MsgFree_2013(&request_confirmation);
```

**See also:** [UDS\\_WaitForService\\_2013](#) on page 656.

**Class-method version:** [SvcAuthenticationAC\\_2020](#) on page 607.

## 3.9 Definitions





The PCAN-UDS 2.x API defines the following values:

Name	Description
Messages Related Definitions	Defines values and constants for the members of the <code>uds_msg</code> structure.
PCAN-UDS 2.x Service Parameter Definitions	Defines constants to be used with some UDS service functions.



### 3.9.1 Messages Related Definitions

The following definitions are related to messages.

**Data information:**

	Type	Constant	Value	Description
	Int32	PCANTP_MAX_LENGTH_CAN_STANDARD	0x8	Maximum size of a CAN (non-FD) frame (8 bytes)
	Int32	PCANTP_MAX_LENGTH_CAN_FD	0x40	Maximum size of a CAN FD frame (64 bytes)
	Int32	PCANTP_MAX_LENGTH_ISOTP2004	0xFFFF	Maximum size of an ISO-TP rev. 2004 frame (4095 bytes)
	UInt32	PCANTP_MAX_LENGTH_ISOTP2016	0xFFFFFFFF	Maximum size of an ISO-TP rev. 2016 frame (4294967295 bytes)

**Other values:**


	Type	Constant	Value	Description
	Int32	PUDS_NRC_EXTENDED_TIMING	0x78 (120)	Negative UDS response code stating that the server/ECU requests more time to transmit a response.
	Int32	PUDS_SI_POSITIVE_RESPONSE	0x40 (64)	Service Identifier offset for positive response message (i.e.: Service Identifier for a positive response to a UDS request is 0x40 + Service Request Identifier).











**See also:** `uds_msg` on page 21.

### 3.9.2 PCAN-UDS 2.x Service Parameter Definitions

#### SecurityAccess Type Definitions

The following constants are a reminder of some Request Seed and Send Key values.

 **Note:** Ranges for system-supplier-specific use and ISO/SAE reserved values have been discarded.








	Type	Constant	Value	Description
	Byte	PUDS_SVC_PARAM_SA_RSD_1	0x01 (1)	Request seed (odd numbers)
	Byte	PUDS_SVC_PARAM_SA_RSD_3	0x03 (3)	Request seed (odd numbers)
	Byte	PUDS_SVC_PARAM_SA_RSD_5	0x05 (5)	Request seed (odd numbers)
	Byte	PUDS_SVC_PARAM_SA_RSD_MIN	0x07 (7)	Request seed (odd numbers)
	Byte	PUDS_SVC_PARAM_SA_RSD_MAX	0x5F (95)	Request seed (odd numbers)
	Byte	PUDS_SVC_PARAM_SA_SK_2	0x02 (2)	Send Key (even numbers)
	Byte	PUDS_SVC_PARAM_SA_SK_4	0x04 (4)	Send Key (even numbers)
	Byte	PUDS_SVC_PARAM_SA_SK_6	0x06 (6)	Send Key (even numbers)
	Byte	PUDS_SVC_PARAM_SA_SK_MIN	0x08 (8)	Send Key (even numbers)
	Byte	PUDS_SVC_PARAM_SA_SK_MAX	0x60 (96)	Send Key (even numbers)

**See also:** `UDS_SvcSecurityAccess_2013` on page 664, `SvcSecurityAccess_2013` on page 267.

## CommunicationControl Communication Type Definitions

The communication type parameter is a bit-code value that allows control of multiple communication types at the same time. The following table lists the coding of the communication type data parameter:










- the bit-encoded low nibble of this byte represents the communication types,
- the high nibble defines which of the subnets connected to the receiving node shall be disabled/enabled

	Type	Constant	Value	Description
	Byte	PUDS_SVC_PARAM_CC_FLAG_APPL	0x01 (1)	CommunicationType Flag: Application (01b)
	Byte	PUDS_SVC_PARAM_CC_FLAG_NWM	0x02 (2)	CommunicationType Flag: NetworkManagement (10b)
	Byte	PUDS_SVC_PARAM_CC_FLAG_DESCIRNCN	0x00 (0)	CommunicationType Flag: Disable/Enable specified communicationType (see Flags APPL/NMW)
	Byte	PUDS_SVC_PARAM_CC_FLAG_DENWRIRO	0xF0 (240)	CommunicationType Flag: Disable/Enable network which request is received on.
	Byte	PUDS_SVC_PARAM_CC_FLAG_DESNIBNN_MIN	0x10 (16)	CommunicationType Flag: Disable/Enable specific network identified by network number (minimum value).
	Byte	PUDS_SVC_PARAM_CC_FLAG_DESNIBNN_MAX	0xE0 (224)	CommunicationType Flag: Disable/Enable specific network identified by network number (maximum value).
	Byte	PUDS_SVC_PARAM_CC_FLAG_DESNIBNN_MASK	0xF0 (240)	CommunicationType Flag: Mask for DESNIBNN bits.








See also: [UDS\\_SvcCommunicationControl\\_2013](#) on page 666, [SvcCommunicationControl\\_2013](#) on page 276.

## ResponseOnEvent Service Definitions




The following table defines the expected size of the [EventTypeRecord](#) based on the [EventType](#) (see [uds\\_svc\\_param\\_roe](#) on page 77):

	Type	Constant	Value	Description
	Byte	PUDS_SVC_PARAM_ROE_STPROE_LEN	0	Expected size of EventTypeRecord for ROE_STPROE.
	Byte	PUDS_SVC_PARAM_ROE_ONDTCS_LEN	1	Expected size of EventTypeRecord for ROE_ONDTCS.
	Byte	PUDS_SVC_PARAM_ROE_OTI_LEN	1	Expected size of EventTypeRecord for ROE_OTI.
	Byte	PUDS_SVC_PARAM_ROE_OCODID_LEN	2	Expected size of EventTypeRecord for ROE_OCODID.
	Byte	PUDS_SVC_PARAM_ROE_RAE_LEN	0	Expected size of EventTypeRecord for ROE_RAE.
	Byte	PUDS_SVC_PARAM_ROE_STRTROE_LEN	0	Expected size of EventTypeRecord for ROE_STRTROE.
	Byte	PUDS_SVC_PARAM_ROE_CLRROE_LEN	0	Expected size of EventTypeRecord for ROE_CLRROE.
	Byte	PUDS_SVC_PARAM_ROE_OCOV_LEN	10	Expected size of EventTypeRecord for ROE_OCOV.
	Byte	PUDS_SVC_PARAM_ROE_RMRDOSC_LEN	1	Expected size of EventTypeRecord for ROE_RMRDOSC.

The following table defines the [EventWindowTime](#) parameters to be used with ResponseOnEvent service:

	Type	Constant	Value	Description
	Byte	PUDS_SVC_PARAM_ROE_EWT_ITTR	2	Infinite Time to Response (eventWindowTime parameter).
	Byte	PUDS_SVC_PARAM_ROE_EWT_SEWT	3	Short event window time (eventWindowTime parameter).
	Byte	PUDS_SVC_PARAM_ROE_EWT_MEWT	4	Medium event window time (eventWindowTime parameter).
	Byte	PUDS_SVC_PARAM_ROE_EWT_LEWT	5	Long event window time (eventWindowTime parameter).
	Byte	PUDS_SVC_PARAM_ROE_EWT_PWT	6	Power window time (eventWindowTime parameter).
	Byte	PUDS_SVC_PARAM_ROE_EWT_IWT	7	Ignition window time (eventWindowTime parameter).
	Byte	PUDS_SVC_PARAM_ROE_EWT_MTEWT	8	Manufacturer trigger event window time (eventWindowTime parameter).



The following table defines the `onTimerInterrupt` timer parameters to be used with `ResponseOnEvent` service:

	Type	Constant	Value	Description
	Byte	PUDS_SVC_PARAM_ROE_OTI_SLOW_RATE	1	Slow rate (onTimerInterrupt parameter).
	Byte	PUDS_SVC_PARAM_ROE_OTI_MEDIUM_RATE	2	Medium rate (onTimerInterrupt parameter).
	Byte	PUDS_SVC_PARAM_ROE_OTI_FAST_RATE	3	Fast rate (onTimerInterrupt parameter).

**See also:** `UDS_SvcResponseOnEvent_2013` on page 677, `SvcResponseOnEvent_2013` on page 314.

## ClearDiagnosticInformation Group of DTC Definitions






The following table lists constants to be used as the `GroupOfDTC` parameter with the `ClearDiagnosticInformation` service:

	Type	Constant	Value	Description
	UInt32	PUDS_SVC_PARAM_CDI_ERS	0x000000	Emissions-related systems group of DTCs.
	UInt32	PUDS_SVC_PARAM_CDI_AGDTCT	0xFFFFFFFF	All Groups of DTCs.

**See also:** `UDS_SvcClearDiagnosticInformation_2013` on page 700, `SvcClearDiagnosticInformation_2013` on page 387.

## SecuredDataTransmission Administrative Parameter Flags Definitions

The following table lists constants to be used as flags for the administrative parameter with the `SecuredDataTransmission` service(ISO-14229-1:2020):

	Type	Constant	Value	Description
	Byte	PUDS_SVC_PARAM_APAR_REQUEST_MSG_FLAG	0x01	The message is a request message.
	Byte	PUDS_SVC_PARAM_APAR_PRE_ESTABLISHED_KEY_FLAG	0x08	A pre - established key is used.
	Byte	PUDS_SVC_PARAM_APAR_ENCRYPTED_MSG_FLAG	0x10	Message is encrypted.
	Byte	PUDS_SVC_PARAM_APAR_SIGNED_MSG_FLAG	0x20	Message is signed.
	Byte	PUDS_SVC_PARAM_APAR_REQUEST_RESPONSE_SIGNATURE_FLAG	0x40	Signature on the response is requested.

**See also:** `UDS_SvcSecuredDataTransmission_2020` on page 672, `SvcSecuredDataTransmission_2020` on page 298.

## 4 Additional Information

PCAN is the platform for PCAN-OBDI, PCAN-UDS 2.x, and PCAN-Basic. In the following, topics there is an overview of PCAN and the fundamental practice with the interface DLL CanApi2 (PCAN-API).

Topics	Description
PCAN Fundamentals	This section contains an introduction to PCAN
PCAN-Basic	This section contains general information about the PCAN-Basic API
UDS and ISO-TP Network Addressing Information	This section contains general information about the ISO-TP network addressing format

### 4.1 PCAN Fundamentals

PCAN is a synonym for PEAK CAN APPLICATIONS and is a flexible system for planning, developing, and using a CAN Bus System. Developers as well as end-users are getting a helpful and powerful product.

The basis for the communication between PCs and external hardware via CAN is a series of Windows Kernel-Mode Drivers (Virtual Device Drivers) e.g. PCAN\_USB.SYS, PCAN\_PCI.SYS, PCAN\_XXX.SYS. These drivers are the core of a complete CAN environment on a PC running Windows and work as interfaces between CAN software and PC-based CAN hardware. The drivers manage the entire data flow of every CAN device connected to the PC.

A user or administrator of a CAN installation gets access via the PCAN-Clients (short: Clients). Several parameters of processes can be visualized and changed with their help. The drivers allow the connection of several Clients at the same time.

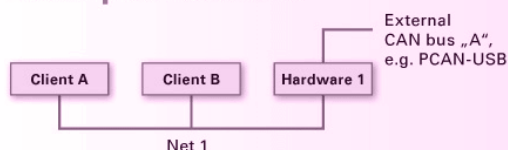
Furthermore, several hardware components based on the SJA1000 CAN controller are supported by a PCAN driver. So-called Nets provide the logical structure for CAN buses, which are virtually extended into the PC. On the hardware side, several Clients can be connected, too. The following figures demonstrate different possibilities of Net configurations (also realizable at the same time).

Following rules apply to PCAN clients, nets, and hardware:

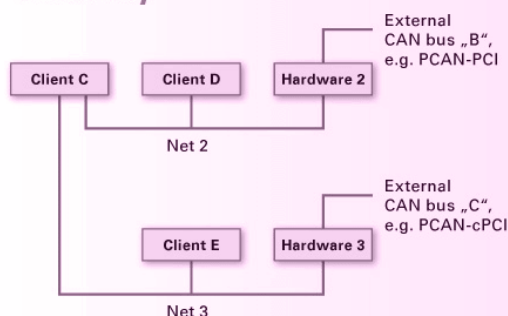
- └ One Client can be connected to several Nets
- └ One Net provides several Clients
- └ One piece of hardware belongs to one Net
- └ One Net can include none or one piece of hardware
- └ A message from a transmitting Client is carried on to every other connected Client, and to the external bus via the connected CAN hardware
- └ A message received by the CAN hardware is received by every connected Client. However, Clients react only on those messages that pass their acceptance filter

Users of PCAN-View 3 do not have to define and manage Nets. If PCAN-View is instructed to connect directly to a PCAN hardware, the application automatically creates a Net for the selected hardware and automatically establishes a connection with this Net.

#### Example network



#### Gateway



#### Internal network





**See also:** PCAN-Basic on page 769, ISO-TP Network Addressing Format on page 773.

## 4.2 PCAN-Basic

PCAN-Basic is a programming application interface (API) for CAN communication using the PCAN system of the company PEAK-System Technik GmbH. It comprises of a collection of Windows Device Drivers which allow the real-time connection of Windows applications to all CAN busses physically connected to a PC. PCAN-Basic supports connecting several CAN channels simultaneously, from the same or different types of devices. The following list shows the PCAN-Channels that can be connected per PCAN-Device:

	PCAN-ISA	PCAN-Dongle	PCAN-PCI	PCAN-USB	PCAN-PC-Card	PCAN-LAN
Number of channels	8	1	16	16	2	16

### Using PCAN-Basic

PCAN-Basic offers the possibility to use several PCAN channels within the same application easily. The communication process is divided in 3 phases: initialization, interaction, and finalization of a PCAN channel.

**Initialization:** To do CAN communication using a channel, it is necessary to first initialize it. This is done making a call to the function `CAN_Initialize` (**class-method:** `Initialize`) or `CAN_InitializeFD` (**class-method:** `InitializeFD`) in case of FD communication.

**Interaction:** After successful initialization, a channel is ready to communicate with the connected CAN bus. Further configuration is not needed. The functions `CAN_Read` and `CAN_Write` (**class-methods:** `Read` and `Write`) can then be used to read and write CAN messages. If the used channel is FD-capable and has been initialized using `CAN_InitializeFD`, then the functions to use are `CAN_ReadFD` and `CAN_WriteFD` (**class-methods:** `ReadFD` and `WriteFD`). An extra configuration can be made to improve a communication session, like changing the message filter to target-specific messages.

**Finalization:** When the communication is finished, the function `CAN_Uninitialize` (**class-method:** `Uninitialize`) should be called to release the PCAN channel and the resources allocated to it. In this way, the channel is marked as “Free” and can be used by other applications.

### Hardware and Drivers

Overview of the current PCAN hardware and device drivers:

Hardware	Plug and Play Hardware	Driver
PCAN-Dongle	No	Pcan_dng.sys
PCAN-ISA	No	Pcan_isa.sys
PCAN-PC/104	No	Pcan_isa.sys
PCAN-PCI	Yes	Pcan_pci.sys
PCAN-PCI Express	Yes	Pcan_pci.sys
PCAN-PCI Express FD	Yes	Pcan_pci.sys
PCAN-cPCI	Yes	Pcan_pci.sys
PCAN-miniPCI	Yes	Pcan_pci.sys
PCAN-miniPCle	Yes	Pcan_pci.sys
PCAN-miniPCle FD	Yes	Pcan_pci.sys
PCAN-M.2	Yes	Pcan_pci.sys
PCAN-Chip PCle FD	Yes	Pcan_pci.sys
PCAN-PC/104-Plus	Yes	Pcan_pci.sys
PCAN-PC/104-Plus Quad	Yes	Pcan_pci.sys
PCAN-PC/104-Express	Yes	Pcan_pci.sys
PCAN-PC/104-Express FD	Yes	Pcan_pci.sys
PCAN-ExpressCard	Yes	Pcan_pci.sys

Hardware	Plug and Play Hardware	Driver
PCAN-ExpressCard 34	Yes	Pcan_pci.sys
PCAN-USB	Yes	Pcan_usb.sys
PCAN-USB FD	Yes	Pcan_usb.sys
PCAN-USB Pro	Yes	Pcan_usb.sys
PCAN-USB Pro FD	Yes	Pcan_usb.sys
PCAN-USB Hub	Yes	Pcan_usb.sys
PCAN-USB X6	Yes	Pcan_usb.sys
PCAN-Chip USB	Yes	Pcan_usb.sys
PCAN-PC Card	Yes	Pcan_pcc.sys
PCAN-Ethernet Gateway DR	Yes	Pcan_lan.sys
PCAN-Wireless Gateway DR	Yes	Pcan_lan.sys
PCAN-Wireless Gateway	Yes	Pcan_lan.sys
PCAN-Wireless Automotive Gateway	Yes	Pcan_lan.sys

**See also:** PCAN Fundamentals on page 768, ISO-TP Network Addressing Format on page 773.

## 4.3 UDS and ISO-TP Network Addressing Information

The UDS API makes use of the PCAN-ISO-TP 3.x API to receive and transmit UDS messages. When a PUDS channel is initialized, the PCAN-ISO-TP 3.x API is configured to allow the following communications:

- └ Functional request using 11 bits CAN identifier and normal addressing, from External Test Equipment address (`PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT`) to OBD functional address (`PUDS_ISO_15765_4_ADDR_OBD_FUNCTIONAL`):
  - CAN ID `0x7DF` (`PUDS_ISO_15765_4_CAN_ID_FUNCTIONAL_REQUEST`) from Source `0xF1` to Target `0x33`
- └ Physical requests and responses using 11 bits CAN identifier and normal addressing, between the External Test Equipment address (`PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT`) and standard ECU addresses (ECU #1 to #8):
  - ECU #1
    - Request: CAN ID `0x7E0` (`PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_1`) from Source `0xF1` to Target `0x01`
    - Response: CAN ID `0x7E8` (`PUDS_ISO_15765_4_CAN_ID_PHYSICAL_RESPONSE_1`) from Source `0x01` to Target `0xF1`
  - ECU #2:
    - Request: CAN ID `0x7E1` (`PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_2`) from Source `0xF1` to Target `0x02`
    - Response: CAN ID `0x7E9` (`PUDS_ISO_15765_4_CAN_ID_PHYSICAL_RESPONSE_2`) from Source `0x02` to Target `0xF1`
  - ECU #3:
    - Request: CAN ID `0x7E2` (`PUDS_ISO_15765_4_CAN_ID_PHYSICAL_REQUEST_3`) from Source `0xF1` to Target `0x03`
    - Response: CAN ID `0x7EA` (`PUDS_ISO_15765_4_CAN_ID_PHYSICAL_RESPONSE_3`) from Source `0x03` to Target `0xF1`

- ECU #4:
  - Request: CAN ID 0x7E3 (PUDS\_ISO\_15765\_4\_CAN\_ID\_PHYSICAL\_REQUEST\_4) from Source 0xF1 to Target 0x04
  - Response: CAN ID 0x7EB (PUDS\_ISO\_15765\_4\_CAN\_ID\_PHYSICAL\_RESPONSE\_4) from Source 0x04 to Target 0xF1
- ECU #5:
  - Request: CAN ID 0x7E4 (PUDS\_ISO\_15765\_4\_CAN\_ID\_PHYSICAL\_REQUEST\_5) from Source 0xF1 to Target 0x05
  - Response: CAN ID 0x7EC (PUDS\_ISO\_15765\_4\_CAN\_ID\_PHYSICAL\_RESPONSE\_5) from Source 0x05 to Target 0xF1
- ECU #6:
  - Request: CAN ID 0x7E5 (PUDS\_ISO\_15765\_4\_CAN\_ID\_PHYSICAL\_REQUEST\_6) from Source 0xF1 to Target 0x06
  - Response: CAN ID 0x7ED (PUDS\_ISO\_15765\_4\_CAN\_ID\_PHYSICAL\_RESPONSE\_6) from Source 0x06 to Target 0xF1
- ECU #7:
  - Request: CAN ID 0x7E6 (PUDS\_ISO\_15765\_4\_CAN\_ID\_PHYSICAL\_REQUEST\_7) from Source 0xF1 to Target 0x07
  - Response: CAN ID 0x7EE (PUDS\_ISO\_15765\_4\_CAN\_ID\_PHYSICAL\_RESPONSE\_7) from Source 0x07 to Target 0xF1
- ECU #8:
  - Request: CAN ID 0x7E7 (PUDS\_ISO\_15765\_4\_CAN\_ID\_PHYSICAL\_REQUEST\_8) from Source 0xF1 to Target 0x08
  - Response: CAN ID 0x7EF (PUDS\_ISO\_15765\_4\_CAN\_ID\_PHYSICAL\_RESPONSE\_8) from Source 0x08 to Target 0xF1

← Communications with 29 bits CAN identifier and FIXED NORMAL addressing format (where XX is Target Address and YY Source address and respectively physical/functional addressing):

- CAN ID 0x00DAXXYY/0x00DBXXYY (data link layer priority 0)
- CAN ID 0x04DAXXYY/0x04DBXXYY (data link layer priority 1)
- CAN ID 0x08DAXXYY/0x08DBXXYY (data link layer priority 2)
- CAN ID 0x0CDAXXYY/0x0CDBXXYY (data link layer priority 3)
- CAN ID 0x10DAXXYY/0x10DBXXYY (data link layer priority 4)
- CAN ID 0x14DAXXYY/0x14DBXXYY (data link layer priority 5)
- CAN ID 0x18DAXXYY/0x18DBXXYY (data link layer priority 6)
- CAN ID 0x1CDAXXYY/0x1CDBXXYY (data link layer priority 7)

← Communications with 29 bits CAN identifier and MIXED addressing format (where XX is Target Address and YY Source address and respectively physical/functional addressing):

- CAN ID 0x00CEXXYY/0x00CDXXYY (data link layer priority 0)
- CAN ID 0x04CEXXYY/0x04CDXXYY (data link layer priority 1)
- CAN ID 0x08CEXXYY/0x08CDXXYY (data link layer priority 2)
- CAN ID 0x0CCEXXYY/0x0CCDXXYY (data link layer priority 3)
- CAN ID 0x10CEXXYY/0x10CDXXYY (data link layer priority 4)

- CAN ID 0x14CEXXYY/0x14CDXXYY (data link layer priority 5)
- CAN ID 0x18CEXXYY/0x18CDXXYY (data link layer priority 6)
- CAN ID 0x1CCEXXYY/0x1CCDXXYY (data link layer priority 7)
- └ Communications with 29 bits CAN identifier and ENHANCED addressing format (where YYY is Target Address and XXX Source address, addresses are encoded on 11 bits):
  - CAN ID 0x03XXXXYY (data link layer priority 0)
  - CAN ID 0x07XXXXYY (data link layer priority 1)
  - CAN ID 0x0BXXXXYY (data link layer priority 2)
  - CAN ID 0x0FXXXXYY (data link layer priority 3)
  - CAN ID 0x13XXXXYY (data link layer priority 4)
  - CAN ID 0x17XXXXYY (data link layer priority 5)
  - CAN ID 0x1BXXXXYY (data link layer priority 6)
- └ CAN ID 0x1FXXXXYY (data link layer priority 7)

If an application requires other communication settings, it will have to be set with through the function `UDS_AddMapping_2013` and the method `AddMapping_2013`. See also `uds_mapping` on page 25.

Alternatively, it is also possible to directly use PCAN-ISO-TP 3.x API. Once a PUDS channel is initialized, PCAN-ISO-TP 3.x specific functions (like `CANTP_Write_2016` and `CANTP_Read_2016`) can be called.

### 4.3.1 Usage in a Non-Standardized Context

#### Default Source Address

When a UDS channel is initialized, the default source address for this new node is the standardized “Test Equipment” address: 0xF1 (see `uds_address` on page 56). This means that all UDS messages received by this node whose target address does not match this source address will be discarded. If your application makes communications with a different source address, you need to specify that address to the API by using the parameter `PUDS_PARAMETER_SERVER_ADDRESS` (see on page 46):

```
cantp_handle channel;

// ...

// Define server address
uint8_t param = 0xA1;
uds_status status = UDS_SetValue_2013(channel, PUDS_PARAMETER_SERVER_ADDRESS, &param,
    sizeof(param));
// check status and proceed...
```

Alternatively, it is possible to listen to multiple addresses via the parameter `PUDS_PARAMETER_ADD_LISTENED_ADDRESS` (see on page 48):

```
cantp_handle channel;

// ...

// Listen to address 0x11
uint16_t param = 0x11;
uds_status status = UDS_SetValue_2013(channel, PUDS_PARAMETER_ADD_LISTENED_ADDRESS, &param,
    sizeof(param));
// check status and proceed...
```

## Removing Default Mappings

- If you need to set different network addressing information to the already defined mappings (for instance to use the standardized CAN identifiers with a different Source Address), you first need to remove the existing mapping(s).

```
cantp_handle channel = PCANTP_HANDLE_USBBUS1;
uds_mapping mappings[256];
uint16_t count;
uds_status status;
uint16_t i;

status = UDS_GetMappings_2013(channel, mappings, 256, &count);
if(!UDS_StatusIsOk_2013(status, PUDS_STATUS_OK, false))
    printf("Get mappings failed.\n");
for (i = 0; i < count; i++)
{
    status = UDS_RemoveMapping_2013(channel, mappings[i]);
    if (!UDS_StatusIsOk_2013(status, PUDS_STATUS_OK, false))
        printf("Remove mapping failed.\n");
}
```

- Standardized 29 bits CAN identifiers do not use mappings, if you want to override those CAN identifiers, simply use that value when adding a mapping.

If you need to disable completely the handling of standardized ISO-TP 29 bits CAN identifiers, consider disabling their support directly in PCAN-ISO-TP API using the following parameters:

- PCANTP\_PARAMETER\_SUPPORT\_29B\_ENHANCED
- PCANTP\_PARAMETER\_SUPPORT\_29B\_FIXED\_NORMAL
- PCANTP\_PARAMETER\_SUPPORT\_29B\_MIXED

### 4.3.2 ISO-TP Network Addressing Format

ISO-TP specifies three addressing formats to exchange data: normal, extended, and mixed addressing. Each addressing requires a different number of CAN frame data bytes to encapsulate the addressing information associated with the data to be exchanged.

The following table sums up the mandatory configuration to the PCAN-ISO-TP 3.x API for each addressing format:

Addressing format	CAN identifier length	Mandatory configuration steps
Normal addressing PCANTP_FORMAT_NORMAL	11 bits	Define mappings with UDS_AddMapping_2013
	29 bits	Define mappings with UDS_AddMapping_2013
Normal fixed addressing PCANTP_FORMAT_FIXED_NORMAL	11 bits	Addressing is invalid
	29 bits	-
Extended addressing PCANTP_FORMAT_EXTENDED	11 bits	Define mappings with UDS_AddMapping_2013
	29 bits	Define mappings with UDS_AddMapping_2013
Mixed addressing PCANTP_FORMAT_MIXED	11 bits	Define mappings with UDS_AddMapping_2013
	29 bits	-
Enhanced addressing PCANTP_ISOTP_FORMAT_ENHANCED	11 bits	Addressing is invalid.
	29 bits	- <b>Note:</b> With ISO-15765:2016, this addressing is considered deprecated and disabled by default. See PCAN-ISO-TP documentation on parameter: PCANTP_PARAMETER_SUPPORT_29B_ENHANCED.

A mapping allows an PCANTP node to identify and decode CAN Identifiers, it binds a CAN identifier to an PCANTP network address information. CAN messages that cannot be identified are ignored by the API.

Mappings involving physically addressed communication are most usually defined in pairs: the first mapping defines outgoing communication (i.e. request messages from node A to node B) and the second to match incoming communication (i.e. responses from node B to node A).

Functionally addressed communication requires one mapping to transmit functionally addressed messages (i.e. request messages from node A to any node) and as many mappings as responding nodes (i.e. responses from nodes B, C, etc. to node A).

### 4.3.3 PCAN-UDS 2.x Example

#### Configuration of Mappings

The following C/C++ example shows how to define 4 mappings with the PCAN-UDS 2.x API on the Tester Client side to:

- Transmit physical message to ECU #1 with CAN identifier 0x326
- Receive physical message from ECU #1 with CAN identifier 0x626
- Transmit functional message on CAN ID 0x200
- Receive UUDT message from the ECU #1 with CAN identifier 0x526

```

cantp_handle channel;
uds_status status;
uds_mapping mapping;

// Note: Channel is properly initialized with UDS_Initialize_2013 (..)
// [...]

// Add mapping for physical request from external equipment to ECU_1: ID=0x326
memset(&mapping, 0, sizeof(mapping));
mapping.can_id = 0x326;
mapping.can_id_flow_ctrl = 0x626;
mapping.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
mapping.can_tx_dlc = 8;
mapping.nai.extension_addr = 0;
mapping.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
mapping.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
mapping.nai.target_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
mapping.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
status = UDS_AddMapping_2013(channel, &mapping);
if (!UDS_StatusIsOk_2013(status, PUDS_STATUS_OK, false))
    printf("Add mapping failed.\n");

// Add mapping for physical response from ECU_#X to external equipment: ID=0x626
memset(&mapping, 0, sizeof(mapping));
mapping.can_id = 0x626;
mapping.can_id_flow_ctrl = 0x326;
mapping.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
mapping.can_tx_dlc = 8;
mapping.nai.extension_addr = 0;
mapping.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
mapping.nai.source_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
mapping.nai.target_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
mapping.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
status = UDS_AddMapping_2013(channel, &mapping);
if (!UDS_StatusIsOk_2013(status, PUDS_STATUS_OK, false))
    printf("Add mapping failed.\n");

// Add mapping for functional request from external equipment: ID=0x200
memset(&mapping, 0, sizeof(mapping));
mapping.can_id = 0x200;
mapping.can_id_flow_ctrl = (uint32_t)-1;

```

```

mapping.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
mapping.can_tx_dlc = 8;
mapping.nai.extension_addr = 0;
mapping.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
mapping.nai.source_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
mapping.nai.target_addr = PUDS_ISO_15765_4_ADDR_OBD_FUNCTIONAL;
mapping.nai.target_type = PCANTP_ISOTP_ADDRESSING_FUNCTIONAL;
status = UDS_AddMapping_2013(channel, &mapping);
if (!UDS_StatusIsOk_2013(status, PUDS_STATUS_OK, false))
    printf("Add mapping failed.\n");

// Unacknowledged Unsegmented Data Transfer (UUDT) support:
// standard CAN ID without UDS Protocol Data Unit can be sent by ECU with service
readDataByPeriodicdataIdentifier
// Add mapping for UUDT physical response from ECU_1 to external equipment: ID=0x526
memset(&mapping, 0, sizeof(mapping));
mapping.can_id = 0x526;
mapping.can_id_flow_ctrl = (uint32_t)-1;
mapping.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
mapping.can_tx_dlc = 4;
mapping.nai.extension_addr = 0;
mapping.nai.protocol = PUDS_MSGPROTOCOL_ISO_15765_2_11B_NORMAL;
mapping.nai.source_addr = PUDS_ISO_15765_4_ADDR_ECU_1;
mapping.nai.target_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
mapping.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;
status = UDS_AddMapping_2013(channel, &mapping);
if (!UDS_StatusIsOk_2013(status, PUDS_STATUS_OK, false))
    printf("Add mapping failed.\n");
status = UDS_AddCanIdFilter_2013(channel, 0x526);
if (!UDS_StatusIsOk_2013(status, PUDS_STATUS_OK, false))
    printf("Add can identifier failed.\n");

```

## UUDT Read/Write Example

The following C/C++ example shows Unacknowledged Unsegmented Data Transfer (UUDT), it writes from USB 1 UDS channel and reads the message from USB2 UDS channel.

```

uds_status status;
int tmp_buffer;
int count;
uds_msgconfig config;
uds_msg tx_msg;
uds_msg rx_msg;

cantp_handle channel_tx = PCANTP_HANDLE_USBBUS1;
cantp_handle channel_rx = PCANTP_HANDLE_USBBUS2;

memset(&config, 0, sizeof(config));
memset(&tx_msg, 0, sizeof(tx_msg));
memset(&rx_msg, 0, sizeof(rx_msg));

// Initializes UDS Communication for the transmitting channel
status = UDS_Initialize_2013(channel_tx, PCANTP_BAUDRATE_500K, (cantp_hwtype)0, 0, 0);
printf("Initialize UDS: %i\n", (int)status);

// Initializes UDS Communication for the receiving channel
status = UDS_Initialize_2013(channel_rx, PCANTP_BAUDRATE_500K, (cantp_hwtype)0, 0, 0);
printf("Initialize channel_rx: %i\n", (int)status);

// Define "channel_tx" Address as ECU #9
tmp_buffer = 0xF9;
status = UDS_SetValue_2013(channel_tx, PUDS_PARAMETER_SERVER_ADDRESS, &tmp_buffer, 1);
printf(" Set server address: %i (0x%02x)\n", (int)status, tmp_buffer);

```



```

// Define "channel_rx" Address as external equipment
tmp_buffer = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
status = UDS_SetValue_2013(channel_rx, PUDS_PARAMETER_SERVER_ADDRESS, &tmp_buffer, 1);
printf(" Set server address: %i (0x%02x)\n", (int)status, tmp_buffer);

// Prepare mapping configuration:
// UUDT physical response from ECU_#9 to external equipment: ID=0x526
config.can_id = 0x526;
config.can_msgtype = PCANTP_CAN_MSGTYPE_STANDARD;
config.type = PUDS_MSGTYPE_UUDT;
config.nai.extension_addr = 0;
config.nai.protocol = PUDS_MSGPROTOCOL_NONE;
config.nai.source_addr = 0xF9;
config.nai.target_addr = PUDS_ISO_15765_4_ADDR_TEST_EQUIPMENT;
config.nai.target_type = PCANTP_ISOTP_ADDRESSING_PHYSICAL;

// Add "channel_tx" can identifier filter (in order to send message)
// for UUDT physical response from ECU_#9 to external equipment: ID=0x526
status = UDS_AddCanIdFilter_2013(channel_tx, 0x526);
printf(" Add channel_tx can identifier filter: 0x%x\n", status);

// Add "channel_rx" can identifier filter (in order to receive message)
// for UUDT physical response from ECU_#9 to external equipment: ID=0x526
status = UDS_AddCanIdFilter_2013(channel_rx, 0x526);
printf(" Add channel_rx can identifier filter: 0x%x\n", status);

// Write a message from "channel_tx" to "channel_rx"
status = UDS_MsgAlloc_2013(&tx_msg, config, 6);
printf(" Allocate tx message: 0x%x\n", status);
if (UDS_StatusIsOk_2013)
{
    tx_msg.msg.msgdata.any->data[4] = 0xCA;
    tx_msg.msg.msgdata.any->data[5] = 0xB1;
    status = UDS_Write_2013(channel_tx, &tx_msg);
    printf(" UDS_Write_2013 UUDT: 0x%x\n", status);

    // Read message on channel Rx
    printf(" Reading message on channel_rx...\n");
    count = 0;
    do
    {
        count++;
        Sleep(100);
        status = UDS_Read_2013(channel_rx, &rx_msg, NULL, NULL);
    } while (status == PUDS_STATUS_NO_MESSAGE && count < 10);
    if (status == PUDS_STATUS_NO_MESSAGE)
        printf("Failed to read message on Channel RX !");
    else
    {
        // Received message will hold Network Address Information
        // as defined by the mapping.
        // The CAN ID information is removed from the "data" field.
        printf("\n --> Received data:");
        for (uint32_t i = 0; i < rx_msg.msg.msgdata.any->length; i++)
            printf(" 0x%02x", rx_msg.msg.msgdata.any->data[i]);
        printf("\n\n");
        UDS_MsgFree_2013(&rx_msg);
    }
}
UDS_MsgFree_2013(&tx_msg);
UDS_Uninitialize_2013(PCANTP_HANDLE_NONEBUS);

```



## 4.4 Using Events

Event objects can be used to automatically notify a client on reception of a UDS message. This has following advantages:

- └ The client program does not need to check periodically for received messages any longer
- └ The response time on received messages is reduced

To use events, the client application must call the `UDS_SetValue_2013` function (class-method: `SetValue_2013`) to set the parameter `PUDS_PARAMETER_RECEIVE_EVENT`. This parameter sets the handle for the event object. When receiving a message, the API sets this event to the **Signaled** state.

Another thread must be started in the client application, which waits for the event to be signaled, using one of the Win32 synchronization functions (e.g. `WaitForSingleObject`) without increasing the processor load. After the event is signaled, available messages can be read with the `UDS_Read_2013` function (class method: `Read_2013`), and the UDS messages can be processed.

### Remarks

Be careful, it is not recommended to use both event-handler (with a reading thread) and the UDS `WaitFor` functions and methods:

- └ `UDS_WaitForSingleMessage_2013` / `WaitForSingleMessage_2013`
- └ `UDS_WaitForFunctionalResponses_2013` / `WaitForFunctionalResponses_2013`
- └ `UDS_WaitForService_2013` / `WaitForService_2013`
- └ `UDS_WaitForServiceFunctional_2013` / `WaitForServiceFunctional_2013`

Indeed, both mechanisms would read messages at the same time, the result is that one will not receive any (or some) messages. If one of the previous functions is called and a thread is waiting for events to call the read UDS message function, then the user will have to temporarily prevent the thread from reading messages.

### Tips for the creation of the event object:

- └ Creation of the event as **auto-reset**
  - Trigger mode **set (default)**: After the first waiting thread has been released, the event object's state changes to non-signaled. Other waiting threads are not released. If no threads are waiting, the event object's state remains signaled
  - Trigger mode **pulse**: After the first waiting thread has been released, the event object's state changes to non-signaled. Other waiting threads are not released. If no threads are waiting, or if no thread can be released immediately, the event object's state is simply set to non-signaled
- └ Creation of the event as **manual-reset**
  - Trigger mode **set (default)**: The state of the event object remains signaled until it is set explicitly to the non-signaled state by the Win32 `ResetEvent` function. Any number of waiting threads, or threads that subsequently begin wait operations, can be released while the object's state remains signaled
  - Trigger mode **pulse**: All waiting threads that can be released immediately are released. The event object's state is then reset to the non-signaled state. If no threads are waiting, or if no thread can be released immediately, the event object's state is simply set to non-signaled

**See also:** `UDS_SetValue_2013` (class-method: `SetValue_2013`), `UDS_Read_2013` (class-method: `Read_2013`)

## 5 License Information

The use of this software is subject to the terms of the End User License Agreement of PEAK-System Technik GmbH.

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