MPLAB® Harmony Help - Networking Presentation Layer

MPLAB Harmony Integrated Software Framework v1.11

Networking Presentation Layer Help

This section describes the MPLAB Harmony Networking Presentation Layer.

Introduction

This library provides a Networking Presentation Layer that is available on the Microchip family of microcontrollers with a convenient C language interface.

Description

The MPLAB Harmony Networking Presentation Layer is an abstracted middleware layer that provides an encrypted channel. There are three interfaces for the layer:

- Client - this interface starts a network session and reads and writes clear text data
- Provider - this interface encrypts the clear text into cipher text, and decrypts cipher text into clear text
- Transport - this interface transmits and receives the cipher text

The linkage to the provider interface is done through function pointers to isolate it from the rest of MPLAB Harmony. This allows for any provider to be used. Please note that Microchip *does not* supply a commercially licensed TLS provider. wolfSSL (formerly CyaSSL) is supported as a provider for evaluation purposes only.

The transport interface is abstracted to function pointers as well, to allow for any transport to be used. Currently, only the MPLAB Harmony TCP/IP Stack is used as a transport; however, other transports can be created, such as using UART, which can be used instead.

The MPLAB Harmony Networking Presentation Layer has a Tasks function that is used to continuously call the provider's connect and accept functions until they run to success of failure, thereby hiding this job from the application.

Using the Library

This topic describes the basic architecture of the Networking Presentation Layer and provides information and examples on its use.

Description

Interface Header File: `net_pres.h`

The interface to the Networking Presentation Layer is defined in the `net_pres.h` header file. Any C language source (`.c`) file that uses the Networking Presentation Layer should include `net_pres.h`.

Library File:

The Networking Presentation Layer archive (`.a`) file is installed with MPLAB Harmony.

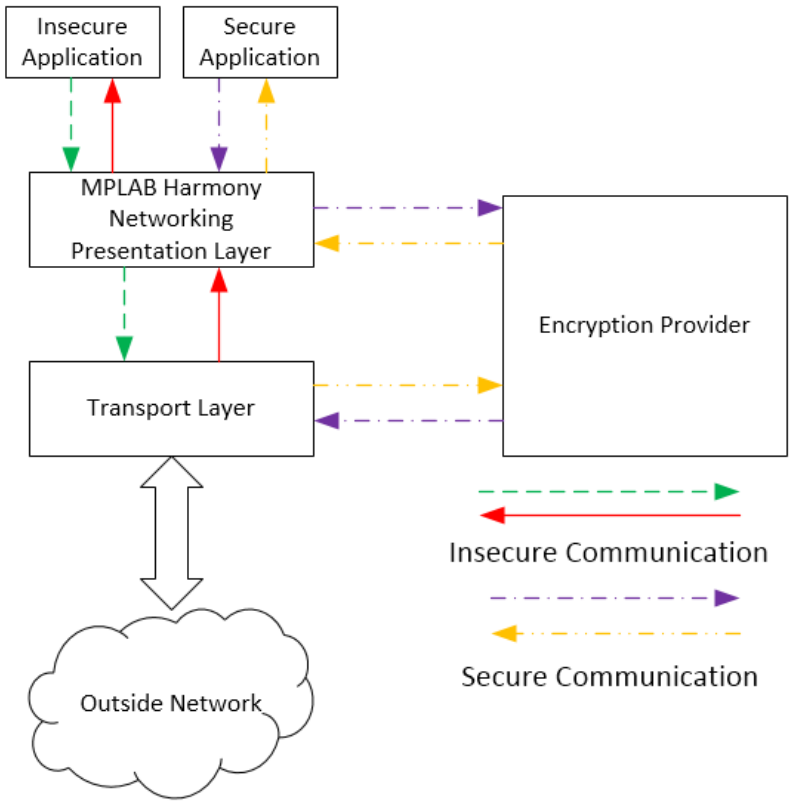
Please refer to the What is MPLAB Harmony? section for how the Networking Presentation Layer interacts with the framework.

Abstraction Model

This library provides the low-level abstraction of the Network Presentation Layer on the Microchip family of microcontrollers with a convenient C language interface. This topic describes how that abstraction is modeled in the software and introduces the library interface.

Description

Software Abstraction Block Diagram



Library Overview

The Library Interface routines are divided into various sub-sections, which address one of the blocks or the overall operation of the Networking Presentation Layer.

Library Interface Section	Description
System Functions	Provides "initialize" functions and a "tasks" function for performing general presentation layer tasks.
Socket Functions	Provides various socket-related functions for the purpose of connecting, flushing, and setting options, among others.
Certificate Store Functions	Provides certificate-related functions for the purpose of obtaining certificates and keys.

Configuring the Library

The configuration of the Networking Presentation Layer is based on the file `system_config.h`.

This header file contains the configuration selection for the Networking Presentation Layer. Based on the selections made, the Networking Presentation Layer may support the selected features. These configuration settings will apply to all instances of the Networking Presentation Layer.

This header can be placed anywhere; however, the path of this header needs to be present in the include search path for a successful build. Refer to the Applications Help section for more details.

Building the Library

This section lists the files that are available in the Networking Presentation Layer.

Description

The following three tables list and describe the header (`.h`) and source (`.c`) files that implement this library. The parent folder for these files is `<install-dir>/framework/net/pres`.

Interface File(s)

This table lists and describes the header files that must be included (i.e., using `#include`) by any code that uses this library.

Source File Name	Description
net_pres.h	This file provides the interface definitions of the Network Presentation Layer.
net_pres_certstore.h	This file describes the common API used to access the certificate store.
net_pres_encryptionproviderapi.h	This file describes the API that an encryption provider must follow to be compatible with the Networking Presentation Layer.
net_pres_socketapi.h	This file describes the API that the application uses to send and receive data though Networking Presentation Layer sockets.
net_pres_transportapi.h	This file descriptions the API that a transport layer must follow to be compatible with the Networking Presentation Layer.

Required File(s)

All of the required files listed in the following table are automatically added into the MPLAB X IDE project by the MHC when the library is selected for use.

This table lists and describes the source and header files that must *always* be included in the MPLAB X IDE project to build this library.

Source File Name	Description
/src/net_pres.c	This file implements the Networking Presentation Layer API for both the socket layer and the system interface.

Optional File(s)

There are no optional files for the Networking Presentation Layer.

Module Dependencies

The Networking Presentation Layer is not dependent upon other modules.

Library Interface

a) System Functions

	Name	Description
	NET_PRES_Deinitialize	Deinitializes the Network Presentation Layer Instance. **Implementation:** Dynamic
	NET_PRES_Initialize	Initializes the Network Presentation Layer sub-system with the configuration data. **Implementation:** Dynamic
	NET_PRES_Reinitialize	Reinitializes the instance of the presentation layer. **Implementation:** Dynamic
	NET_PRES_Tasks	MPLAB Harmony tasks function used for general presentation layer tasks. **Implementation:** Dynamic
	NET_PRES_Status	Provides the current status of the MPLAB Harmony Networking Presentation Layer. **Implementation:** Dynamic
	NET_PRES_EncProviderReadReady	Defines the read ready function to the provider **Implementation:** Dynamic

b) Socket Functions

	Name	Description
	NET_PRES_SocketIsOpenModeSupported	Checks to see if a mode is supported by open.
	NET_PRES_SocketOpen	Opens a presentation socket.
	NET_PRES_SocketBind	Binds a socket to a local address.
	NET_PRES_SocketClose	Disconnects an open socket and destroys the socket handle, releasing the associated resources.
	NET_PRES_SocketConnect	Connects a client socket.
	NET_PRES_SocketDiscard	Discards any pending data in the RX FIFO.
	NET_PRES_SocketDisconnect	Disconnects an open socket.
	NET_PRES_SocketEncryptSocket	This function turns an insecure socket into a secure socket. Details: This function will turn an unencrypted socket into an encrypted socket and starts encryption negotiation.
	NET_PRES_SocketFlush	Immediately transmits all pending TX data.
	NET_PRES_SocketInfoGet	Obtains information about a currently open socket.
	NET_PRES_SocketIsConnected	Determines whether a socket has an established connection.
	NET_PRES_SocketIsNegotiatingEncryption	This function checks if encryption negotiation is still in progress.
	NET_PRES_SocketIsSecure	This function checks whether a connection is secure.
	NET_PRES_SocketLastError	This function returns the last error code for this socket. Details: This function will return the last error code that was set for this socket and it will clear the current error code. An error code is set whenever a socket operation fails for some missing functionality, bad parameter, etc.
	NET_PRES_SocketOptionsGet	Allows the options for a socket such as, current RX/TX buffer size, etc., to be obtained.
	NET_PRES_SocketOptionsSet	Allows setting options to a socket like adjust RX/TX buffer size, etc.
	NET_PRES_SocketPeek	Reads a specified number of data bytes from the RX buffer/FIFO without removing them from the buffer.
	NET_PRES_SocketRead	Reads an array of data bytes from a socket's RX buffer/FIFO.
	NET_PRES_SocketReadIsReady	Determines how many bytes can be read from the RX buffer.
	NET_PRES_SocketRemoteBind	Binds a socket to a remote local address.
	NET_PRES_SocketSignalHandlerDeregister	Deregisters a previously registered socket signal handler.
	NET_PRES_SocketSignalHandlerRegister	Registers a socket signal handler.
	NET_PRES_SocketWasReset	Self-clearing semaphore indicating socket reset.
	NET_PRES_SocketWrite	Takes a buffer and sends it to the encryption provider.
	NET_PRES_SocketGetTransportHandle	This function returns the transport layer handle. Details: This function returns the transport layer handle for a valid socket
	NET_PRES_SocketWriteIsReady	Determines how much free space is available in the TX buffer.

c) Certificate Store Functions

	Name	Description
	NET_PRES_CertStoreGetCACerts	This function gets the CA certificates from the store, **Implementation:** Dynamic
	NET_PRES_CertStoreGetServerCert	This function gets a server certificate and key from the certificate store. **Implementation:** Dynamic

d) Data Types and Constants

	Name	Description
	_NET_PRES_EncProviderObject	Defines the data that the presentation layer needs from the provider.
	_NET_PRES_TransportObject	Defines the data that the transport layer needs to provide to the Networking Presentation Layer.
	NET_PRES_ADDRESS	This is type NET_PRES_ADDRESS.
	NET_PRES_EncProviderConnect	Connects the function to the provider. **Implementation:** Dynamic
	NET_PRES_EncProviderConnectionClose	Defines the close function to the provider. **Implementation:** Dynamic
	NET_PRES_EncProviderDeinit	Defines the deinitialization function for the provider. **Implementation:** Dynamic
	NET_PRES_EncProviderInit	Defines the initialization function to the encryption provider. **Implementation:** Dynamic
	NET_PRES_EncProviderIsInitialized	Determines whether the encryption provider has been initialized. **Implementation:** Dynamic
	NET_PRES_EncProviderObject	Defines the data that the presentation layer needs from the provider.
	NET_PRES_EncProviderOpen	Defines the open connection function to the provider. **Implementation:** Dynamic
	NET_PRES_EncProviderRead	Defines the read function to the provider **Implementation:** Dynamic
	NET_PRES_EncProviderWrite	Defines the write function to the provider. **Implementation:** Dynamic
	NET_PRES_EncSessionStatus	Defines the enumeration for the state and status of the encrypted portion of a connection.
	NET_PRES_INDEX	Sets the type for the presentation layer index.
	NET_PRES_INIT_DATA	Initializes a Presentation layer.
	NET_PRES_INST_DATA	Initializes a Presentation layer.
	NET_PRES_SIGNAL_FUNCTION	MPLAB Harmony Networking Presentation Layer Signal function.
	NET_PRES_SIGNAL_HANDLE	Sets the type for the presentation layer signal handle.
	NET_PRES_SKT_ADDR_T	This is type NET_PRES_SKT_ADDR_T.
	NET_PRES_SKT_ERROR_T	This is type NET_PRES_SKT_ERROR_T.
	NET_PRES_SKT_HANDLE_T	Sets the type for the presentation layer socket handle.
	NET_PRES_SKT_OPTION_TYPE	This is type NET_PRES_SKT_OPTION_TYPE.
	NET_PRES_SKT_T	This is type NET_PRES_SKT_T.
	NET_PRES_TRANS_ADDR_T	Defines a generic address structure to pass to the transport layer.
	NET_PRES_TRANS_ADDRESS_TYPE	Defines the enumeration for the type of address.
	NET_PRES_TRANS_OPTION_T	Defines the enumeration for the type of options.
	NET_PRES_TransBind	Binds a socket to a local address.
	NET_PRES_TransBool	Generic function prototype for functions that return a bool.
	NET_PRES_TransClose	Function prototype for functions that closes a socket.
	NET_PRES_TransDiscard	Function prototype for functions that clears a socket's RX buffer.
	NET_PRES_TransHandlerRegister	Function prototype that registers a handler with a socket.
	NET_PRES_TransOpen	Opens a presentation socket.
	NET_PRES_TransOption	Sets of gets a socket's options.
	NET_PRES_TransPeek	Function prototype for functions that peeks on the socket's buffer.
	NET_PRES_TransportObject	Defines the data that the transport layer needs to provide to the Networking Presentation Layer.

	NET_PRES_TransRead	Defines the read function provided by the transport layer. **Implementation:** Dynamic
	NET_PRES_TransReady	Defines the ready function provided by the transport layer. **Implementation:** Dynamic
	NET_PRES_TransSignalHandlerDeregister	Function prototype that deregisters a handler with a socket.
	NET_PRES_TransSocketInfoGet	Function prototype for functions that gets the information on a socket.
	NET_PRES_TransWrite	Defines the write function provided by the transport layer. **Implementation:** Dynamic
	NET_PRES_INVALID_SOCKET	Invalid socket indicator macro.
	NET_PRES_SKT_PORT_T	Sets the type for the presentation layer port.
	NET_PRES_TransIsPortDefaultSecured	Checks to see if a port is encrypted by default. **Implementation:** Dynamic
	NET_PRES_EncProviderWriteReady	Defines the write ready function to the provider. **Implementation:** Dynamic

Description

This section describes the Application Programming Interface (API) functions of the Networking Presentation Layer.

Refer to each section for a detailed description.

a) System Functions

NET_PRES_Deinitialize Function

Deinitializes the Network Presentation Layer Instance.

Implementation: Dynamic

File

net_pres.h

C

```
void NET_PRES_Deinitialize(SYS_MODULE_OBJ obj);
```

Returns

None.

Description

Network Presentation Layer Deinitialization

This function deallocates any resources allocated by the initialization function.

Preconditions

The layer must be successfully initialized with NET_PRES_Initialize.

Parameters

Parameters	Description
Object	the valid object returned from NET_PRES_Initialize

NET_PRES_Initialize Function

Initializes the Network Presentation Layer sub-system with the configuration data.

Implementation: Dynamic

File

net_pres.h

C

```
SYS_MODULE_OBJ NET_PRES_Initialize(const SYS_MODULE_INDEX index, const SYS_MODULE_INIT * const init);
```

Returns

- Valid handle to the presentation instance - If successful
- SYS_MODULE_OBJ_INVALID - If unsuccessful

Description

Network Presentation Layer Initialization

Initializes the Network Presentation Layer sub-system with the configuration data.

Preconditions

None.

Parameters

Parameters	Description
index	This is the index of the network presentation layer instance to be initialized. Since there is only one network presentation layer, this parameter is ignored.
init	This is a pointer to a NET_PRES_INIT_DATA structure

NET_PRES_Reinitialize Function

Reinitializes the instance of the presentation layer.

Implementation: Dynamic

File

net_pres.h

C

```
void NET_PRES_Reinitialize(SYS_MODULE_OBJ obj, const SYS_MODULE_INIT * const init);
```

Returns

None.

Description

Network Presentation Layer Reinitialization

This function will deinitialize and initialize the layer instance.

Preconditions

The layer must be successfully initialized with NET_PRES_Initialize.

Parameters

Parameters	Description
object	The object valid passed back to NET_PRES_Initialize
init	The new initialization structure

NET_PRES_Tasks Function

MPLAB Harmony tasks function used for general presentation layer tasks.

Implementation: Dynamic

File

net_pres.h

C

```
void NET_PRES_Tasks(SYS_MODULE_OBJ obj);
```

Returns

None.

Description

MPLAB Harmony Networking Presentation Layer Tasks

This function is called by the main loop. It is used to pump encryption connections during negotiations.

Preconditions

The layer must be successfully initialized with NET_PRES_Initialize.

Parameters

Parameters	Description
object	The valid object passed back to NET_PRES_Initialize

NET_PRES_Status Function

Provides the current status of the MPLAB Harmony Networking Presentation Layer.

Implementation: Dynamic

File

net_pres.h

C

```
SYS_STATUS NET_PRES_Status(SYS_MODULE_OBJ object);
```

Returns

- SYS_STATUS_READY - Indicates that any previous module operation for the specified module has completed
- SYS_STATUS_UNINITIALIZED - Indicates the module has not been initialized
- SYS_STATUS_BUSY - Indicates that the module is busy and can't accept operations
- SYS_STATUS_ERROR - Indicates that there is a fatal error in the module

Description

This function provides the current status of the MPLAB Harmony Net Presentation Layer.

Remarks

None.

Preconditions

The NET_PRES_Initialize function must have been called before calling this function.

Parameters

Parameters	Description
object	Layer object handle, returned from NET_PRES_Initialize

NET_PRES_EncProviderReadReady Type

Defines the read ready function to the provider

Implementation: Dynamic

File

net_pres_encryptionproviderapi.h

C

```
typedef int32_t (* NET_PRES_EncProviderReadReady)(void * providerData);
```

Returns

The number of bytes ready to be read.

Description

Presentation Encryption Provider Read Ready Function Pointer Prototype

This function pointer defines the read ready function. It is called by the presentation layer when the presentation client wants to check whether read data is available from a secured connection.

Preconditions

A connection must have already been created, and be in the open state.

Parameters

Parameters	Description
providerData	A pointer to the buffer for the provider to keep connection specific data.

b) Socket Functions

NET_PRES_SocketIsOpenModeSupported Function

Checks to see if a mode is supported by open.

File

net_pres_socketapi.h

C

```
bool NET_PRES_SocketIsOpenModeSupported(NET_PRES_INDEX index, NET_PRES_SKT_T socketType);
```

Returns

- true - The mode is supported
- false - The mode is not supported

Description

This function checks to see if a mode is supported by open.

Preconditions

The MPLAB Harmony Networking Presentation Layer is initialized.

Parameters

Parameters	Description
index	Index of the presentation layer.
socketType	The type of socket to mode to be checked.

NET_PRES_SocketOpen Function

Opens a presentation socket.

File

net_pres_socketapi.h

C

```
NET_PRES_SKT_HANDLE_T NET_PRES_SocketOpen(NET_PRES_INDEX index, NET_PRES_SKT_T socketType,
NET_PRES_SKT_ADDR_T addrType, NET_PRES_SKT_PORT_T port, NET_PRES_ADDRESS * addr, NET_PRES_SKT_ERROR_T*
error);
```

Returns

- NET_PRES_INVALID_SOCKET - No sockets of the specified type were available to be opened
- NET_PRES_SKT_HANDLE_T handle - Returned when NET_PRES_INVALID_SOCKET is returned. Save this handle and use it when calling all other presentation socket APIs.

Description

Provides a unified method for opening all presentation sockets types. Sockets are created at the presentation layer module initialization, and can be claimed with this function and freed using NET_PRES_SocketClose. The presentation layer will call the corresponding open function in the transport layer, and if encryption is specified the presentation layer will also handle encryption negotiation.

Preconditions

The MPLAB Harmony Networking Presentation Layer is initialized.

Parameters

Parameters	Description
index	Index of the presentation layer.

socketType	The type of socket to open.
addType	The type of address being used. This is passed unaltered to the transport layer.
port	The port to listen or to send to. This is passed unaltered to the transport layer.
addr	Address to use. This is passed unaltered to the transport layer.
error	The extended error code of the function.

NET_PRES_SocketBind Function

Binds a socket to a local address.

File

net_pres_socketapi.h

C

```
bool NET_PRES_SocketBind(NET_PRES_SKT_HANDLE_T handle, NET_PRES_SKT_ADDR_T addrType, NET_PRES_SKT_PORT_T
port, NET_PRES_ADDRESS * addr);
```

Returns

- true - Indicates success
- false - Indicates failure

Description

This function calls directly to the transport layer's bind function.

Preconditions

A socket needs to have been opened by NET_PRES_SocketOpen.

Parameters

Parameters	Description
handle	The socket to bind.
addType	The type of address being used. This is passed unaltered to the transport layer.
port	The port to use. This is passed unaltered to the transport layer.
addr	The address to bind to. This is passed unaltered to the transport layer.

NET_PRES_SocketClose Function

Disconnects an open socket and destroys the socket handle, releasing the associated resources.

File

net_pres_socketapi.h

C

```
void NET_PRES_SocketClose(NET_PRES_SKT_HANDLE_T handle);
```

Returns

None.

Description

This function calls the encryption provider's close function and then calls the close function of the transport layer for the socket and frees the socket for reuse.

Preconditions

A socket needs to have been opened by NET_PRES_SocketOpen.

Parameters

Parameters	Description
handle	The presentation layer socket handle.

NET_PRES_SocketConnect Function

Connects a client socket.

File

net_pres_socketapi.h

C

```
bool NET_PRES_SocketConnect(NET_PRES_SKT_HANDLE_T handle);
```

Returns

- true - Indicates success
- false - Indicates failure

Description

This function calls the transport layer's connect function directly, if it exists.

Preconditions

A socket needs to have been opened by NET_PRES_SocketOpen.

Parameters

Parameters	Description
handle	The presentation layer socket handle.

NET_PRES_SocketDiscard Function

Discards any pending data in the RX FIFO.

File

net_pres_socketapi.h

C

```
uint16_t NET_PRES_SocketDiscard(NET_PRES_SKT_HANDLE_T handle);
```

Returns

The number of bytes that have been discarded from the RX buffer.

Description

This function calls the transport layer's discard function, if it exists.

Preconditions

A socket needs to have been opened by NET_PRES_SocketOpen

Parameters

Parameters	Description
handle	The presentation layer socket handle.

NET_PRES_SocketDisconnect Function

Disconnects an open socket.

File

net_pres_socketapi.h

C

```
bool NET_PRES_SocketDisconnect(NET_PRES_SKT_HANDLE_T handle);
```

Returns

- true - Indicates success
- false - Indicates failure

Description

This function calls the transport layer's disconnect function directly, if it exists.

Preconditions

A socket needs to have been opened by NET_PRES_SocketOpen.

Parameters

Parameters	Description
handle	The presentation layer socket handle.

NET_PRES_SocketEncryptSocket Function

This function turns an insecure socket into a secure socket.

Details: This function will turn an unencrypted socket into an encrypted socket and starts encryption negotiation.

File

net_pres_socketapi.h

C

```
bool NET_PRES_SocketEncryptSocket(NET_PRES_SKT_HANDLE_T handle);
```

Returns

- true - If the call was successful
- false - If the call was unsuccessful

Preconditions

A socket needs to have been opened by NET_PRES_SocketOpen.

Parameters

Parameters	Description
handle	The presentation layer socket handle.

NET_PRES_SocketFlush Function

Immediately transmits all pending TX data.

File

net_pres_socketapi.h

C

```
uint16_t NET_PRES_SocketFlush(NET_PRES_SKT_HANDLE_T handle);
```

Returns

- The number of flushed bytes
- 0, if no flushed bytes or an error occurred

Description

This function calls the transport layer's flush function, if it exists.

Preconditions

A socket needs to have been opened by NET_PRES_SocketOpen.

Parameters

Parameters	Description
handle	The presentation layer socket handle.

NET_PRES_SocketInfoGet Function

Obtains information about a currently open socket.

File

net_pres_socketapi.h

C

```
bool NET_PRES_SocketInfoGet(NET_PRES_SKT_HANDLE_T handle, void * info);
```

Returns

- true - Indicates success
- false - Indicates failure

Description

This function calls the transport layer's SocketInfoGet, if it exists.

Preconditions

A socket needs to have been opened by NET_PRES_SocketOpen.

Parameters

Parameters	Description
handle	The presentation layer socket handle.
info	The buffer that the information gets written to.

NET_PRES_SocketIsConnected Function

Determines whether a socket has an established connection.

File

net_pres_socketapi.h

C

```
bool NET_PRES_SocketIsConnected(NET_PRES_SKT_HANDLE_T handle);
```

Description

This function determines whether a socket has an established connection to a remote node. This function calls directly to the transport layer's IsConnected function, if it exists.

Preconditions

A socket needs to have been opened by NET_PRES_SocketOpen.

Parameters

Parameters	Description
handle	The presentation layer socket handle.

NET_PRES_SocketIsNegotiatingEncryption Function

This function checks if encryption negotiation is still in progress.

File

net_pres_socketapi.h

C

```
bool NET_PRES_SocketIsNegotiatingEncryption(NET_PRES_SKT_HANDLE_T handle);
```

Returns

- true - If the encryption negotiation is still ongoing
- false - If there is no ongoing negotiation

Description

This function returns checks to see if an encrypted socket is still undergoing negotiation.

Preconditions

A socket needs to have been opened by NET_PRES_SocketOpen.

Parameters

Parameters	Description
handle	The presentation layer socket handle.

NET_PRES_SocketIsSecure Function

This function checks whether a connection is secure.

File

net_pres_socketapi.h

C

```
bool NET_PRES_SocketIsSecure(NET_PRES_SKT_HANDLE_T handle);
```

Returns

- true - If the communications is secure
- false - If the communications is not secure

Description

This function returns whether or not the connection is secure. It will return true if encryption negotiation was successful .

Preconditions

A socket needs to have been opened by NET_PRES_SocketOpen.

Parameters

Parameters	Description
handle	The presentation layer socket handle.

NET_PRES_SocketLastError Function

This function returns the last error code for this socket.

Details: This function will return the last error code that was set for this socket and it will clear the current error code. An error code is set whenever a socket operation fails for some missing functionality, bad parameter, etc.

File

net_pres_socketapi.h

C

```
NET_PRES_SKT_ERROR_T NET_PRES_SocketLastError(NET_PRES_SKT_HANDLE_T handle);
```

Returns

A NET_PRES_SKT_ERROR_T representing the last encountered error for this socket.

Preconditions

A socket needs to have been opened by NET_PRES_SocketOpen.

Parameters

Parameters	Description
handle	The presentation layer socket handle.

NET_PRES_SocketOptionsGet Function

Allows the options for a socket such as, current RX/TX buffer size, etc., to be obtained.

File

net_pres_socketapi.h

C

```
bool NET_PRES_SocketOptionsGet(NET_PRES_SKT_HANDLE_T handle, NET_PRES_SKT_OPTION_TYPE option, void*
optParam);
```

Returns

- true - Indicates success
- false - Indicates failure

Description

Various options can be obtained at the socket level. This function calls directly to the transport layer's OptionGet function, if it exists.

Preconditions

A socket needs to have been opened by NET_PRES_SocketOpen.

Parameters

Parameters	Description
handle	The socket to set options for.
option	The specific option to set, this is passed unaltered to the transport layer.
optParam	The option value, which is passed unaltered to the transport layer.

NET_PRES_SocketOptionsSet Function

Allows setting options to a socket like adjust RX/TX buffer size, etc.

File

net_pres_socketapi.h

C

```
bool NET_PRES_SocketOptionsSet(NET_PRES_SKT_HANDLE_T handle, NET_PRES_SKT_OPTION_TYPE option, void*
optParam);
```

Returns

- true - Indicates success
- false - Indicates failure

Description

Various options can be set at the socket level. This function calls directly to the transport layer's OptionSet function, if it exists.

Preconditions

A socket needs to have been opened by NET_PRES_SocketOpen.

Parameters

Parameters	Description
handle	The socket to set options for.
option	The specific option to be set, this is passed unaltered to the transport layer.
optParam	The option value, this is passed unaltered to the transport layer.

NET_PRES_SocketPeek Function

Reads a specified number of data bytes from the RX buffer/FIFO without removing them from the buffer.

File

net_pres_socketapi.h

C

```
uint16_t NET_PRES_SocketPeek(NET_PRES_SKT_HANDLE_T handle, void * buffer, uint16_t size);
```

Description

If the socket is encrypted this function will call the encryption provider's peek function. Otherwise this function calls the transport layer's peek function.

Remarks

None

Preconditions

A socket needs to have been opened by NET_PRES_SocketOpen.

Parameters

Parameters	Description
handle	The presentation layer socket handle.
buffer	Destination to write the peeked data bytes.
size	Length of bytes to peek from the RX FIFO and copy to the buffer.

NET_PRES_SocketRead Function

Reads an array of data bytes from a socket's RX buffer/FIFO.

File

net_pres_socketapi.h

C

```
uint16_t NET_PRES_SocketRead(NET_PRES_SKT_HANDLE_T handle, void * buffer, uint16_t size);
```

Returns

The number of bytes read from the socket. If less than len, the RX FIFO buffer became empty or the socket is not connected.

Description

This function reads an array of data bytes from a socket's RX buffer/FIFO. The data is removed from the FIFO in the process. If the connection is encrypted this function calls the encryption provider's read function, otherwise it calls the transport layer's read function.

Remarks

For encrypted connections, a null buffer is an invalid parameter. For non encrypted connections if the supplied buffer is null, the data is simply discarded.

Preconditions

A socket needs to have been opened by NET_PRES_SocketOpen.

Parameters

Parameters	Description
handle	The presentation layer socket handle.
buffer	The pointer to the array to store data that was read.
size	The number of bytes to be read.

NET_PRES_SocketReadIsReady Function

Determines how many bytes can be read from the RX buffer.

File

net_pres_socketapi.h

C

```
uint16_t NET_PRES_SocketReadIsReady(NET_PRES_SKT_HANDLE_T handle);
```

Returns

The number of bytes available to be read from the TCP RX buffer.

Description

Call this function to determine how many bytes can be read from the RX buffer. If this function returns zero, the application must return to the main stack loop before continuing in order to wait for more data to arrive. This function calls the transport layer's ReadIsReady function. When using an encrypted connection the number of unencrypted bytes may turn out to be different than what this function returns.

Preconditions

A socket needs to have been opened by NET_PRES_SocketOpen.

Parameters

Parameters	Description
handle	The presentation layer socket handle.

NET_PRES_SocketRemoteBind Function

Binds a socket to a remote local address.

File

net_pres_socketapi.h

C

```
bool NET_PRES_SocketRemoteBind(NET_PRES_SKT_HANDLE_T handle, NET_PRES_SKT_ADDR_T addrType,
NET_PRES_SKT_PORT_T port, NET_PRES_ADDRESS * addr);
```

Returns

- true - Indicates success
- false - Indicates failure

Description

This function calls directly to the transport layer's remote bind function.

Preconditions

A socket needs to have been opened by NET_PRES_SocketOpen.

Parameters

Parameters	Description
handle	The socket to bind.
addType	The type of address being used. This is passed unaltered to the transport layer.
port	The port to use. This is passed unaltered to the transport layer.
addr	The address to bind to. This is passed unaltered to the transport layer.

NET_PRES_SocketSignalHandlerDeregister Function

Deregisters a previously registered socket signal handler.

File

net_pres_socketapi.h

C

```
bool NET_PRES_SocketSignalHandlerDeregister(NET_PRES_SKT_HANDLE_T handle, NET_PRES_SIGNAL_HANDLE hSig);
```

Returns

- true - If the call succeeds
- false - If no such handler is registered

Description

This function calls the transport layer's deregister signal handler function, if it exists

Preconditions

A socket needs to have been opened by NET_PRES_SocketOpen.

Parameters

Parameters	Description
handle	The presentation layer socket handle.
hSig	A handle returned by a previous call to TCPIP_TCP_SignalHandlerRegister.

NET_PRES_SocketSignalHandlerRegister Function

Registers a socket signal handler.

File

net_pres_socketapi.h

C

```
NET_PRES_SIGNAL_HANDLE NET_PRES_SocketSignalHandlerRegister(NET_PRES_SKT_HANDLE_T handle, uint16_t sigMask,
NET_PRES_SIGNAL_FUNCTION handler, const void* hParam);
```

Returns

- valid handle - Indicates the call succeeded
- null handle - Indicates the call failed (null handler, no such socket, existent handler)

Description

This function calls the transport layer's register signal handle function directly, if it exists

Preconditions

A socket needs to have been opened by NET_PRES_SocketOpen

Parameters

Parameters	Description
handle	The presentation layer socket handle.
sigMask	The mask of signals to be reported, this parameter is passed to the transport layer directly.
handler	signal handler to be called when an event occurs. This parameter is passed to the transport layer directly.
hParam	Parameter to be used in the handler call. This parameter is passed to the transport layer directly.

NET_PRES_SocketWasReset Function

Self-clearing semaphore indicating socket reset.

File

net_pres_socketapi.h

C

```
bool NET_PRES_SocketWasReset(NET_PRES_SKT_HANDLE_T handle);
```

Description

This function is a self-clearing semaphore indicating whether or not a socket has been disconnected since the previous call. This function calls directly to the transport layer's IsConnected function, if it exists.

Preconditions

A socket needs to have been opened by NET_PRES_SocketOpen.

Parameters

Parameters	Description
handle	The presentation layer socket handle.

NET_PRES_SocketWrite Function

Takes a buffer and sends it to the encryption provider.

File

net_pres_socketapi.h

C

```
uint16_t NET_PRES_SocketWrite(NET_PRES_SKT_HANDLE_T handle, const void * buffer, uint16_t size);
```

Returns

The number of bytes written to the socket. If less than len, the buffer became full or the socket is not connected.

Description

This function takes a buffer and sends it to the encryption provider for an encrypted socket, or to the transport layer directly for an unencrypted socket.

Preconditions

A socket needs to have been opened by NET_PRES_SocketOpen.

Parameters

Parameters	Description
handle	The presentation layer socket handle.
buffer	The pointer to the array to be written.
size	The number of bytes to be written.

NET_PRES_SocketGetTransportHandle Function

This function returns the transport layer handle.

Details: This function returns the transport layer handle for a valid socket

File

net_pres_socketapi.h

C

```
NET_PRES_SKT_HANDLE_T NET_PRES_SocketGetTransportHandle(NET_PRES_SKT_HANDLE_T handle);
```

Returns

A valid transport layer handle that can be casted into the proper type.

Preconditions

A socket needs to have been opened by NET_PRES_SocketOpen.

Parameters

Parameters	Description
handle	The presentation layer socket handle.

NET_PRES_SocketWriteIsReady Function

Determines how much free space is available in the TX buffer.

File

net_pres_socketapi.h

C

```
uint16_t NET_PRES_SocketWriteIsReady(NET_PRES_SKT_HANDLE_T handle, uint16_t reqSize, uint16_t minSize);
```

Returns

The number of bytes available in the TX buffer:

- >= reqSize - If the requested space is available in the output buffer
- >= minSize - I there's at least this minimum space (minSize != 0)
- 0 - Requested (minimum) space cannot be granted

Description

This function calls the transport or the encryption layer's WriteIsReady, if it exists.

Preconditions

A socket needs to have been opened by NET_PRES_SocketOpen.

Parameters

Parameters	Description
handle	Presentation layer socket handle.
reqSize	Write size to check for.
minSize	Minimum size that could be guaranteed. Could be '0' if not needed.

c) Certificate Store Functions

NET_PRES_CertStoreGetCACerts Function

This function gets the CA certificates from the store,

Implementation: Dynamic

File

net_pres_certstore.h

C

```
bool NET_PRES_CertStoreGetCACerts(const uint8_t ** certPtr, int32_t * certSize, uint8_t certIndex);
```

Returns

- true - Indicates success
- false - Indicates failure

Description

Get CA Certificates function

This function is used by client connections to retrieve the Certificate Authority certificates that are used to validate signatures on server certificates.

Preconditions

None.

Parameters

Parameters	Description
certPtr	A pointer to the CA certificates
certSize	The size of the certificates
certIndex	Most likely '0', but this parameter is provided to select a different set of CA certificates

NET_PRES_CertStoreGetServerCert Function

This function gets a server certificate and key from the certificate store.

Implementation: Dynamic

File

net_pres_certstore.h

C

```
bool NET_PRES_CertStoreGetServerCert(const uint8_t ** serverCertPtr, int32_t * serverCertSize, const
uint8_t ** serverKeyPtr, int32_t * serverKeySize, uint8_t certIndex);
```

Returns

- true - Indicates success
- false - Indicates failure

Description

Get Server Certificate and Key function

This function is used by server connections to retrieve their certificate and private key. Multiple server certificates can be stored in the certificate store, for example one for a Web server and one for a mail server.

Preconditions

None.

Parameters

Parameters	Description
serverCertPtr	A pointer to the server certificate
serverCertSize	The size of the server certificate
serverKeyPtr	A pointer to the server private key
serverKeySize	The size of the server private key
certIndex	Most likely '0', but this parameter is provided to select a different server certificate

d) Data Types and Constants

NET_PRES_ADDRESS Structure

File

net_pres_socketapi.h

C

```
typedef struct {
  uint8_t addr[16];
} NET_PRES_ADDRESS;
```

Description

This is type NET_PRES_ADDRESS.

NET_PRES_EncProviderConnect Type

Connects the function to the provider.

Implementation: Dynamic

File

net_pres_encryptionproviderapi.h

C

```
typedef NET_PRES_EncSessionStatus (* NET_PRES_EncProviderConnect)(void * providerData);
```

Returns

- NET_PRES_ENC_SS_CLIENT_NEGOTIATING - Client is still negotiating the connection
- NET_PRES_ENC_SS_SERVER_NEGOTIATING - Server is still negotiating the connection
- NET_PRES_ENC_SS_OPEN - Negotiation is complete and data can be securely transmitted
- NET_PRES_ENC_SS_FAILED - Negotiation failed

Description

Presentation Encryption Provider Connect Prototype

This function is used by the presentation layer to pump the encryption negotiation. While negotiation is ongoing, the presentation layer's task function will continue to call the function until negotiation ends.

Preconditions

A connection must have already been created.

Parameters

Parameters	Description
providerData	A pointer to the buffer that keeps the providerData returned from the Open call.

NET_PRES_EncProviderConnectionClose Type

Defines the close function to the provider.

Implementation: Dynamic

File

net_pres_encryptionproviderapi.h

C

```
typedef NET_PRES_EncSessionStatus (* NET_PRES_EncProviderConnectionClose)(void * providerData);
```

Returns

- NET_PRES_ENC_SS_CLOSING - Connection is closing, function must be called again to pump the close
- NET_PRES_ENC_SS_CLOSED - The connection is closed and can be cleaned up

Description

Presentation Encryption Provider Close Function Pointer Prototype

This function pointer defines the close function. It is called by the Networking Presentation Layer after a connection has been closed by the client.

Preconditions

A connection must have already been created.

Parameters

Parameters	Description
providerData	A pointer to the buffer for the provider to keep connection specific data.

NET_PRES_EncProviderDeinit Type

Defines the deinitialization function for the provider.

Implementation: Dynamic

File

net_pres_encryptionproviderapi.h

C

```
typedef bool (* NET_PRES_EncProviderDeinit)();
```

Returns

- true - Deinitialization succeeded
- false - Deinitialization did not succeed

Description

Presentation Encryption Provider Close Function Pointer Prototype

This function pointer prototype defines the deinitialization function for the provider.

Preconditions

None.

NET_PRES_EncProviderInit Type

Defines the initialization function to the encryption provider.

Implementation: Dynamic

File

net_pres_encryptionproviderapi.h

C

```
typedef bool (* NET_PRES_EncProviderInit)(struct _NET_PRES_TransportObject * transObject);
```

Returns

- true - Initialization succeeded
- false - Initialization did not succeed

Description

Presentation Encryption Provider Initialization Function Pointer Prototype

This function pointer prototype defines the initialization function to the encryption provider.

Preconditions

None.

Parameters

Parameters	Description
transObject	This is a copy of the structure the transport layer provides to the presentation layer to read and write data.

NET_PRES_EncProviderIsInitialized Type

Determines whether the encryption provider has been initialized.

Implementation: Dynamic

File

net_pres_encryptionproviderapi.h

C

```
typedef bool (* NET_PRES_EncProviderIsInitialized)();
```

Returns

- true - The provider has been initialized
- false - The provider has not been initialized

Description

Presentation Encryption Provider Is Initialized Pointer Prototype

This function pointer determines whether the encryption provider has been initialized and informs the presentation layer.

Preconditions

A connection must have already been created, and be in the open state.

NET_PRES_EncProviderObject Structure

Defines the data that the presentation layer needs from the provider.

File

net_pres_encryptionproviderapi.h

C

```
typedef struct _NET_PRES_EncProviderObject {
  NET_PRES_EncProviderInit fpInit;
  NET_PRES_EncProviderDeinit fpDeinit;
  NET_PRES_EncProviderOpen fpOpen;
  NET_PRES_EncProviderConnect fpConnect;
  NET_PRES_EncProviderConnectionClose fpClose;
  NET_PRES_EncProviderWrite fpWrite;
  NET_PRES_EncProviderWriteReady fpWriteReady;
  NET_PRES_EncProviderRead fpRead;
  NET_PRES_EncProviderReadReady fpReadReady;
  NET_PRES_EncProviderRead fpPeek;
  NET_PRES_EncProviderIsInitialized fpIsInited;
} NET_PRES_EncProviderObject;
```

Members

Members	Description
NET_PRES_EncProviderInit fpInit;	Function pointer to open/initialize the provider
NET_PRES_EncProviderDeinit fpDeinit;	Function pointer to close/deinitialize the provider
NET_PRES_EncProviderOpen fpOpen;	Function pointer to create a stream client connection
NET_PRES_EncProviderConnect fpConnect;	Function pointer to connect and pump the negotiation of a stream client connection
NET_PRES_EncProviderConnectionClose fpClose;	Function Pointer to close and clean up a connection
NET_PRES_EncProviderWrite fpWrite;	Function Pointer to write data to a connection
NET_PRES_EncProviderWriteReady fpWriteReady;	Function Pointer to check the connection write space
NET_PRES_EncProviderRead fpRead;	Function pointer to read data from a connection
NET_PRES_EncProviderReadReady fpReadReady;	Function pointer to return the available read data from a connection
NET_PRES_EncProviderRead fpPeek;	Function pointer to peek at data from a connection
NET_PRES_EncProviderIsInitialized fpIsInited;	Function pointer to check to determine if the provider has been initialized

Description

Presentation Encryption Provider Information Structure

This data type is given to the presentation layer during initialization to provide information on the provider, so it can be used during secure communications.

Remarks

None.

NET_PRES_EncProviderOpen Type

Defines the open connection function to the provider.

Implementation: Dynamic

File

net_pres_encryptionproviderapi.h

C

```
typedef bool (* NET_PRES_EncProviderOpen)(uintptr_t transHandle, void * providerData);
```

Returns

- true - Create succeeded
- false - Create did not succeed

Description

Presentation Encryption Provider Open Connection Prototype

This function pointer prototype defines the open connection function to the provider.

Preconditions

None.

Parameters

Parameters	Description
transHandle	The handle from the transport layer to use for this client.
providerData	A pointer to the buffer for the provider to keep connection specific data.

NET_PRES_EncProviderRead Type

Defines the read function to the provider

Implementation: Dynamic

File

net_pres_encryptionproviderapi.h

C

```
typedef int32_t (* NET_PRES_EncProviderRead)(void * providerData, uint8_t * buffer, uint16_t size);
```

Returns

The number of bytes transferred.

Description

Presentation Encryption Provider Read Function Pointer Prototype

This function pointer defines the read function. It is called by the presentation layer when the presentation client wants to read from a secured connection.

Remarks

If the supplied buffer is NULL the operation is ignored.

Preconditions

A connection must have already been created, and be in the open state.

Parameters

Parameters	Description
providerData	A pointer to the buffer for the provider to keep connection specific data.
buffer	A pointer to the buffer that will be read from the provider.
count	Size of the buffer.

NET_PRES_EncProviderWrite Type

Defines the write function to the provider.

Implementation: Dynamic

File

net_pres_encryptionproviderapi.h

C

```
typedef int32_t (* NET_PRES_EncProviderWrite)(void * providerData, const uint8_t * buffer, uint16_t size);
```

Returns

The number of bytes transferred.

Description

Presentation Encryption Provider Write Function Pointer Prototype

This function pointer defines the write function. It is called by the presentation layer when the application wants to write to a secured connection.

Preconditions

A connection must have already been created, and be in the open state.

Parameters

Parameters	Description
providerData	A pointer to the buffer for the provider to keep connection specific data.
buffer	This is a pointer to the buffer that will be sent to the provider.
size	This is the size of the buffer.

NET_PRES_EncSessionStatus Enumeration

Defines the enumeration for the state and status of the encrypted portion of a connection.

File

net_pres_encryptionproviderapi.h

C

```
typedef enum {
  NET_PRES_ENC_SS_UNKNOWN,
  NET_PRES_ENC_SS_WAITING_TO_START_NEGOTIATION,
  NET_PRES_ENC_SS_CLIENT_NEGOTIATING,
  NET_PRES_ENC_SS_SERVER_NEGOTIATING,
  NET_PRES_ENC_SS_OPEN,
  NET_PRES_ENC_SS_FAILED,
  NET_PRES_ENC_SS_CLOSING,
  NET_PRES_ENC_SS_CLOSED
} NET_PRES_EncSessionStatus;
```

Members

Members	Description
NET_PRES_ENC_SS_UNKNOWN	Presentation encryption is in an unknown/default state
NET_PRES_ENC_SS_WAITING_TO_START_NEGOTIATION	Presentation encryption has not started negotiation
NET_PRES_ENC_SS_CLIENT_NEGOTIATING	Presentation encryption client negotiation is in progress
NET_PRES_ENC_SS_SERVER_NEGOTIATING	Presentation encryption server negotiation is in progress
NET_PRES_ENC_SS_OPEN	Presentation encryption negotiation is complete and data can be sent/received
NET_PRES_ENC_SS_FAILED	Presentation encryption negotiation failed or some other failure
NET_PRES_ENC_SS_CLOSING	Presentation encryption is closing, but connection needs to be pumped for final packets
NET_PRES_ENC_SS_CLOSED	Presentation encryption is closed, provider data has been freed

Description

MPLAB Harmony Networking Presentation Layer Encryption status type

This enumeration defines the enumeration for the state and status of the encrypted portion of a connection.

Remarks

None.

NET_PRES_INDEX Type

Sets the type for the presentation layer index.

File

net_pres.h

C

```
typedef uint8_t NET_PRES_INDEX;
```

Description

Net Presentation Index Type

This data type sets the type for the presentation layer index.

Remarks

None.

NET_PRES_INIT_DATA Structure

Initializes a Presentation layer.

File

net_pres.h

C

```
typedef struct {
  uint8_t numLayers;
  const NET_PRES_INST_DATA * pInitData;
} NET_PRES_INIT_DATA;
```

Members

Members	Description
uint8_t numLayers;	Number of presentation layers
const NET_PRES_INST_DATA * pInitData;	Pointer to an array of pointers to presentation layer instance data.

Description

Net Presentation Initialization data

Data type that initializes a Presentation layer.

Remarks

None.

NET_PRES_INST_DATA Structure

Initializes a Presentation layer.

File

net_pres.h

C

```
typedef struct {
  const struct _NET_PRES_TransportObject * pTransObject_ss;
  const struct _NET_PRES_TransportObject * pTransObject_sc;
  const struct _NET_PRES_TransportObject * pTransObject_ds;
  const struct _NET_PRES_TransportObject * pTransObject_dc;
  const struct _NET_PRES_EncProviderObject * pProvObject_ss;
  const struct _NET_PRES_EncProviderObject * pProvObject_sc;
  const struct _NET_PRES_EncProviderObject * pProvObject_ds;
  const struct _NET_PRES_EncProviderObject * pProvObject_dc;
} NET_PRES_INST_DATA;
```

Members

Members	Description
const struct _NET_PRES_TransportObject * pTransObject_ss;	Pointer to the transport object that handles the stream server
const struct _NET_PRES_TransportObject * pTransObject_sc;	Pointer to the transport object that handles the stream client
const struct _NET_PRES_TransportObject * pTransObject_ds;	Pointer to the transport object that handles the datagram server
const struct _NET_PRES_TransportObject * pTransObject_dc;	Pointer to the transport object that handles the datagram client
const struct _NET_PRES_EncProviderObject * pProvObject_ss;	Pointer to the encryption provider object that handles the stream server
const struct _NET_PRES_EncProviderObject * pProvObject_sc;	Pointer to the encryption provider object that handles the stream client
const struct _NET_PRES_EncProviderObject * pProvObject_ds;	Pointer to the encryption provider object that handles the datagram server
const struct _NET_PRES_EncProviderObject * pProvObject_dc;	Pointer to the encryption provider object that handles the datagram client

Description

Net Presentation Instance Initialization data

This data type initializes a Presentation layer.

Remarks

None.

NET_PRES_SIGNAL_FUNCTION Type

MPLAB Harmony Networking Presentation Layer Signal function.

File

net_pres.h

C

```
typedef void (* NET_PRES_SIGNAL_FUNCTION)(NET_PRES_SKT_HANDLE_T handle, NET_PRES_SIGNAL_HANDLE hNet,
uint16_t sigType, const void* param);
```

Description

Type: NET_PRES_SIGNAL_FUNCTION

Prototype of a signal handler. Socket user can register a handler for the socket. Once an event occurs the registered handler will be called.

Remarks

The handler has to be short and fast. It is meant for setting an event flag, not for lengthy processing!

Parameters

Parameters	Description
handle	The presentation socket to be used
hNet	The network interface on which the event has occurred
sigType	The type of signal that has occurred
param	An additional parameter that can has been specified at the handler registration call. Currently not used and it will be null.

NET_PRES_SIGNAL_HANDLE Type

Sets the type for the presentation layer signal handle.

File

net_pres.h

C

```
typedef const void* NET_PRES_SIGNAL_HANDLE;
```

Description

Net Presentation Signal Handle Type

This data type sets the type for the presentation layer signal handle.

Remarks

None.

NET_PRES_SKT_ADDR_T Enumeration

File

net_pres_socketapi.h

C

```
typedef enum {
  NET_PRES_SKT_ADDR_UNKNOWN
} NET_PRES_SKT_ADDR_T;
```

Description

This is type NET_PRES_SKT_ADDR_T.

NET_PRES_SKT_ERROR_T Enumeration

File

net_pres_socketapi.h

C

```
typedef enum {
```

```
  NET_PRES_SKT_OK = 0,
  NET_PRES_SKT_OP_NOT_SUPPORTED = -1,
  NET_PRES_SKT_OP_OUT_OF_HANDLES = -2,
  NET_PRES_SKT_OP_INVALID_INDEX = -3,
  NET_PRES_SKT_UNKNOWN_ERROR = -4,
  NET_PRES_SKT_INVALID_SOCKET = -5
} NET_PRES_SKT_ERROR_T;
```

Members

Members	Description
NET_PRES_SKT_OP_NOT_SUPPORTED = -1	Most likely the function is not supported by the socket type

Description

This is type NET_PRES_SKT_ERROR_T.

NET_PRES_SKT_HANDLE_T Type

Sets the type for the presentation layer socket handle.

File

net_pres.h

C

```
typedef int16_t NET_PRES_SKT_HANDLE_T;
```

Description

Net Presentation Socket Handle Type

This data type sets the type for the presentation layer socket handle.

Remarks

None.

NET_PRES_SKT_OPTION_TYPE Enumeration

File

net_pres_socketapi.h

C

```
typedef enum {
  NET_PRES_SKT_OPT_UNKNOWN
} NET_PRES_SKT_OPTION_TYPE;
```

Description

This is type NET_PRES_SKT_OPTION_TYPE.

NET_PRES_SKT_T Enumeration

File

net_pres_socketapi.h

C

```
typedef enum {
  NET_PRES_SKT_CLIENT = 0x0001,
  NET_PRES_SKT_SERVER = 0x0002,
  NET_PRES_SKT_STREAM = 0x0004,
  NET_PRES_SKT_DATAGRAM = 0x0008,
  NET_PRES_SKT_UNENCRYPTED = 0x0010,
  NET_PRES_SKT_ENCRYPTED = 0x0020,
  NET_PRES_SKT_UNENCRYPTED_STREAM_CLIENT = (NET_PRES_SKT_UNENCRYPTED | NET_PRES_SKT_STREAM |
NET_PRES_SKT_CLIENT),
  NET_PRES_SKT_UNENCRYPTED_STREAM_SERVER = (NET_PRES_SKT_UNENCRYPTED | NET_PRES_SKT_STREAM |
NET_PRES_SKT_SERVER),
  NET_PRES_SKT_UNENCRYPTED_DATAGRAM_CLIENT = (NET_PRES_SKT_UNENCRYPTED | NET_PRES_SKT_DATAGRAM |
NET_PRES_SKT_CLIENT),
```

```
  NET_PRES_SKT_UNENCRYPTED_DATAGRAM_SERVER = (NET_PRES_SKT_UNENCRYPTED | NET_PRES_SKT_DATAGRAM |
NET_PRES_SKT_SERVER),
  NET_PRES_SKT_ENCRYPTED_STREAM_CLIENT = (NET_PRES_SKT_ENCRYPTED | NET_PRES_SKT_STREAM |
NET_PRES_SKT_CLIENT),
  NET_PRES_SKT_ENCRYPTED_STREAM_SERVER = (NET_PRES_SKT_ENCRYPTED | NET_PRES_SKT_STREAM |
NET_PRES_SKT_SERVER),
  NET_PRES_SKT_ENCRYPTED_DATAGRAM_CLIENT = (NET_PRES_SKT_ENCRYPTED | NET_PRES_SKT_DATAGRAM |
NET_PRES_SKT_CLIENT),
  NET_PRES_SKT_ENCRYPTED_DATAGRAM_SERVER = (NET_PRES_SKT_ENCRYPTED | NET_PRES_SKT_DATAGRAM |
NET_PRES_SKT_SERVER),
  NET_PRES_SKT_DEFAULT_STREAM_CLIENT = (NET_PRES_SKT_STREAM | NET_PRES_SKT_CLIENT),
  NET_PRES_SKT_DEFAULT_STREAM_SERVER = (NET_PRES_SKT_STREAM | NET_PRES_SKT_SERVER),
  NET_PRES_SKT_DEFAULT_DATAGRAM_CLIENT = (NET_PRES_SKT_DATAGRAM | NET_PRES_SKT_CLIENT),
  NET_PRES_SKT_DEFAULT_DATAGRAM_SERVER = (NET_PRES_SKT_DATAGRAM | NET_PRES_SKT_SERVER)
} NET_PRES_SKT_T;
```

Description

This is type NET_PRES_SKT_T.

NET_PRES_TRANS_ADDR_T Structure

Defines a generic address structure to pass to the transport layer.

File

net_pres_transportapi.h

C

```
typedef struct {
  uint8_t addr[16];
} NET_PRES_TRANS_ADDR_T;
```

Members

Members	Description
uint8_t addr[16];	So far biggest for IPv6

Description

MPLAB Harmony Networking Presentation Transport Address Structure

This data type is just a generic address structure. The presentation layer does not do any processing on this data, but instead passes it directly to the transport.

Remarks

None.

NET_PRES_TRANS_ADDRESS_TYPE Enumeration

Defines the enumeration for the type of address.

File

net_pres_transportapi.h

C

```
typedef enum {
  NET_PRES_ADDRT_UNKNOWN
} NET_PRES_TRANS_ADDRESS_TYPE;
```

Description

MPLAB Harmony Networking Presentation Layer Address type

Defines the enumeration for the type of address. This enumeration is not used directly by the presentation layer and is used to enforce a consistent interface between layers.

Remarks

None.

NET_PRES_TRANS_OPTION_T Enumeration

Defines the enumeration for the type of options.

File

net_pres_transportapi.h

C

```
typedef enum {
  NET_PRES_OPT_UNKNOWN
} NET_PRES_TRANS_OPTION_T;
```

Description

MPLAB Harmony Networking Presentation Layer Option type

Defines the enumeration for the type of options. This enumeration is not used directly by the presentation layer and is used to enforce a consistent interface between layers.

Remarks

None.

NET_PRES_TransBind Type

Binds a socket to a local address.

File

net_pres_transportapi.h

C

```
typedef bool (* NET_PRES_TransBind)(NET_PRES_SKT_HANDLE_T handle, NET_PRES_TRANS_ADDRESS_TYPE addType,
NET_PRES_SKT_PORT_T port, NET_PRES_ADDRESS * address);
```

Returns

- true - Indicates success
- false - Indicates failure

Description

Transport Layer Bind Function Pointer Prototype

This function is called by the presentation layer when an application wants to bind a socket.

Preconditions

A socket needs to have been opened by NET_PRES_TransOpen.

Parameters

Parameters	Description
handle	The handle returned from NET_PRES_TransOpen.
addType	The type of address being used. This is passed unaltered to the transport layer.
port	The port to use. This is passed unaltered to the transport layer.
address	The address to bind to. This is passed unaltered to the transport layer.

NET_PRES_TransBool Type

Generic function prototype for functions that return a bool.

File

net_pres_transportapi.h

C

```
typedef bool (* NET_PRES_TransBool)(NET_PRES_SKT_HANDLE_T handle);
```

Returns

The result is passed directly through from the transport layer to the application. The meaning of the return is dependent on the transport function

Description

Transport Layer Boolean Function Pointer Prototype

This function is called by the presentation layer when it accesses a function that takes no parameters apart from the socket handle and returns a boolean.

Preconditions

A socket needs to have been opened by NET_PRES_TransOpen.

Parameters

Parameters	Description
handle	The handle returned from NET_PRES_TransOpen.

NET_PRES_TransClose Type

Function prototype for functions that closes a socket.

File

net_pres_transportapi.h

C

```
typedef void (* NET_PRES_TransClose)(NET_PRES_SKT_HANDLE_T handle);
```

Returns

None.

Description

Transport Layer Close Function Pointer Prototype

This function is called by the presentation layer when the application wants to close a connection.

Preconditions

A socket needs to have been opened by NET_PRES_TransOpen.

Parameters

Parameters	Description
handle	The handle returned from NET_PRES_TransOpen.

NET_PRES_TransDiscard Type

Function prototype for functions that clears a socket's RX buffer.

File

net_pres_transportapi.h

C

```
typedef uint16_t (* NET_PRES_TransDiscard)(NET_PRES_SKT_HANDLE_T handle);
```

Returns

The number of bytes discarded.

Description

Transport Layer Discard Function Pointer Prototype

This function is called by the presentation layer when the application wants to discard the RX buffer in a socket.

Preconditions

A socket needs to have been opened by NET_PRES_TransOpen.

Parameters

Parameters	Description
handle	The handle returned from NET_PRES_TransOpen.

NET_PRES_TransHandlerRegister Type

Function prototype that registers a handler with a socket.

File

net_pres_transportapi.h

C

```
typedef NET_PRES_SIGNAL_HANDLE (* NET_PRES_TransHandlerRegister)(NET_PRES_SKT_HANDLE_T handle, uint16_t
sigMask, NET_PRES_SIGNAL_FUNCTION handler, const void* hParam);
```

Returns

The handle of a signal handler.

Description

Transport Layer Register Handler Function Pointer Prototype

This function is called by the presentation layer when the application wants to register a handler function.

Preconditions

A socket needs to have been opened by NET_PRES_TransOpen.

Parameters

Parameters	Description
handle	The handle returned from NET_PRES_TransOpen.
sigMask	The event mask.
handler	The event handler function.
hParam	Parameters passed to the handler function.

NET_PRES_TransOpen Type

Opens a presentation socket.

File

net_pres_transportapi.h

C

```
typedef NET_PRES_SKT_HANDLE_T (* NET_PRES_TransOpen)(NET_PRES_TRANS_ADDRESS_TYPE addType,
NET_PRES_SKT_PORT_T port, NET_PRES_ADDRESS * address);
```

Returns

- NET_PRES_INVALID_SOCKET - No sockets of the specified type were available to be opened.
- NET_PRES_SKT_HANDLE_T handle - Returned when NET_PRES_INVALID_SOCKET is returned. Save this handle and use it when calling all other presentation socket APIs.

Description

Transport Layer Open Function Pointer Prototype

This function is called by the presentation layer when an application wants to open a socket.

Preconditions

Transport layer must be initialized.

Parameters

Parameters	Description
addType	The type of address being used. This is passed unaltered to the transport layer.
port	The port to listen or to send to. This is passed unaltered to the transport layer.

address	The address to use. This is passed unaltered to the transport layer.

NET_PRES_TransOption Type

Sets of gets a socket's options.

File

net_pres_transportapi.h

C

```
typedef bool (* NET_PRES_TransOption)(NET_PRES_SKT_HANDLE_T handle, NET_PRES_TRANS_OPTION_T option, void *
optParam);
```

Returns

- true - Indicates success
- false - Indicates failure

Description

Transport Layer Option Function Pointer Prototype

This function is called by the presentation layer when an application wants to get the current socket options or set them.

Preconditions

A socket needs to have been opened by NET_PRES_TransOpen.

Parameters

Parameters	Description
handle	The handle returned from NET_PRES_TransOpen.
option	The option to set or get.
optParam	The pointer to option specific information.

NET_PRES_TransPeek Type

Function prototype for functions that peeks on the socket's buffer.

File

net_pres_transportapi.h

C

```
typedef bool (* NET_PRES_TransPeek)(NET_PRES_SKT_HANDLE_T handle, uint8_t *vBuffer, uint16_t wLen, uint16_t
wStart);
```

Returns

- true - Indicates success
- false - Indicates failure

Description

Transport Layer Peek Function Pointer Prototype

This function is called by the presentation layer when the application wants to peek into the buffer of an unencrypted socket.

Preconditions

A socket needs to have been opened by NET_PRES_TransOpen.

Parameters

Parameters	Description
handle	The handle returned from NET_PRES_TransOpen.
vBuffer	The buffer location to put the information.
wLen	The size of the buffer.
wStart	Where to start peeking into the buffer. This parameter is not used and will always be set to '0'.

NET_PRES_TransportObject Structure

Defines the data that the transport layer needs to provide to the Networking Presentation Layer.

File

net_pres_transportapi.h

C

```
typedef struct _NET_PRES_TransportObject {
  NET_PRES_TransOpen fpOpen;
  NET_PRES_TransBind fpLocalBind;
  NET_PRES_TransBind fpRemoteBind;
  NET_PRES_TransOption fpOptionGet;
  NET_PRES_TransOption fpOptionSet;
  NET_PRES_TransBool fpIsConnected;
  NET_PRES_TransBool fpWasReset;
  NET_PRES_TransBool fpDisconnect;
  NET_PRES_TransBool fpConnect;
  NET_PRES_TransClose fpClose;
  NET_PRES_TransSocketInfoGet fpSocketInfoGet;
  NET_PRES_TransBool fpFlush;
  NET_PRES_TransPeek fpPeek;
  NET_PRES_TransDiscard fpDiscard;
  NET_PRES_TransHandlerRegister fpHandlerRegister;
  NET_PRES_TransSignalHandlerDeregister fpHandlerDeregister;
  NET_PRES_TransRead fpRead;
  NET_PRES_TransWrite fpWrite;
  NET_PRES_TransReady fpReadyToRead;
  NET_PRES_TransReady fpReadyToWrite;
  NET_PRES_TransIsPortDefaultSecured fpIsPortDefaultSecure;
} NET_PRES_TransportObject;
```

Members

Members	Description
NET_PRES_TransOpen fpOpen;	Function pointer to the transport's open call
NET_PRES_TransBind fpLocalBind;	Function pointer to the transport's bind call
NET_PRES_TransBind fpRemoteBind;	Function pointer to the transport's remote bind call
NET_PRES_TransOption fpOptionGet;	Function call to the the transport's option get call
NET_PRES_TransOption fpOptionSet;	Function call to the the transport's option set call
NET_PRES_TransBool fpIsConnected;	Function call to the the transport's is connected call
NET_PRES_TransBool fpWasReset;	Function call to the the transport's was reset call
NET_PRES_TransBool fpDisconnect;	Function call to the the transport's disconnect call
NET_PRES_TransBool fpConnect;	Function call to the the transport's connect call
NET_PRES_TransClose fpClose;	Function call to the the transport's close call
NET_PRES_TransSocketInfoGet fpSocketInfoGet;	Function call to the the transport's get socket info call
NET_PRES_TransBool fpFlush;	Function call to the the transport's flush call
NET_PRES_TransPeek fpPeek;	Function call to the the transport's peek call
NET_PRES_TransDiscard fpDiscard;	Function call to the the transport's discard call
NET_PRES_TransHandlerRegister fpHandlerRegister;	Function call to the the transport's register handler call
NET_PRES_TransSignalHandlerDeregister fpHandlerDeregister;	Function call to the the transport's deregister handler call
NET_PRES_TransRead fpRead;	Function pointer to call when doing a read from a transport layer
NET_PRES_TransWrite fpWrite;	Function pointer to call when doing a write to a transport layer
NET_PRES_TransReady fpReadyToRead;	Function pointer to call when checking to see if there is data available to be read from a transport layer
NET_PRES_TransReady fpReadyToWrite;	Function pointer to call when checking to see if there is space available to be write to a transport layer
NET_PRES_TransIsPortDefaultSecured fpIsPortDefaultSecure;	Function pointer to call when checking to see if a port is secure by default

Description

MPLAB Harmony Networking Presentation Transport Information Structure

This data type defines the data required by the transport layer to effectively work with the Networking Presentation Layer. The data is there to allow the Networking Presentation Layer to configure the provider to effectively use the transport layer.

Remarks

None.

NET_PRES_TransRead Type

Defines the read function provided by the transport layer.

Implementation: Dynamic

File

net_pres_transportapi.h

C

```
typedef uint16_t (* NET_PRES_TransRead)(uintptr_t transHandle, uint8_t* buffer, uint16_t count);
```

Returns

The number of data bytes copied by the transport channel into the buffer.

Description

Presentation Layer Transport Layer Read Function Pointer Prototype

This function prototype is used to define the function that the Networking Presentation Layer will pass to the provider when it is initialized. The provider will use this function when it needs to read from the transport layer.

Preconditions

None.

Parameters

Parameters	Description
transHandle	This is the transport layer handle provided by the transport layer when a communications channel is open.
buffer	This is a pointer to the buffer that the transport layer will copy data to.
count	This is the size of the buffer.

NET_PRES_TransReady Type

Defines the ready function provided by the transport layer.

Implementation: Dynamic

File

net_pres_transportapi.h

C

```
typedef uint16_t (* NET_PRES_TransReady)(uintptr_t transHandle);
```

Returns

- true - The presentation layer can read or write to the transport layer
- false - The transport layer is busy and cannot accept reads or write

Description

Presentation Layer Transport Layer Ready Function

This function prototype is used to define the function that the Networking Presentation Layer will pass to the provider when it is initialized. The provider will use this function when it needs to check if it can read or write to the layer.

Preconditions

None.

Parameters

Parameters	Description
transHandle	This is the transport layer handle provided by the transport layer when a communications channel is open.

NET_PRES_TransSignalHandlerDeregister Type

Function prototype that deregisters a handler with a socket.

File

net_pres_transportapi.h

C

```
typedef bool (* NET_PRES_TransSignalHandlerDeregister)(NET_PRES_SKT_HANDLE_T handle,
NET_PRES_SIGNAL_FUNCTION hSig);
```

Returns

- true - Indicates success
- false - Indicates failure

Description

Transport Layer Deregister Handler Function Pointer Prototype

This function is called by the presentation layer when the application wants to deregister a handler function.

Preconditions

A socket needs to have been opened by NET_PRES_TransOpen.

Parameters

Parameters	Description
handle	The handle returned from NET_PRES_TransOpen.
hSig	The handler handle returned from NET_PRES_TransHandlerRegister.

NET_PRES_TransSocketInfoGet Type

Function prototype for functions that gets the information on a socket.

File

net_pres_transportapi.h

C

```
typedef bool (* NET_PRES_TransSocketInfoGet)(NET_PRES_SKT_HANDLE_T handle, void * info);
```

Returns

- true - Indicates success
- false - Indicates failure

Description

Transport Layer Get Socket Info Function Pointer Prototype

This function is called by the presentation layer when the application wants to get information on a socket.

Preconditions

A socket needs to have been opened by NET_PRES_TransOpen.

Parameters

Parameters	Description
handle	The handle returned from NET_PRES_TransOpen.
info	The socket information.

NET_PRES_TransWrite Type

Defines the write function provided by the transport layer.

Implementation: Dynamic

File

net_pres_transportapi.h

C

```
typedef uint16_t (* NET_PRES_TransWrite)(uintptr_t transHandle, const uint8_t* buffer, uint16_t count);
```

Returns

The number of data bytes accepted by the transport layer.

Description

Presentation Layer Transport Layer Write Function Pointer Prototype

This function prototype is used to define the function that the Networking Presentation Layer will pass to the provider when it is initialized. The provider will use this function when it needs to write to the transport layer.

Preconditions

None.

Parameters

Parameters	Description
transHandle	This is the transport layer handle provided by the transport layer when a communications channel is open.
buffer	This is a pointer to the buffer contains the data to be passed to the transport layer.
count	This is the size of the buffer.

NET_PRES_INVALID_SOCKET Macro

Invalid socket indicator macro.

File

net_pres.h

C

```
#define NET_PRES_INVALID_SOCKET (-1)
```

Description

Macro: NET_PRES_INVALID_SOCKET

Indicates that the socket is invalid or could not be opened.

NET_PRES_SKT_PORT_T Type

Sets the type for the presentation layer port.

File

net_pres.h

C

```
typedef uint16_t NET_PRES_SKT_PORT_T;
```

Description

Net Presentation Port Type

This data type sets the type for the presentation layer port.

Remarks

None.

NET_PRES_TransIsPortDefaultSecured Type

Checks to see if a port is encrypted by default.

Implementation: Dynamic

File

net_pres_transportapi.h

C

```
typedef bool (* NET_PRES_TransIsPortDefaultSecured)(uint16_t port);
```

Returns

- true - The port is encrypted by default and the presentation layer will start negotiating encryption when it is connected.
- false - The post is not encrypted by default.

Description

Presentation Layer Transport Layer Is Port Encrypted

This function prototype is used by the presentation layer to determine if a port is encrypted by default or not when it is opened.

Preconditions

None.

NET_PRES_EncProviderWriteReady Type

Defines the write ready function to the provider.

Implementation: Dynamic

File

net_pres_encryptionproviderapi.h

C

```
typedef uint16_t (* NET_PRES_EncProviderWriteReady)(void * providerData, uint16_t reqSize, uint16_t
minSize);
```

Returns

The number of bytes available in the output buffer:

- >= reqSize, if the requested space is available in the output buffer
- >= minSize, if there's at least this minimum space (minSize != 0)
- 0, requested (minimum) space cannot be granted

Description

Presentation Encryption Provider Write Ready Function Pointer Prototype

This function pointer defines the write ready function. It is called by the presentation layer when the application wants to check the write space to a secured connection. The function checks for the requested size. If this is not available, it checks for at least minimum size (if != 0)

Preconditions

A connection must have already been created, and be in the open state.

Parameters

Parameters	Description
providerData	A pointer to the buffer for the provider to keep connection specific data.
reqSize	The requested size to check for.
minSize	Minimum size to check for. Could be 0, if not used.

Files

Files

Name	Description
net_pres.h	Describes the system level interface and common definitions to the MPLAB Harmony presentation layer.
net_pres_certstore.h	This file describes the standard interface for the certificate store
net_pres_socketapi.h	Describes the API for accessing presentation layer sockets.
net_pres_transportapi.h	API descriptions that the transport layers follow for the presentation layer.
net_pres_encryptionproviderapi.h	API descriptions that encryption providers follow for the presentation layer.

Description

This section lists the source and header files used by the Network Presentation Layer.

net_pres.h

Describes the system level interface and common definitions to the MPLAB Harmony presentation layer.

Functions

	Name	Description
	NET_PRES_Deinitialize	Deinitializes the Network Presentation Layer Instance. **Implementation:** Dynamic
	NET_PRES_Initialize	Initializes the Network Presentation Layer sub-system with the configuration data. **Implementation:** Dynamic
	NET_PRES_Reinitialize	Reinitializes the instance of the presentation layer. **Implementation:** Dynamic
	NET_PRES_Status	Provides the current status of the MPLAB Harmony Networking Presentation Layer. **Implementation:** Dynamic
	NET_PRES_Tasks	MPLAB Harmony tasks function used for general presentation layer tasks. **Implementation:** Dynamic

Macros

	Name	Description
	NET_PRES_INVALID_SOCKET	Invalid socket indicator macro.

Structures

	Name	Description
	NET_PRES_INIT_DATA	Initializes a Presentation layer.
	NET_PRES_INST_DATA	Initializes a Presentation layer.

Types

	Name	Description
	NET_PRES_INDEX	Sets the type for the presentation layer index.
	NET_PRES_SIGNAL_FUNCTION	MPLAB Harmony Networking Presentation Layer Signal function.
	NET_PRES_SIGNAL_HANDLE	Sets the type for the presentation layer signal handle.
	NET_PRES_SKT_HANDLE_T	Sets the type for the presentation layer socket handle.
	NET_PRES_SKT_PORT_T	Sets the type for the presentation layer port.

Description

MPLAB Harmony Networking Presentation Layer Header File

This file describes the system interface and common definitions to the MPLAB Harmony Networking Presentation Layer.

Company

Microchip Technology Inc.

Filename: net_pres.h

net_pres_certstore.h

This file describes the standard interface for the certificate store

Functions

	Name	Description
	NET_PRES_CertStoreGetCACerts	This function gets the CA certificates from the store, **Implementation:** Dynamic
	NET_PRES_CertStoreGetServerCert	This function gets a server certificate and key from the certificate store. **Implementation:** Dynamic

Description

MPLAB Harmony Networking Presentation Certificate Storage header file

This file describes the interface that the presentation layer uses to access the certificate store. The MHC can generate a read-only, Flash-based certificate store, or stubs for these functions. If a more complex certificate store is desired, for instance storing multiple certificates or being able to update certificates, the implementation may be provided by the end user.

Company

Microchip Technology Inc.

Filename: net_pres_certstore.h

net_pres_socketapi.h

Describes the API for accessing presentation layer sockets.

Enumerations

	Name	Description
	NET_PRES_SKT_ADDR_T	This is type NET_PRES_SKT_ADDR_T.
	NET_PRES_SKT_ERROR_T	This is type NET_PRES_SKT_ERROR_T.
	NET_PRES_SKT_OPTION_TYPE	This is type NET_PRES_SKT_OPTION_TYPE.
	NET_PRES_SKT_T	This is type NET_PRES_SKT_T.

Functions

	Name	Description
	NET_PRES_SocketBind	Binds a socket to a local address.
	NET_PRES_SocketClose	Disconnects an open socket and destroys the socket handle, releasing the associated resources.
	NET_PRES_SocketConnect	Connects a client socket.
	NET_PRES_SocketDiscard	Discards any pending data in the RX FIFO.
	NET_PRES_SocketDisconnect	Disconnects an open socket.
	NET_PRES_SocketEncryptSocket	This function turns an insecure socket into a secure socket. Details: This function will turn an unencrypted socket into an encrypted socket and starts encryption negotiation.
	NET_PRES_SocketFlush	Immediately transmits all pending TX data.
	NET_PRES_SocketGetTransportHandle	This function returns the transport layer handle. Details: This function returns the transport layer handle for a valid socket
	NET_PRES_SocketInfoGet	Obtains information about a currently open socket.
	NET_PRES_SocketIsConnected	Determines whether a socket has an established connection.
	NET_PRES_SocketIsNegotiatingEncryption	This function checks if encryption negotiation is still in progress.
	NET_PRES_SocketIsOpenModeSupported	Checks to see if a mode is supported by open.
	NET_PRES_SocketIsSecure	This function checks whether a connection is secure.
	NET_PRES_SocketLastError	This function returns the last error code for this socket. Details: This function will return the last error code that was set for this socket and it will clear the current error code. An error code is set whenever a socket operation fails for some missing functionality, bad parameter, etc.
	NET_PRES_SocketOpen	Opens a presentation socket.
	NET_PRES_SocketOptionsGet	Allows the options for a socket such as, current RX/TX buffer size, etc., to be obtained.

	NET_PRES_SocketOptionsSet	Allows setting options to a socket like adjust RX/TX buffer size, etc.
	NET_PRES_SocketPeek	Reads a specified number of data bytes from the RX buffer/FIFO without removing them from the buffer.
	NET_PRES_SocketRead	Reads an array of data bytes from a socket's RX buffer/FIFO.
	NET_PRES_SocketReadIsReady	Determines how many bytes can be read from the RX buffer.
	NET_PRES_SocketRemoteBind	Binds a socket to a remote local address.
	NET_PRES_SocketSignalHandlerDeregister	Deregisters a previously registered socket signal handler.
	NET_PRES_SocketSignalHandlerRegister	Registers a socket signal handler.
	NET_PRES_SocketWasReset	Self-clearing semaphore indicating socket reset.
	NET_PRES_SocketWrite	Takes a buffer and sends it to the encryption provider.
	NET_PRES_SocketWriteIsReady	Determines how much free space is available in the TX buffer.

Structures

	Name	Description
	NET_PRES_ADDRESS	This is type NET_PRES_ADDRESS.

Description

MPLAB Harmony Networking Presentation socket API header file

This file describes the API for accessing Networking Presentation Layer sockets.

Company

Microchip Technology Inc.

Filename: net_pres_socketapi.h

net_pres_transportapi.h

API descriptions that the transport layers follow for the presentation layer.

Enumerations

	Name	Description
	NET_PRES_TRANS_ADDRESS_TYPE	Defines the enumeration for the type of address.
	NET_PRES_TRANS_OPTION_T	Defines the enumeration for the type of options.

Structures

	Name	Description
	_NET_PRES_TransportObject	Defines the data that the transport layer needs to provide to the Networking Presentation Layer.
	NET_PRES_TRANS_ADDR_T	Defines a generic address structure to pass to the transport layer.
	NET_PRES_TransportObject	Defines the data that the transport layer needs to provide to the Networking Presentation Layer.

Types

	Name	Description
	NET_PRES_TransBind	Binds a socket to a local address.
	NET_PRES_TransBool	Generic function prototype for functions that return a bool.
	NET_PRES_TransClose	Function prototype for functions that closes a socket.
	NET_PRES_TransDiscard	Function prototype for functions that clears a socket's RX buffer.
	NET_PRES_TransHandlerRegister	Function prototype that registers a handler with a socket.
	NET_PRES_TransIsPortDefaultSecured	Checks to see if a port is encrypted by default. **Implementation:** Dynamic
	NET_PRES_TransOpen	Opens a presentation socket.
	NET_PRES_TransOption	Sets of gets a socket's options.
	NET_PRES_TransPeek	Function prototype for functions that peeks on the socket's buffer.
	NET_PRES_TransRead	Defines the read function provided by the transport layer. **Implementation:** Dynamic
	NET_PRES_TransReady	Defines the ready function provided by the transport layer. **Implementation:** Dynamic

	NET_PRES_TransSignalHandlerDeregister	Function prototype that deregisters a handler with a socket.
	NET_PRES_TransSocketInfoGet	Function prototype for functions that gets the information on a socket.
	NET_PRES_TransWrite	Defines the write function provided by the transport layer. **Implementation:** Dynamic

Description

MPLAB Harmony Networking Presentation Layer Header File

This file describes the API that transport layers follow for to integrate with MPLAB Harmony's Networking Presentation Layer.

Company

Microchip Technology Inc.

Filename: net_pres_transportapi.h

net_pres_encryptionproviderapi.h

API descriptions that encryption providers follow for the presentation layer.

Enumerations

	Name	Description
	NET_PRES_EncSessionStatus	Defines the enumeration for the state and status of the encrypted portion of a connection.

Structures

	Name	Description
	_NET_PRES_EncProviderObject	Defines the data that the presentation layer needs from the provider.
	NET_PRES_EncProviderObject	Defines the data that the presentation layer needs from the provider.

Types

	Name	Description
	NET_PRES_EncProviderConnect	Connects the function to the provider. **Implementation:** Dynamic
	NET_PRES_EncProviderConnectionClose	Defines the close function to the provider. **Implementation:** Dynamic
	NET_PRES_EncProviderDeinit	Defines the deinitialization function for the provider. **Implementation:** Dynamic
	NET_PRES_EncProviderInit	Defines the initialization function to the encryption provider. **Implementation:** Dynamic
	NET_PRES_EncProviderIsInitialized	Determines whether the encryption provider has been initialized. **Implementation:** Dynamic
	NET_PRES_EncProviderOpen	Defines the open connection function to the provider. **Implementation:** Dynamic
	NET_PRES_EncProviderRead	Defines the read function to the provider **Implementation:** Dynamic
	NET_PRES_EncProviderReadReady	Defines the read ready function to the provider **Implementation:** Dynamic
	NET_PRES_EncProviderWrite	Defines the write function to the provider. **Implementation:** Dynamic
	NET_PRES_EncProviderWriteReady	Defines the write ready function to the provider. **Implementation:** Dynamic

Description

MPLAB Harmony Networking Presentation Layer Encryption Provider Header File

This file describes the API that encryption providers follow for the Networking Presentation Layer.

Company

Microchip Technology Inc.

Filename: net_pres_encryptionproviderapi.h

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