Qualcomm® Unified Tool Service (QUTS)

User Guide

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Revision history

Revision	Date	Description
A	July 2019	Initial release
B	July 2020	Chapter 3: Updated Sections 3.3 and 3.4 Chapter 4: Added Sections 4.2, 4.3.1.49, 4.3.1.50, 4.3.1.52, 4.3.1.54 to 4.3.1.56, 4.3.1.61 to 4.3.1.66, 4.3.2.16 to 4.3.2.18, 4.3.2.27. 4.3.2.33 to 4.3.2.38, 4.4.2.8, 4.4.2.9. 4.4.2.11, 4.4.2.17, 4.4.2.18, 4.5.1.3, 4.5.1.8, 4.5.2.4, 4.5.2.9, 4.5.2.12, 4.5.2.13, 4.5.2.15, 4.5.2.18 to 4.5.2.22, and 4.6.2.3 Updated Sections 4.3.1.12, 4.3.1.13, 4.3.1.16, 4.3.1.46, 4.4.2.11, 4.4.2.17, 4.5.1.3, 4.5.2.4, and 4.5.2.15 Chapter 5: Added Sections: 5.1.2.12, 5.1.3.47, 5.1.3.48, 5.2, 5.2.1.1, 5.2.1.2 to 5.2.1.4, 5.2.2.25 to 5.2.2.27, 5.3.2.14, 5.5, and 5.7, Updated Sections 5.2, 5.2.1.2, 5.2.2.8, 5.2.2.25, 5.5

Contents

1 Introduction

1.1 Purpose

This document describes the Qualcomm® Unified Tools Service (QUTS) interfaces. Included is an overview of QUTS, call flows, and descriptions of the APIs.

1.2 Conventions

Function declarations, function names, type declarations, attributes, and code samples appear in a different font, for example, `cp armcc armcpp`.

Code variables appear in angle brackets, for example, `<number>`.

Commands to be entered appear in a different font, for example, **`copy a:*.* b:`**.

Shading indicates content that has been added or changed in this revision of the document.

1.3 Technical assistance

For assistance or clarification on information in this document, submit a case to Qualcomm Technologies, Inc. (QTI) at https://createpoint.qti.qualcomm.com/.

If you do not have access to the CDMATech Support website, register for access or send email to support.cdmatech@qti.qualcomm.com.

2 Functional overview

QUTS provides access to all Qualcomm devices connected to the computer on which it's running. The single instance of the QUTS service provides device discovery and access control to the different interfaces made available through Qualcomm devices. Client applications will then connect to QUTS to access functionality provided over these connections.

Application clients must communicate with QUTS using the socket-based RPC system, Apache Thrift. For some languages (such as C, C++, PERL, etc.), a wrapper for this communication layer is provided along with the application. For other languages supported by Thrift, the communication layer must be developed by the client.

QUTS provides some callback mechanisms to which clients can optionally connect. These interfaces provide valuable runtime information or provide a mechanism for querying input for QUTS. This interface is described in Chapter 4. To connect to these functions, a Thrift server must be made available from the client application. If you are using a provided wrapper, this is done automatically.

3 Use cases

3.1 Using QUTS

For supported languages (C++, C#, Python, Perl), there is a QutsClient module distributed with QUTS that allows easy connection and configuration with QUTS. Create an instance of the QutsClient then call getDeviceManager() to return an instance of the DeviceManager (see Section 4.3). If using any other language supported by Thrift, the language bindings must be generated using thrift.exe, then following the procedure in Section 3.2.

3.2 Set up a connection to QUTS

1. Call registerClient() on UTS_REGISTRATION_PORT (50090) using the *QUTS Registration* Thrift service.

   This operation allocates a client service port, which is returned from the function call. All subsequent calls are done on that service port by the DeviceManager server using the *Device Manager* Thrift service.

2. (Optional) Start up and register a client callback server to handle notifications and input requests from QUTS.

   Run this operation on the port (client port + 1). It must implement a Thrift multiplexed server with a single service called *QUTS Callback*.

3. Make function calls to the DeviceManager.

   If an error value is returned, call getLastError() to determine the reason for the failure. For usage errors, QUTS throws an AppException that contains information regarding the error. For device errors, QUTS provides failure information in either the function return type or through the getLastError interface.

3.3 Use the service

At this point the service is ready for use. A typical situation makes use of services or a connection to a device. The following is a typical call flow for using a device:

1. Call getServicesList() to get a list of available services, and choose the service to be used.
2. For a list of active devices that support a specified service, call getDevicesForService() and indicate the serviceName.
3. To start an instance of the service communicating with a specified device, call createService() and indicate the serviceName and deviceHandle.

4. Create a Thrift service client using the name returned from createService().

   Each service has its own API (see Chapter 4.5.2.1).

For services provided by QUTS, modules are provided to simplify the process of service creation. C++ DLLs, PERL modules, and Python modules are distributed with QUTS to facilitate this process. For usage ideas, see the samples provided in this document.

3.4 Postprocessing log sessions

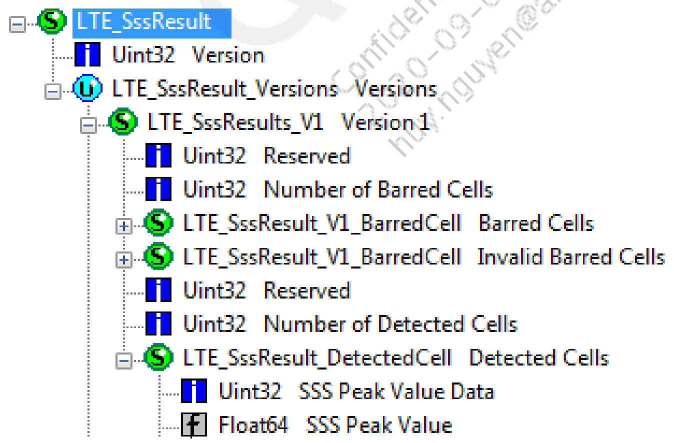
Alternative to using services on live connections, QUTS can load and iterate log files for postprocessing as follows:

1. Call openLogSession() (see Section 4.3.2.21) with a list of log files that were generated in a single session of live traffic in QUTS.
2. Create a Thrift LogSession service client using the name returned from openLogSession (see Section 4.3.2.21).

   Multiple log sessions can be created and processed independently. Each log session has an API as defined in Section 4.4.2.15.

3.5 Field queries

Field queries allow for the access of specific field values from structures. The user can provide partial paths or fully qualified paths based on the structure of the data packet containing the fields. For example, given the following structure:



```
LTE_SssResult
    Uint32  Version
    LTE_SssResult_Versions  Versions
        LTE_SssResults_V1  Version 1
            Uint32  Reserved
            Uint32  Number of Barred Cells
            LTE_SssResult_V1_BarredCell  Barred Cells
            LTE_SssResult_V1_BarredCell  Invalid Barred Cells
            Uint32  Reserved
            Uint32  Number of Detected Cells
            LTE_SssResult_DetectedCell  Detected Cells
                Uint32  SSS Peak Value Data
                Float64  SSS Peak Value
```

The following table provides example accessors.

Accessor	Description
”SSS Peak Value”	Matches every instance of “SSS Peak Value” in the packet
”SSS Peak Value”[0]	Matches only instances of “SSS Peak Value” at array index 0
”Detected Cells”.”SSS Peak Value”	Matches only instances “SSS Peak Value” that exist within a field called “Detected Cells”
”Detected Cells”[1].”SSS Peak Value”	Matches only instances of “SSS Peak Value” that exist within a field called “Detected Cells” where “Detected Cells” is at index 1

4 QUTS application interfaces

4.1 QutsClientManager interface

4.1.1 Constants

4.1.1.1 UTS_REGISTRATION_PORT

Static port that QUTS uses for registering new clients. Only registerClient() is called on this port.

```
const i32 UTS_REGISTRATION_PORT = 50090
```

4.1.2 Types

4.1.2.1 ClientPortOffsets

Provides the offsets for ports relative to the port number allocated by the QUTS registration by registerClient().

```
enum ClientPortOffsets
{
   PORT_DEVICE_MANAGER_SERVER = 0,
   PORT_CALLBACK_CLIENT = 1
}
```

PORT_DEVICE_MANAGER_SERVER	Port offset from registerClient() on which DeviceManager calls will be running.
PORT_CALLBACK_CLIENT	Port on which the ClientCallback server should be instantiated by the client application.

4.1.3 Functions

4.1.3.1 registerClient()

Allocates a new DeviceManager server for servicing client function calls.

Prototype

```
i32 registerClient()
```

Returns

Port number on which the new DeviceManager is set up.

4.2 Scripting interface methods

For a few specific languages (for example, Python, Perl, C# and Java), QUTS provides wrapper APIs that make starting QUTS client easier by hiding all thrift calls. The initial calls on Python are described for example:

To get a QutsClient object:

```
import QutsClient
import Common.ttypes

 client = QutsClient.QutsClient("QUTS Sample", [multithreadedClient])
```

`If multiple threads are needed on the script side, set multithreadedClient to True. Default value is False.`

NOTE: If multithreadedClient is set to `True`, then call `stop()` on qutsClient object at the end of the test case as needed for proper cleanup. If qutsClient is created in main, then call to `stop()` is needed (if multithreadedClient set to `True`). However, if qutsClient is created in a method which is called from main, then when that method exits, `stop()` is automatically called when qutsClient goes out of scope/destroyed, so the explicit call to `stop()` is not needed in this case.

4.2.1 QutsClient interface functions

4.2.1.1 getDeviceManager

Gets the deviceManager handle. All other methods defined in the deviceManager interface can be called on this handle.

4.2.1.2 getUtilityService

Gets the utilityService handle. All other methods defined in the utilityService interface can be called on this handle.

4.2.1.3 openLogSession

Opens logSession. Same as openLogSession on the DeviceManager handle.

4.2.1.4 getActiveLogSession

Opens existing logSession. Same as getActiveLogSession on DeviceManager handle.

4.2.1.5 createService

Used to create any service, such as Diag/Qmi, etc. For example, diagService can be created as:

```
import DiagService.DiagService
import DiagService.constants
import DiagService.ttypes

diagService = DiagService.DiagService.Client(
    qutsClient.createService(DiagService.constants.DIAG_SERVICE_NAME,
                             deviceId))
```

4.2.2 Qutsclient interface call back methods

These are callback methods. When the corresponding event occurs, the callback is invoked. An example is provided in Section 4.2.2.1, the other callback methods usage is similar.

4.2.2.1 `setOnMessageCallback`

```
e.g., qutsClient.setOnMessageCallback(onMessageCallback)
```

4.2.2.2 `setOnDeviceConnectedCallback`

4.2.2.3 `setOnDeviceDisconnectedCallback`

4.2.2.4 `setOnDeviceModeChangeCallback`

4.2.2.5 `setOnProtocolAddedCallback`

4.2.2.6 `setOnProtocolRemovedCallback`

4.2.2.7 `setOnProtocolStateChangeCallback`

4.2.2.8 `setOnMissingQShrinkHashFileCallback`

4.2.2.9 `setOnLogSessionMissingQShrinkHashFileCallback`

4.2.2.10 `setOnAsyncResponseCallback`

4.2.2.11 `setOnDataQueueUpdatedCallback`

4.2.2.12 `setOnDataViewUpdatedCallback`

4.2.2.13 `setOnServiceAvailableCallback`

4.2.2.14 `setOnServiceEndedCallback`

4.2.2.15 `setOnServiceEventCallback`

4.2.2.16 `setOnQShrinkStateUpdated`

4.3 DeviceManager interface

4.3.1 Types

4.3.1.1 ErrorCode

Reasons for a failed function call.

```
enum ErrorCode
{
   DEVICE_NO_ERROR = 0,
   DEVICE_UNKNOWN_ERROR,
   DEVICE_INVALID_PARAMETERS,
   DEVICE_PERMISSIONS_ERROR,
   DEVICE_INVALID_DEVICE_HANDLE,
   DEVICE_INVALID_PROTOCOL_HANDLE,
   DEVICE_INVALID_CONNECTION_HANDLE,
   DEVICE_CONNECTION_LOCKED,
   DEVICE_DISCONNECTED,
   DEVICE_PROTOCOL_INVALID,
   DEVICE_PROTOCOL_DISCONNECTED,
   DEVICE_PROTOCOL_UNRESPONSIVE,
   DEVICE_TX_CANCELLED,
   DEVICE_TX_TIMEOUT,
   DEVICE_INVALID_PROCESSOR,
   DEVICE_INVALID_PACKET,
   DEVICE_RESPONSE_ERROR,
   DEVICE_INVALID_LOG_SESSION,
   DEVICE_SERVICE_NOT_INITIALIZED,
   DEVICE_TCP_PORT_FAILURE,
   DEVICE_SERVICE_ALREADY_INITIALIZED
}
```

4.3.1.2 ErrorType

Bundles the latest error code with a string that describes the error in more detail.

```
struct ErrorType
{
    1: required ErrorCode errorCode;
    2: required string errorString;
}
```

4.3.1.3 AppException

This exception is thrown by QUTS when there is a usage issue or unknown error. The specific error information is set in the errorCode and errorString.

```
exception AppException
{
    1: required ErrorCode errorCode;
    2: required string errorString;
}
```

4.3.1.4 ProtocolType

Type of interface that a protocol represents.

```
enum ProtocolType
{
   PROT_UNKNOWN = -1,
   PROT_DIAG = 0,
   PROT_QMI,
   PROT_ADB,
   PROT_SAHARA,
   PROT_FIREHOSE,
   PROT_QDSS,
   PROT_ADPL,
   PROT_FASTBOOT,
   PROT_NMEA,
   PROT_DUN,
   PROT_RMNET,
   PROT_RNDIS,
   PROT_MBIM,
   PROT_MAX
}
```

4.3.1.5 ConnectionType

Type of physical connection that a protocol uses.

```
enum ConnectionType
{
   CONNECT_UNKNOWN = -1,
   CONNECT_USB = 0,
   CONNECT_TCP,
   CONNECT_FILE,
   CONNECT_ETHERNET,
   CONNECT_MAX
}
```

4.3.1.6 OpenProp

Permissions for opening and sharing a connection.

```
enum OpenProp
{
   OPEN_NONE = 0x0000,
   OPEN_READ  = 0x0001,
   OPEN_WRITE = 0x0002,
   OPEN_READ_WRITE = 0x0003
}
```

4.3.1.7 DeviceMode

Device operation mode bitmask.

```
enum DeviceMode
{
   DEVICE_MODE_NONE              = 0x00000000,
   DEVICE_MODE_SAHARA_DOWNLOAD   = 0x00000001,
   DEVICE_MODE_SAHARA_CRASH      = 0x00000002,
   DEVICE_MODE_SAHARA_EFS_SYNC   = 0x00000004
}
```

4.3.1.8 ProtocolInfo

Structure that contains all relevant information for a specific protocol.

```
struct ProtocolInfo {
   1: i64 protocolHandle;
   2: i64 deviceHandle;
   3: string description;
   4: ProtocolType protocolType;
   5: ConnectionType connectionType;
   6: OpenProp connectionStatus;
   7: OpenProp shareStatus;
   8: ProtocolState protocolState;
}
```

Fields

`protocolHandle`	64-bit handle for referencing the protocol.
`deviceHandle`	64-bit handle for the device to which the protocol belongs.
`Description`	Human-readable text description of the protocol.

`protocolType`	Type of protocol (see AppException
	This exception is thrown by QUTS when there is a usage issue or unknown error. The specific error information is set in the errorCode and errorString.
	`exception AppException`
	`{`
	`    1: required ErrorCode errorCode;`
	`    2: required string errorString;`
	`}`
	ProtocolType).

`connectionType`	Type of physical connection (see ConnectionType).
`connectionStatus`	Connection state of the protocol, if a service is using the protocol.
`shareStatus`	Indicates whether the protocol is available based on current sharing restrictions.
`protocolState`	Indicates the current protocol state (see ProtocolState).

4.3.1.9 DeviceInfo

Structure that contains all relevant information for a specific device.

```
struct DeviceInfo {
   1: i64 deviceHandle;
   2: string description;
   3: list<ProtocolInfo> protocols;
   4: list<string> services;
   5: string serialNumber;
   6: string adbSerialNumber;
   7: string location;
}
```

Fields

`deviceHandle`	64-bit handle for referencing the device.
`description`	Human-readable text description of the device.
`protocols`	List of protocols on the device (see ProtocolInfo).
`services`	List of services currently available on the device.
`serialNumber`	MSM serial number if it is available.
`adbSerialNumber`	ADB serial number if it is available.
`location`	Hub location number of the device.

4.3.1.10 DiagPacketType

Enumerates the different categories of diag payloads. Each has its own ID system below the diag level command code.

```
enum DiagPacketType
{
   LOG_PACKET = 0,
   EVENT,
   NV_ITEM,
   DEBUG_MSG,
   REQUEST,
   RESPONSE,
   SUBSYS_REQUEST,
   SUBSYS_RESPONSE,
   SUBSYSV2_REQUEST,
   SUBSYSV2_IMMEDIATE_RESPONSE,
   SUBSYSV2_DELAYED_RESPONSE,
   QTRACE,
   QSH_METRIC
}
```

Values

LOG_PACKET	Corresponds to command ID 16 (0x10). ID values are log codes, names are the names of the log packets (for example, 0x1234 or “Log Packet Name”).
EVENT	Corresponds to command ID 96 (0x60). ID values are event IDs, names are the names of the events (for example, 123 or “Event Name”).
NV_ITEM	Corresponds to NV read/set related commands or subsystem commands. ID values are NV IDs, names are either the name of the legacy NV item or the EFS path for the NV item (for example, 12 or “My NV Value” or “/nv/item”).
DEBUG_MSG	Corresponds to command ID 121 (0x79). ID values are the combination of subsystem ID and Level (for example, 123/3 or “Subsystem/High”).
REQUEST	Any outgoing command code other than those enumerated in this table. ID values are the command code, names are the request name (for example, 12 or “Command Request”).
RESPONSE	Any incoming command code other than those enumerated in this table. ID values are the command code, names are the request name (for example, 12 or “Command Response”).
SUBSYS_REQUEST	Corresponds to outgoing command ID 75 (0x4B). ID values are the combination of subsystem ID and subsystem command code (for example, 12/1 or “Subsystem/Command Name”).
SUBSYS_RESPONSE	Corresponds to incoming command ID 75 (0x4B). ID values are the combination of subsystem ID and subsystem command code (for example, 12/1 or “Subsystem/Command Name”).
SUBSYSV2_REQUEST	Corresponds to outgoing command ID 128 (0x80). ID values are the combination of subsystem ID and subsystem command code (for example, 12/1 or “Subsystem/Command Name”).

`SUBSYS_V2_IMMEDIATE_RESPONSE`	Corresponds to the immediate incoming command ID 128 (0x80) responding to a SUBSYV2_REQUEST. ID values are the combination of subsystem ID and subsystem command code (for example, 12/1 or "Subsystem/Command Name").
`SUBSYS_V2_DELAYED_RESPONSE`	Corresponds to subsequent incoming command ID 128 (0x80) after receiving the initial SUBSYSV2_IMMEDIATE_RESPONSE. ID values are the combination of subsystem ID and subsystem command code (for example, 12/1 or "Subsystem/Command Name").
`QTRACE`	Corresponds to command ID 157 (0x9D). ID values are the combination of client ID and buffer ID (for example, 12/1 or "Client Name/Buffer").
`QSH_METRIC`	Corresponds to log packet 0x19B6. ID values are the combination of client ID and metric ID (for example, 12/1 or "Client Name/Metric").

4.3.1.11 DiagIdFilterItem

The DiagIdFilterItem allows for specification of an ID level filter. It is used in conjunction with DiagPacketFilter. It specifies an optional ID and two optional regex-based filters for parsed text and summary text. If no ID is given, the regex is applied to all items of this type (for instance, all DEBUG_MSG). If no regex is given, filtering is done at the ID level.

```
struct DiagIdFilterItem
{
   1: optional string idOrName;
   2: optional string regexFilter;
   3: optional string summaryRegexFilter;
}
```

Fields

`idOrName`	Name or ID of the item. For ID definitions, see DiagPacketType.
`regexFilter`	Regular expression to filter based on the parsed text of the item
`summaryRegexFilter`	Regular expression to filter based on the summary text of the item

4.3.1.12 DiagPacketFilter

DiagPacketFilter provides the ability to specify which items are required from a Diag stream.

```
struct DiagPacketFilter
{
   1: optional map<DiagPacketType, list<DiagIdFilterItem> >
idOrNameMask;
   2: optional list<i32> subscriptionId;
   3: optional InputLogMask logMask;
   4: optional list<string> formatStringFilter;
   5: optional bool enableMultiSim;
}
```

Fields

`idOrNameMask`	For each DiagPacketType this can provide many ID/Regex combinations based on DiagIdFilterItem. If a DiagPacketType is not included or it has an empty list, it is not included in the results (it is filtered out).
`subscriptionId`	Allows specification of a subset of subscription IDs. If no ID is specified, all are passed (no filtering is done on the subscription ID).
`logMask`	Input log mask
`formatStringFilter`	Format string Filter
`enableMultiSim`	If the multisim mask is to be enabled, this needs to be set to true

4.3.1.13 DiagReturnFlags

DiagReturnFlags specify what type of data should be returned when querying specific diag data packets. For more information on what they provide, see DiagPacket.

```
enum DiagReturnFlags
{
   SESSION_INDEX          = 0x00000001,
   PROTOCOL_INDEX         = 0x00000002,
   RECEIVE_TIME_DATA      = 0x00000004,
   RECEIVE_TIME_STRING    = 0x00000008,
   PACKET_TYPE            = 0x00000010,
   PACKET_ID              = 0x00000020,
   PACKET_NAME            = 0x00000040,
   BINARY_PAYLOAD         = 0x00000080,
   PARSED_TEXT            = 0x00000100,
   TIME_STAMP_DATA        = 0x00000200,
   TIME_STAMP_STRING      = 0x00000400,
   SUBSCRIPTION_ID        = 0x00000800,
   PROCESSOR_ID           = 0x00001000,
   HW_TIME_STAMP_DATA     = 0x00002000,
   HW_TIME_STAMP_STRING   = 0x00004000,
   ULOG_SOURCE            = 0x00008000,
   MORE_RESPONSES_FLAG    = 0x00010000,
   SUMMARY_TEXT           = 0x00020000,
   QDSS_CHANNEL_ID          = 0x00040000,
   QDSS_MASTER_ID           = 0x00080000,
   QDSS_AT_ID                 = 0x00100000,
   DEFAULT_FORMAT_TEXT       = 0x00200000,
   CALL_FRAME_NUMBER         = 0x00400000,
   TIME_STAMP_TOD_ADJUSTED_DATA      = 0x00800000
   TIME_STAMP_TOD_ADJUSTED_STRING   = 0x01000000
   PACKET_SIZE               = 0x02000000
}
```

4.3.1.14 DiagReturns

The DiagReturns type specifies information to be queried regarding a DiagPacket. The data specified is returned in the resulting DiagPacket.

```
struct DiagReturns
{
   1: optional DiagReturnFlags flags;
   2: optional list<string> queries;
}
```

Fields

`Flags`	What fields to return in the resulting DiagPacket items. Flags specified at this value apply only to the specific item specified in the fieldQueries of DiagReturnConfig. Flags put in the DiagReturnConfig apply to all packets.
`Queries`	Specifies queries to make for field values in the log packet. For information on queries, see Field queries.

4.3.1.15 DiagReturnConfig

DiagReturnConfig encompasses all return configuration information for a DiagPacket.

```
struct DiagReturnConfig
{
   1: DiagReturnFlags flags;
   2: optional map<DiagPacketType, map<string, DiagReturns> >
fieldQueries;
   3: optional bool diagTimeSorted;
}
```

Fields

`Flags`	What fields to return in the resulting DiagPacket items. Flags specified in this structure apply to all resulting DiagPackets. To specify fields per packet type or ID, use the flags in DiagReturns, accessed using the fieldQueries field.
`fieldQueries`	Specialized returns for different packets based on ID. Each DiagPacketType has a map of DiagReturns configuration keyed on the unique ID. The string value for the key of the secondary map can specify either an ID or the name of the item. For ID definitions, see DiagPacketType.
`diagTimeSorted`	Allows specifying that a DataView should have the diag-based traffic sorted based on the target assigned diag time stamp. This option is only valid log session DataViews and only in postprocessing (not during live connections).

4.3.1.16 DiagPacket

Return types for functions requesting a DiagPacket.

This structure contains many optional fields that can be filled using the DiagReturnFlags type. All fields other than `errorCode` are available only if ErrorCode is `DEVICE_NO_ERROR (0)`. Other fields are optionally available depending on the function and values specified in DiagReturnFlags.

```
struct DiagPacket
{
   1: optional ErrorCode errorCode;
   2: optional DiagPacketType packetType;
   3: optional string packetId;
   4: optional bool moreResponsesFlag;
   5: optional i64 sessionIndex;
   6: optional i64 protocolIndex;
   7: optional string packetName;
   8: optional i64 timeStampData;
   9: optional string timeStampString;
   10: optional binary binaryPayload;
   11: optional string parsedText;
   12: optional i32 subscriptionId;
   13: optional i16 processorId;
   14: optional i64 hwTimeStampData;
   15: optional string hwTimeStampString;
   16: optional string ulogSource;
   17: optional i64 receiveTimeData;
   18: optional string receiveTimeString;
   19: optional string queryResultJson;
   20: optional string summaryText;
   21: optional i64 transactionId;
   22: optional i16 qdssChannelId;
   23: optional i16 qdssMasterId;
   24: optional i8 qdssAtid;
   25: optional string defaultFormatText;
   26: optional i16 callFrameNumber;
   27: optional i64 timeStampTodAdjustedData;
   28: optional string timeStampTodAdjustedString;
   29: optional list<string> formatStringArguments;
   30: optional i16 packetSize;
}
```

Fields

`errorCode`	Code if an error occurred. All other fields available only when `DEVICE_NO_ERROR (0)` is set in ErrorCode.
`packetType`	Diagnostic packet data type (defined in DiagPacketType). Values: ▪ `LOG_PACKET` – Log ID (hex) ▪ `EVENT` – Event ID ▪ `NV_ITEM` – NV ID ▪ `DEBUG_MSG` – Subsystem ID/level ▪ `REQUEST` – DIAG command code ▪ `RESPONSE` – DIAG command code ▪ `SUBSYS_REQUEST` – Subsystem ID/subsystem command ▪ `SUBSYS_RESPONSE` – Subsystem ID/subsystem command ▪ `SUBSYSV2_REQUEST` – Subsystem ID/subsystem command ▪ `SUBSYSV2_IMMEDIATE_RESPONSE` – Subsystem ID/subsystem command ▪ `SUBSYSV2_DELAYED_RESPONSE` – Subsystem ID/subsystem command ▪ `QTRACE` – Client ID/buffer ID ▪ `QSH_METRIC` – Client ID/metric ID
`packetId`	Packet ID based on type.
`moreResponsesFlag`	TRUE only for subsystem version 2 responses that anticipate further delayed responses from the corresponding request.
`sessionIndex`	Session index of the packet. The index is relative to incoming packets from all active protocols in QUTS.
`protocolIndex`	Protocol index of the packet. The index is relative to incoming packets from only this instance of the protocol in QUTS.
`packetName`	Description of the packet based on the `type` and `id` combination. Available when `PACKET_NAME` is set in DiagReturnFlags.
`timeStampData`	Raw data for the DIAG-assigned timestamp of the packet. Timestamps are set by DIAG for `LOG_PACKET`, `EVENT`, `DEBUG_MSG`, `QTRACE`, and `QSH_METRIC` types. All others are interpolated by QUTS. Timestamp format is Windows FILETIME, 100 ns ticks from midnight, Jan 1 1600 UTC. Available when `TIME_STAMP_DATA` is set in DiagReturnFlags.
`timeStampString`	String formatted DIAG-assigned timestamp of the packet. Timestamps are set by DIAG for `LOG_PACKET`, `EVENT`, `DEBUG_MSG`, `QTRACE`, and `QSH_METRIC` types. All others are interpolated by QUTS. Available when `TIME_STAMP_STRING` is set in DiagReturnFlags.
`binaryPayload`	Raw binary payload of the response starting at the command code. Available when `BINARY_PAYLOAD` is set in DiagReturnFlags.

`parsedText`	Parsed text of the payload. `PARSED_TEXT` turns on the flag which returns formatted full parsed text for the log packet, (i.e., bUseFormat is set to true). Available when `PARSED_TEXT` is set in DiagReturnFlags.
`subscriptionId`	ID of the subscription for the SIM from which the response came. Not all packets have a Subscription ID. If no ID of the subscription information is available for the packet, this field is set to -1. Available when `SUBSCRIPTION_ID` is set in DiagReturnFlags.
`processorId`	Processor ID of the processor from which the response came. Not all packets have a processor ID. If no processor ID information is available for the packet, this field is set to 0xFF. Available when `PROCESSOR_ID` is set in DiagReturnFlags.
`hwTimeStampData`	Raw data for the QDSS-assigned hardware timestamp. Packets not received from QDSS are assigned a timestamp of 0. Timestamp format is 100 ns ticks. Available when `HW_TIME_STAMP_DATA` is set in DiagReturnFlags.
`hwTimeStampString`	String-formatted QDSS-assigned hardware timestamp. Packets not received from QDSS have an empty string. Available when `HW_TIME_STAMP_STRING` is set in DiagReturnFlags.
`ulogSource`	Source name for the ULog-originated packet. Not all packets have a ULog source name. Packets with no source have an empty string. Available when `ULOG_SOURCE` is set in DiagReturnFlags.
`receiveTimeData`	Raw data for the time when the packet was received by QUTS. Receive timestamps are consistent across all connections in QUTS and can be used for rudimentary sorting across protocols. However, depending on the protocol implementations and transport layers sent from the device, receive times might not be consistent with relative packet creation/send times. Timestamp format is Windows FILETIME, 100 ns ticks from midnight, Jan 1 1600 UTC. Available when `RECEIVE_TIME_DATA` is set in DiagReturnFlags.
`receiveTimeString`	String formatted time when the packet was received by QUTS. Available when `RECEIVE_TIME_STRING` is set in DiagReturnFlags.
`queryResultJson`	Returns the results of any queries specified in DiagReturnConfig (see DiagReturnConfig) in a single JSON formatted string.
`summaryText`	Single line summary text for a packet based on its type. This is similar to the QXDM Professional™ Tool summary text. For debug messages, it will be the formatted output of the debug message, including file and line number. For events, it will be a single line summary of the payload. For RRC messages it will contain information about the signaling message.
`transactionId`	The transaction ID received when the packet was sent.
`qdssChannelId`	QDSS data channel ID.
`qdssMasterId`	QDSS data master ID.

`qdssAtid`	QDSS data AT ID.
`defaultFormatText`	Return parsed text in default format. DEFAULT_FORMAT_TEXT turns off the flag which returns formatted full parsed text for the log packet, (i.e., bUseFormat is set to false). Available when `DEFAULT_FORMAT_TEXT` is set in DiagReturnFlags
`callFrameNumber`	Available when `CALL_FRAME_NUMBER` is set in DiagReturnFlags
`timeStampTodAdjustedData`	Available when `TIME_STAMP_TOD_ADJUSTED_DATA` is set in DiagReturnFlags
`timeStampTodAdjustedString`	Available when `TIME_STAMP_TOD_ADJUSTED_STRING` is set in DiagReturnFlags
`formatStringArguments`	Formatted string arguments
`packetSize`	Return packet size in bytes. Available when `PACKET_SIZE` is set in DiagReturnFlags

4.3.1.17 QmiPacketType

The QmiPacketType enum indicates whether a data packet is a request, response, or asynchronous indication.

```
enum QmiPacketType
{
   QMI_REQUEST = 0,
   QMI_RESPONSE,
   QMI_INDICATION
}
```

4.3.1.18 QmiPacketFilter

The QmiPacketFilter specifies a list of message IDs to include.

```
struct QmiPacketFilter
{
   1: optional map<QmiPacketType, list<string> > idOrNameMask;
}
```

Fields

`idOrNameMask`	A list that can include a number of IDs. Each can be either the numerical message ID or the message name.

4.3.1.19 QmiReturnFlags

Flags for requesting the types of data to return when calling functions that return a QmiPacket.

```
enum QmiReturnFlags
{
   SESSION_INDEX         = 0x00000001,
   PROTOCOL_INDEX        = 0x00000002,
   RECEIVE_TIME_DATA     = 0x00000004,
   RECEIVE_TIME_STRING   = 0x00000008,
   PACKET_TYPE           = 0x00000010,
   PACKET_NAME           = 0x00000040,
   BINARY_PAYLOAD        = 0x00000080,
   PARSED_XML            = 0x00000100,
   SERVICE_ID            = 0x00000200,
   MESSAGE_ID            = 0x00000400
}
```

4.3.1.20 QmiReturns

The QmiReturns type specifies return information for a single item, as specified in QmiReturnConfig.

```
struct QmiReturns
{
   1: optional QmiReturnFlags flags;
   2: optional list<string> queries;
}
```

Fields

`Flags`	What fields to return in resulting QmiPacket. Flags specified at this value apply only to the specific item specified in the queries of QmiReturnConfig. Flags put in the QmiReturnConfig object apply to all packets.
`Queries`	Specifies queries to make for field values in the log packet. See Field queries.

4.3.1.21 QmiReturnConfig

The QmiReturnConfig type specifies return information for all resulting QmiPacket.

```
struct QmiReturnConfig
{
   1: QmiReturnFlags flags;
   2: optional map<QmiPacketType, map<string, QmiReturns> >
fieldQueries;
}
```

Fields

`Flags`	What fields to return in resulting QmiPacket. Flags specified in this structure apply to all resulting QmiPackets. To specify fields per packet type or ID, use the flags in QmiReturns, accessed using the queries field.
`Queries`	Specialized returns for different packets based on ID. Each QmiPacketType has a map of QmiReturns configuration keyed on the unique ID. The string value for the key of the secondary map can specify either an ID or the name of the message.

4.3.1.22 QmiPacket

Return type for functions requesting a QMI packet.

This structure contains many optional fields that can be filled using QmiReturnFlags. All fields other than `errorCode` are available only if ErrorCode is `DEVICE_NO_ERROR (0)`. Other fields are optionally available depending on the function and the values specified in QmiReturnFlags.

```
struct QmiPacket
{
   1: optional ErrorCode errorCode;
   2: optional QmiPacketType packetType;
   3: optional i32 serviceId;
   4: optional i16 messageId;
   5: optional i64 sessionIndex;
   6: optional i64 protocolIndex;
   7: optional string packetName;
   8: optional binary binaryPayload;
   9: optional string parsedXml;
   10: optional i64 receiveTimeData;
   11: optional string receiveTimeString;
   12: optional string queryResultJson;
   13: optional i64 transactionId;
}
```

Fields

`errorCode`	Code if an error occurred.

	All other fields are available only when `DEVICE_NO_ERROR (0)` is set in ErrorCode.
`packetType`	QMI packet data type according to QmiPacketType.
`serviceId`	ID of the QMI service this connection has opened.
`messageId`	ID of the QMI message packet.
`sessionIndex`	Session index of the packet. The index is relative to incoming packets from all active protocols in QUTS.
`protocolIndex`	Protocol index of the packet. The index is relative to incoming packets from only this instance of the protocol in QUTS.
`packetName`	Description of the packet based on the `serviceId` and `messageId` combination. Available when `PACKET_NAME` is set in QmiReturnFlags.
`binaryPayload`	Raw binary payload of the response starting at the command code. Available when `BINARY_PAYLOAD` is set in QmiReturnFlags.
`parsedXml`	Parsed XML string of the payload. Available when `PARSED_XML` is set in QmiReturnFlags.
`receiveTimeData`	Raw data for the time when the packet was received by QUTS. Receive timestamps are consistent across all connections in QUTS and can be used for a rudimentary sorting across protocols. However, depending on the protocol implementations and transport layers sent from the device, receive times might not be consistent with relative packet creation/send times. Timestamp format is Windows FILETIME, 100 ns ticks from midnight, Jan 1 1600 UTC. Available when `RECEIVE_TIME_DATA` is set in QmiReturnFlags.
`receiveTimeString`	String formatted time when the packet was received by QUTS. Available when `RECEIVE_TIME_STRING` is set in QmiReturnFlags.
`queryResultJson`	Returns the results of any queries specified in QmiReturnConfig (see QmiReturnConfig) in a single JSON formatted string.
`transactionId`	The transaction ID received when the packet was sent.

4.3.1.23 AdbPacketFilter

The AdbPacketFilter provides an optional filter for determining ADB responses to collect.

```
struct AdbPacketFilter
{
   1: optional string regexFilter;
}
```

Fields

`regexFilter`	Regular expression to filter based on the ADB response

4.3.1.24 AdbReturnFlags

The AdbReturnFlags type determines what information to return for AdbPackets.

```
enum AdbReturnFlags
{
   SESSION_INDEX         = 0x00000001,
   PROTOCOL_INDEX        = 0x00000002,
   RECEIVE_TIME_DATA     = 0x00000004,
   RECEIVE_TIME_STRING   = 0x00000008,
   PACKET_TEXT           = 0x00000100
}
```

4.3.1.25 AdbReturnConfig

The AdbReturnConfig specifies what type of information to return for each AdbPacket.

```
struct AdbReturnConfig
{
   1: AdbReturnFlags flags;
}
```

Fields

`Flags`	Determines what information to return. See AdbReturnFlags

4.3.1.26 AdbPacket

Return type for functions requesting a ADB packet.

This structure contains many optional fields that can be filled using the AdbReturnFlags. All fields other than `errorCode` are available only if ErrorCode is `DEVICE_NO_ERROR (0)`. Other fields are optionally available depending on the function and the values specified in AdbReturnFlags.

```
struct AdbPacket
{
   1: optional ErrorCode errorCode;
   2: optional i64 sessionIndex;
   3: optional i64 protocolIndex;
   4: optional string packetText;
   5: optional i64 receiveTimeData;
   6: optional string receiveTimeString;
}
```

Fields

`errorCode`	Code if an error occurred. All other fields are available only when `DEVICE_NO_ERROR (0)` is set in ErrorCode.
`sessionIndex`	Session index of the packet. The index is relative to incoming packets from all active protocols in QUTS.
`protocolIndex`	Protocol index of the packet. The index is relative to incoming packets from only this instance of the protocol in QUTS.
`packetText`	The ADB text of the packet
`receiveTimeData`	Raw data for the time when the packet was received by QUTS. Receive timestamps are consistent across all connections in QUTS and can be used for a rudimentary sorting across protocols. However, depending on the protocol implementations and transport layers sent from the device, receive times might not be consistent with relative packet creation/send times. Timestamp format is Windows FILETIME, 100 ns ticks from midnight, Jan 1 1600 UTC. Available when `RECEIVE_TIME_DATA` is set in AdbReturnConfigQmiReturnFlags.
`receiveTimeString`	String formatted time when the packet was received by QUTS. Available when `RECEIVE_TIME_STRING` is set in AdbReturnConfig.

4.3.1.27 SaharaPacketFilter

SaharaPacketFilter provides an optional filter for determining Sahara packets to collect.

```
struct SaharaPacketFilter
{
   1: optional list<string> idOrNameMask;
}
```

Fields

`idOrNameMask`	List of Sahara packet IDs or packet names to include.

4.3.1.28 SaharaReturnFlags

The SaharaReturnFlags type determines what information to return for SaharaPackets.

```
enum SaharaReturnFlags
{
   SESSION_INDEX          = 0x00000001,
   PROTOCOL_INDEX         = 0x00000002,
   RECEIVE_TIME_DATA      = 0x00000004,
   RECEIVE_TIME_STRING    = 0x00000008,
   PACKET_ID              = 0x00000020,
   PACKET_NAME            = 0x00000040,
   BINARY_PAYLOAD         = 0x00000080
}
```

4.3.1.29 SaharaReturnConfig

The SaharaReturnConfig specifies what type of information to return for each SaharaPacket.

```
struct SaharaReturnConfig
{
   1: SaharaReturnFlags flags;
}
```

Fields

Flags	Determines what information to return. See SaharaReturnFlags.

4.3.1.30 SaharaPacket

Return type for functions requesting a Sahara packet.

This structure contains many optional fields that can be filled using the SaharaReturnFlags (see SaharaReturnFlags). All fields other than `errorCode` are available only if ErrorCode is `DEVICE_NO_ERROR (0)`. Other fields are optionally available depending on the function and the values specified in SaharaReturnFlags.

```
struct SaharaPacket
{
   1: optional ErrorCode errorCode;
   2: optional i32 packetId;
   3: optional i64 sessionIndex;
   4: optional i64 protocolIndex;
   5: optional string packetName;
   6: optional binary binaryPayload;
   7: optional i64 receiveTimeData;
   8: optional string receiveTimeString;
}
Fields
```

errorCode	Code if an error occurred. All other fields are available only when `DEVICE_NO_ERROR (0)` is set in ErrorCode.
packetId	Sahara packet ID.
sessionIndex	Session index of the packet. The index is relative to incoming packets from all active protocols in QUTS.
protocolIndex	Protocol index of the packet. The index is relative to incoming packets from only this instance of the protocol in QUTS.
packetName	The name of the Sahara packet.
binaryPayload	The binary payload of the Sahara packet.
receiveTimeData	Raw data for the time when the packet was received by QUTS. Receive timestamps are consistent across all connections in QUTS and can be used for a rudimentary sorting across protocols.

	However, depending on the protocol implementations and transport layers sent from the device, receive times might not be consistent with relative packet creation/send times. Timestamp format is Windows FILETIME, 100 ns ticks from midnight, Jan 1 1600 UTC. Available when `RECEIVE_TIME_DATA` is set in QmiReturnFlags.
`receiveTimeString`	String formatted time when the packet was received by QUTS. Available when `RECEIVE_TIME_STRING` is set in QmiReturnFlags.

4.3.1.31 FastbootPacketFilter

The FastbootPacketFilter provides an optional filter for determining what Fastboot messages to collect.

```
struct FastbootPacketFilter
{
   1: optional string regexFilter;
}
```

Fields

`regexFilter`	Regular expression to filter based on the Fastboot message

4.3.1.32 FastbootReturnFlags

The FastbootReturnFlags type determines what information to return for FastbootPackets.

```
enum FastbootReturnFlags
{
   SESSION_INDEX         = 0x00000001,
   PROTOCOL_INDEX        = 0x00000002,
   RECEIVE_TIME_DATA     = 0x00000004,
   RECEIVE_TIME_STRING   = 0x00000008,
   PACKET_TEXT           = 0x00000100
}
```

4.3.1.33 FastbootReturnConfig

The FastbootReturnConfig specifies what type of information to return for each FastbootPacket.

```
struct FastbootReturnConfig
{
   1: FastbootReturnFlags flags;
}
```

Fields

`flags`	Determines what information to return. See FastbootPacketFilter.

4.3.1.34 FastbootPacket

Return type for functions requesting a Fastboot packet.

This structure contains many optional fields that can be filled using the FastbootReturnFlags (see FastbootPacketFilter). All fields other than `errorCode` are available only if ErrorCode is `DEVICE_NO_ERROR (0)`. Other fields are optionally available depending on the function and the values specified in FastbootReturnFlags.

```
struct FastbootPacket
{
   1: optional ErrorCode errorCode;
   2: optional i64 sessionIndex;
   3: optional i64 protocolIndex;
   4: optional string packetText;
   5: optional i64 receiveTimeData;
   6: optional string receiveTimeString;
}
```

Fields

`errorCode`	Code if an error occurred. All other fields are available only when `DEVICE_NO_ERROR (0)` is set in ErrorCode.
`sessionIndex`	Session index of the packet. The index is relative to incoming packets from all active protocols in QUTS.
`protocolIndex`	Protocol index of the packet. The index is relative to incoming packets from only this instance of the protocol in QUTS.
`packetText`	The Fastboot text of the packet
`receiveTimeData`	Raw data for the time when the packet was received by QUTS. Receive timestamps are consistent across all connections in QUTS and can be used for a rudimentary sorting across protocols. However, depending on the protocol implementations and transport layers sent from the device, receive times might not be consistent with relative packet creation/send times. Timestamp format is Windows FILETIME, 100 ns ticks from midnight, Jan 1 1600 UTC. Available when `RECEIVE_TIME_DATA` is set in FastbootReturnConfig.
`receiveTimeString`	String formatted time when the packet was received by QUTS. Available when `RECEIVE_TIME_STRING` is set in FastbootReturnConfig.

4.3.1.35 AnnotationPacketFilter

The AnnotationPacketFilter provides an optional filter for determining what annotation messages to collect.

```
struct AnnotationPacketFilter
{
   1: optional bool includeAnnotations;
   2: optional list<i64> messageIdFilter;
}
```

Fields

`includeAnnotations`	Boolean flag to include (true) or exclude (false) annotation messages
`messageIdFilter`	List of message IDs to include. If not set and includeAnnotations is true, all annotation packets are included.

4.3.1.36 AnnotationPacket

Return type for functions requesting an annotation packet.

```
struct AnnotationPacket
{
   1: optional ErrorCode errorCode;
   2: optional i64 sessionIndex;
   3: optional i64 protocolIndex;
   4: optional string parsedText;
   5: optional i64 messageId;
   6: optional i64 receiveTimeData;
   7: optional string receiveTimeString;
}
```

Fields

`errorCode`	Code if an error occurred.
`sessionIndex`	Session index of the packet. The index is relative to incoming packets from all active protocols in QUTS.
`protocolIndex`	Protocol index of the packet. The index is relative to incoming packets from only this instance of the protocol in QUTS.
`parsedText`	The annotation text of the packet
`messageId`	The message id of the packet
`receiveTimeData`	Raw data for the time when the packet was received by QUTS. Receive timestamps are consistent across all connections in QUTS and can be used for a rudimentary sorting across protocols. However, depending on the protocol implementations and transport layers sent from the device, receive times might not be consistent with relative packet creation/send times. Timestamp format is Windows FILETIME, 100 ns ticks from midnight, Jan 1 1600 UTC. Available when `RECEIVE_TIME_DATA` is set in FastbootReturnConfig.
`receiveTimeString`	String formatted time when the packet was received by QUTS. Available when `RECEIVE_TIME_STRING` is set in FastbootReturnConfig.

4.3.1.37 BuildInfo

Structure that contains all relevant information for a specific protocol.

```
struct BuildInfo{
   1: optional string msmRevision;
   2: optional string mobileModelId;
   3: optional string mobileSoftwareRevision;
   4: optional string mobileModelName;
}
```

Fields

`msmRevision`	An extension of the MSM_VER field from the version number response packet. Length and format is dependent on the Version field. Values are: ■ 0 – Length is 16 bits and derived from the 16-bit hardware version register. Format varies depending on the target build. ■ 1 – Length is 20 bits and derived from the 32-bit hardware version register. Format is described by the following offsets in the 32-bit hardware version register: ▫ Bits 19:4 = Bits 27:12 of the hardware version register ▫ Bits 3:0 = Bits 31:28 of the hardware version register ■ 2 – Length is 32 bits and is the value of the full 32-bit hardware version register
`mobileModelId`	Manufacturer's mobile model number
`mobileSoftwareRevision`	Mobile software revision as a string
`mobileModelName`	Mobile model as a string

4.3.1.38 NvItem

Structure that contains all NV metadata for its definition.

```
struct NvItem
{
   1: optional i64 id;
   2: optional string name;
   3: optional string description;
   4: optional string category;
}
```

Fields

`id`	The numeric assignment of the NV Item as seen in QXDM or PCAT
`name`	The description of the NV item or EFS path
`Description`	A text description about the NV Item
`category`	Category the NV item falls into

4.3.1.39 RxTxInfo

Contains all throughput information for a specific connection.

```
struct RxTxInfo
{
   1: i64 rxTotalPacketCount;
   2: i64 txTotalPacketCount;
   3: i64 rxTotalByteCount;
   4: i64 txTotalByteCount;
   5: double rxInstThroughput;
   6: double txInstThroughput;
}
```

Fields

`rxTotalPacketCount`	Total number of packets that have been received on this protocol since it was opened
`txTotalPacketCount`	Total number of packets that have been sent on this protocol since it was opened
`rxTotalByteCount`	Total number of bytes that have been received on this protocol since it was opened
`txTotalByteCount`	Total number of bytes that have been sent on this protocol since it was opened
`rxInstThroughput`	Instantaneous receive throughput. This is calculated as the number of bytes received based on the previous half second.
`txInstThroughput`	Instantaneous transmit throughput. This is calculated as the number of bytes sent based on the previous half second.

NOTE: All throughput stats are combined across any clients that may be using a given protocol. This means that the time the connection was opened may have been before the current client started using it. It also means throughput can be affected based on the usage of other active QUTS clients.

4.3.1.40 QShrink4DownloadState

Used to specify the current state qshrink is using getQShrinkState.

```
enum QShrink4DownloadState
{
   QSR4_STATE_INIT = 0,
   QSR4_STATE_DOWNLOADING,
   QSR4_STATE_DOWNLOADED,
          QSR4_STATE_LOADED,
          QSR4_STATE_FAILED
};
```

4.3.1.41 NmeaPacketFilter

The NmeaPacketFilter provides an optional filter for determining what Nmea messages to collect.

```
struct NmeaPacketFilter
{
  1: optional list<string> nameMask;
}
```

Fields

nameMask	List of mask strings. Possible values for individual mask strings in the list are “$GPGGA” and “$GPRMC”

4.3.1.42 NmeaReturnFlags

The NmeaReturnFlags type determines what information to return for NmeaPackets.

```
enum NmeaReturnFlags
{
   SESSION_INDEX         = 0x00000001,
   PROTOCOL_INDEX        = 0x00000002,
   RECEIVE_TIME_DATA     = 0x00000004,
   RECEIVE_TIME_STRING   = 0x00000008,
   PACKET_ID             = 0x00000020,
   PACKET_TEXT           = 0x00000100
}
```

4.3.1.43 NmeaReturnConfig

The NmeaReturnConfig specifies what type of information to return for each NmeaPacket.

```
struct NmeaReturnConfig
{
   1: NmeaReturnFlags flags;
}
```

Fields

flags	Determines what information to return. See NmeaReturnFlags..

4.3.1.44 NmeaPacket

Return type for functions requesting a Nmea packet.

This structure contains many optional fields that can be filled using the NmeaReturnFlags. All fields other than `errorCode` are available only if ErrorCode is `DEVICE_NO_ERROR (0)`. Other fields are optionally available depending on the function and the values specified in NmeaReturnFlags.

```
struct NmeaPacket
{
   1: optional ErrorCode errorCode;
   2: optional i64 sessionIndex;
   3: optional i64 protocolIndex;
   4: optional string packetText;
   5: optional i64 receiveTimeData;
   6: optional string receiveTimeString;
   7: optional string packetId;
}
```

Fields

`errorCode`	Code if an error occurred. All other fields are available only when `DEVICE_NO_ERROR (0)` is set in ErrorCode.
`sessionIndex`	Session index of the packet. The index is relative to incoming packets from all active protocols in QUTS.
`protocolIndex`	Protocol index of the packet. The index is relative to incoming packets from only this instance of the protocol in QUTS.
`packetText`	The Nmea text of the packet
`receiveTimeData`	Raw data for the time when the packet was received by QUTS. Receive timestamps are consistent across all connections in QUTS and can be used for a rudimentary sorting across protocols. However, depending on the protocol implementations and transport layers sent from the device, receive times might not be consistent with relative packet creation/send times. Timestamp format is Windows FILETIME, 100 ns ticks from midnight, Jan 1 1600 UTC. Available when `RECEIVE_TIME_DATA` is set in NmeaReturnConfig.
`receiveTimeString`	String formatted time when the packet was received by QUTS. Available when `RECEIVE_TIME_STRING` is set in NmeaReturnConfig.

4.3.1.45 SpcStatus

The SpcStatus specifies the return type for a checkSpc API call.

```
struct SpcStatus
{
   1: Common.ErrorType errorType;
   2: bool status;
}
```

4.3.1.46 OperatingMode

OperatingMode specifies the various possible operating modes that can be set for setOperatingMode or received from getOperatingMode. Only some can be used as setOperatingMode() input parameters. Refer to the comments next to enum to know if they can be used in conjunction with setOperatingMode().

```
enum OperatingMode
{
  MODE_NONE = -1,
  OFFLINE_ANALOG = 0,
  OFFLINE_DIGITAL = 1,
  OFFLINE_FACTORY_TEST = 3,
  ONLINE = 4,
  LOW_POWER = 5,
  POWER_OFF = 6,
  OFFLINE,       // not valid for setOperatingMode() API
  RESET,       // not valid for setOperatingMode() API
  NET_TEST_GW, // not valid for setOperatingMode() API
  OFFLINE_IF_NOT_FTM,
  ONLINE_TX_DISABLED
}
```

4.3.1.47 OperatingModeInfo

OperatingModeInfo specifies the return type for the getOperatingMode API call.

```
struct OperatingModeInfo
{
   1: Common.ErrorType errorType;
   2: OperatingMode operatingMode;
}
```

4.3.1.48 ProtocolState

The protocols current state.

```
enum ProtocolState
{
   STATE_AVAILABLE = 0,
   STATE_DISCONNECTED = 1,
   STATE_UNRESPONSIVE = 2,
   STATE_INITIALIZING = 3
}
```

The state of the protocol is determined based on the specific protocol type. The following table describes the various protocol states.

`STATE_AVAILABLE`	Indicates that the protocol is connected and responding as expected. Not all protocols have an availability check; for protocols not mentioned or for unknown protocols, the state is set to STATE_AVAILABLE but QUTS does not validate the responsiveness of the protocol. For diag, this state indicates it is successfully responding to loopback commands. For QMI, this state indicates the driver has marked the protocol as ready on the device.
`STATE_DISCONNECTED`	Indicates the protocol has been successfully removed from the host. For USB, this means it would no longer show up in the device manager. For TCP this means the connection was removed by the user.
`STATE_UNRESPONSIVE`	Indicates that the protocol has been connected but that the communication layer has stopped receiving data from the protocol. For example, for USB, the drivers are no longer able to communicate to the protocol, or for TCP, the connection has been lost.
`STATE_INITIALIZING`	Indicates the protocol has been discovered by the system but is not necessarily ready for use. If a protocol has no specific ready check, it immediately moves to STATE_AVAILABLE. Protocols can be connected to while in STATE_INITIALIZING but the behavior will be undefined. If the use case does not expect the protocol to behave normally (for instance diag does not respond to status requests), the user may need to use it while in STATE_INITIALIZING.

4.3.1.49 Direction

The direction of data transmission.

```
enum Direction
{
   DIR_RX = 1,
   DIR_TX = 2
}
```

4.3.1.50 FlowControlStatus

The protocol flow control status on a direction.

```
enum FlowControlStatus
{
   FLOW_CONTROL_OFF = 0,
   FLOW_CONTROL_ON = 1
}
```

4.3.1.51 LockState

The lock state of a protocol.

```
enum LockState
{
   LOCK_STATE_OFF = 0,
   LOCK_STATE_ON = 1
}
```

4.3.1.52 LockStatus

The protocol lock status containing detailed lock information.

```
struct LockStatus
{
   1: LockState lockState;
   2: optional i64 clientId;
   3: optional string reason;
}
```

4.3.1.53 GpsPacket

GPS packet information.

```
struct GpsPacket
{
   1: optional ErrorCode errorCode;
   2: optional string latitude;
   3: optional string longitude;
   4: optional string altitude;
   5: optional string speed;
   6: optional string time;
   7: optional string date;
}
```

4.3.1.54 AdplReturnFlags

The AdplReturnFlags type determines what information to return for AdplPackets. Use Raw Service to enable DPL/ADPL logging.

```
enum AdplReturnFlags
{
   SESSION_INDEX         = 0x00000001,
   PROTOCOL_INDEX        = 0x00000002,
   RECEIVE_TIME_DATA     = 0x00000004,
   RECEIVE_TIME_STRING   = 0x00000008,
   PACKET_VERSION        = 0x00000010,
   BINARY_PAYLOAD        = 0x00000080
}
```

4.3.1.55 AdplReturnConfig

AdplReturnConfig specifies what type of information to return for each AdplPacket. Use Raw Service to enable DPL /ADPL logging.

```
struct AdplReturnConfig
{
   1: AdplReturnFlags flags;
}
```

Fields

`Flags`	Determines what information to return. See AdplReturnFlags.

4.3.1.56 AdplPacket

Return type for functions requesting an ADPL packet. Use Raw Service to enable DPL / ADPL logging.

```
struct AdplPacket
{
   1: optional ErrorCode errorCode;
   2: optional i64 sessionIndex;
   3: optional i64 protocolIndex;
   4: optional i8 version;
   5: optional string binaryPayload;
   6: optional i64 receiveTimeData;
   7: optional string receiveTimeString;
}
```

4.3.1.57 QdssPacketFilter

QdssPacketFilter provides an optional filter for determining what QDSS messages to collect.

```
struct QdssPacketFilter
{
   1: list<i8>  atIds;
   2: list<i16> stpv2Atids;
   3: list<i16> stmAtids;
   4: optional list<i16> diagEntityId;
}
```

Fields

`atIds`	List of AT ID to stream
`stpv2Atids`	List of AT ID which are of type stpv2
`stmAtids`	List of AT ID which are of type stm
`diagEntityId`	List of entities which represent diag data

4.3.1.58 QdssReturnFlags

The QdssReturnFlags type determines what information to return for QdssPackets.

```
enum QdssReturnFlags
{
   SESSION_INDEX         = 0x00000001,
   PROTOCOL_INDEX        = 0x00000002,
   RECEIVE_TIME_DATA     = 0x00000004,
   RECEIVE_TIME_STRING   = 0x00000008,
   AT_ID                   = 0x00000020,
   BINARY_PAYLOAD        = 0x00000080,
   HW_TIME_STAMP_DATA    = 0x00002000,
   HW_TIME_STAMP_STRING = 0x00004000,
   CHANNEL_ID              = 0x00020000,
   MASTER_ID               = 0x00040000,
}
```

4.3.1.59 QdssReturnConfig

QdssReturnConfig specifies what type of information to return for each QdssPacket.

```
struct QdssReturnConfig
{
   1: QdssReturnFlags flags;
}
```

Fields

`flags`	Determines what information to return. See QdssReturnFlags

4.3.1.60 QdssPacket

Return type for functions requesting a QDSS packet.

```
struct QdssPacket
{
   1: optional ErrorCode errorCode;
   2: optional i64 sessionIndex;
   3: optional i64 protocolIndex;
   4: optional i64 receiveTimeData;
   5: optional string receiveTimeString;
   6: optional i8 atid;
   7: optional binary binaryPayload;
   8: optional i64 hwTimeStampData;
   9: optional string hwTimeStampString;
  10: optional i16 channelId;
  11: optional i16 masterId;
}
```

Fields

`errorCode`	Code if an error occurred.
`sessionIndex`	Session index of the packet. The index is relative to incoming packets from all active protocols in QUTS.
`protocolIndex`	Protocol index of the packet. The index is relative to incoming packets from only this instance of the protocol in QUTS.
`receiveTimeData`	Raw data for the time when the packet was received by QUTS. Receive timestamps are consistent across all connections in QUTS and can be used for rudimentary sorting across protocols. However, depending on the protocol implementations and transport layers sent from the device, receive times might not be consistent with relative packet creation/send times. Timestamp format is Windows FILETIME, 100 ns ticks from midnight, Jan 1 1600 UTC. Available when `RECEIVE_TIME_DATA` is set in QdssReturnFlags.
`receiveTimeString`	String formatted time when the packet was received by QUTS. Available when `RECEIVE_TIME_STRING` is set in QdssReturnFlags.
`atid`	QDSS AT ID value of the packet.
`binaryPayload`	Raw binary payload of the response starting at the command code. Available when `BINARY_PAYLOAD` is set in QdssReturnFlags.
`hwTimeStampData`	Raw data for the QDSS-assigned hardware timestamp. Packets not received from QDSS are assigned a timestamp of 0. Timestamp format is 100 ns ticks. Available when `HW_TIME_STAMP_DATA` is set in QdssReturnFlags.
`hwTimeStampString`	String-formatted QDSS-assigned hardware timestamp. Packets not received from QDSS have an empty string. Available when `HW_TIME_STAMP_STRING` is set in QdssReturnFlags.
`channelId;`	QDSS data channel ID.
`masterId;`	QDSS data master ID.

4.3.1.61 QmiConnectionOptions

Specifies connection options for qmiconnection.

```
struct QmiConnectionOptions
{
    1: optional i64 protocolHandle;
}
```

4.3.1.62 FunctionArea

The FunctionArea type specifies functional areas to be logged, used by enableFunctionLog and disableFunctionLog API.

```
enum FunctionArea
{
   FUNCTION_AREA_SAHARA_PORT_TRACE      = 0x00000001,
   FUNCTION_AREA_FIREHOSE_PORT_TRACE    = 0x00000002,
   FUNCTION_AREA_FIREHOSE_LOADER        = 0x00000003,
   FUNCTION_AREA_QDSS_DIAG_RAW_TRACE    = 0x00000004
}
```

4.3.1.63 LogLevel

The LogLevel type specifies logging levels to be enabled in the log file.

```
enum LogLevel
{
   LOG_DEFAULT     = 0x00000000,
   LOG_DATA        = 0x00000001,
   LOG_DEBUG       = 0x00000002,
   LOG_INFO        = 0x00000004,
   LOG_WARNING     = 0x00000008,
   LOG_ERROR       = 0x00000010,
   LOG_EXCEPTION   = 0x00000020,
   LOG_FATAL       = 0x00000040,
   LOG_ALL         = 0x7FFFFFFF
}
```

4.3.1.64 LogFormat

The LogFormat type specifies log file format.

```
enum LogFormat
{
   LOG_CSV      = 0x00000001,
   LOG_BINARY   = 0x00000002
}
```

4.3.1.65 LogLayout

The LogLayout type specifies information that can be turned on in the log file for each log message.

```
enum LogLayout
{
   LOG_DATE            = 0,
   LOG_DATEUTC,
   LOG_DATETIME,
   LOG_DATETIMEUTC,
   LOG_TIME,
   LOG_TIMEUTC,
   LOG_TIMEZONE,
   LOG_EPOCH,
   LOG_UPTIME,
   LOG_RUNTIME,

   LOG_SEQUENCE,
   LOG_LOGSEQUENCE,
   LOG_LEVEL,
   LOG_MESSAGE,
   LOG_COMBINED,

   LOG_DATATYPE,
   LOG_DATALEN,
   LOG_DATA,

   LOG_LOGGER,
   LOG_CLASS,
   LOG_NAMESPACE,
   LOG_APPNAME,
   LOG_APPVER,
   LOG_PROCNAME,
   LOG_PID,
   LOG_PROCID,
   LOG_TID,
   LOG_THREADID,
   LOG_THREADNAME,
   LOG_HOSTNAME,
   LOG_USERNAME,

   LOG_CALLERFILE,
   LOG_CALLERPATH,
   LOG_CALLERLINE,
   LOG_CALLERMETHOD,
   LOG_TRACE,

   LOG_EXCEPTION,
   LOG_EXCEPTIONMESSAGE,
   LOG_EXCEPTIONNAME,
   LOG_EXCEPTIONSTACK
}
```

4.3.1.66 LogOptions

Logging options to be used with logging APIs to customize log file properties.

```
struct LogOptions
{
   1: optional LogLevel    level;
   2: optional LogFormat   format;
   3: optional list<LogLayout> layout;
   4: optional i32         sizeRotationKB;
   5: optional string      savePath;
}
```

Fields

`level`	Logging level bitmask.
`format`	Log file format.
`layout`	List of LogLayout type to specify log file layout.
`sizeRotationKB`	Maximum log file size in KB before rotation.
`savePath`	Client specified path for saving log files.

4.3.1.67 CdmaProtocolRevision

Used to specify the version while setting the revision in setCdmaProtocolRevision().

```
enum CdmaProtocolRevision
 {
   IS_95A = 0,
   IS_95B = 4,
   IS_2000_Rev_0 = 6,
   IS_2000_Rev_A,
   IS_2000_Rev_B,
   IS_2000_Rev_C,
   IS_2000_Rev_C2,
   IS_2000_Rev_D
}
```

4.3.1.68 WcdmaProtocolRevision

Used to specify the version while setting the revision in setWcdmaProtocolRevision().

```
enum WcdmaProtocolRevision
{
    VB50 = 0x0B201303,
    VA70 = 0x0A201203,
    V9B0 = 0x09201207,
    VC80 = 0x0C201601,
    VAB1 = 0x0A201311,
    V930 = 0x09200912,
    V8A0 = 0x08201003,
    V860 = 0x08200903,
    V7G0 = 0x07201003,
    V790 = 0x07200805,
    V780 = 0x07200803,
    V770 = 0x07200712,
    V6F0 = 0x06200709,
    V6B0 = 0x06200609,
    V6A0 = 0x06200606,
    V690 = 0x06200603,
    V680 = 0x06200512,
    V590 = 0x05200406,
    V3I0 = 0x03200403,
    V3A0 = 0x03200203,
    V370 = 0x03200106,
    V350 = 0x03199900,
    VC81 = 0x0C201602
}
```

4.3.2 Functions

4.3.2.1 getLastError()

Queries for the error from the last function call.

Prototype

```
Common.ErrorType getLastError()
```

Returns

Error code and description.

4.3.2.2 getServicesList()

Gets a list of available services provided by QUTS.

Prototype

```
list<string> getServicesList()
```

Returns

List of available service names.

4.3.2.3 getDevicesForService()

Gets a list of devices that support a specified service.

Prototype

```
list<i64> getDevicesForService(1:string serviceName)
```

Parameters

`serviceName`	Service for which to find devices.

Returns

List of devices.

4.3.2.4 getServicesForDevice()

Gets a list of services that are supported by a specified device.

Prototype

```
list<string> getServicesForDevice(1:i64 deviceHandle)
```

Parameters

`deviceHandle`	Device for which to find services.

Returns

List of services.

4.3.2.5 createService()

Creates a new instance of a specified service to be run on a specified device.

To make calls on the service's interface, a new RPC client must be set up on this service.

Prototype

```
string createService(1:string serviceName,
                     2:i64 deviceHandle)
```

Parameters

`serviceName`	Service to create.
`deviceHandle`	Device on which to create the service.

Returns

Unique identifier of the RPC service.

4.3.2.6 getDeviceList()

Gets the information for all devices currently connected to QUTS.

Prototype

```
list<Common.DeviceInfo> getDeviceList()
```

Returns

List of available devices (see DeviceInfo).

Upon a failure, the list is empty (for the error code, call getLastError()).

4.3.2.7 getDeviceMode()

Returns current device mode of operations.

Prototype

```
Common.DeviceMode getDeviceMode(1:i64 deviceHandle)
```

Parameters

`deviceHandle`	Device on which to get the operation mode.

Returns

Device operation mode bitmask (see DeviceMode).

4.3.2.8 getProtocolList()

Gets a list of protocols available on a specified device.

Prototype

```
list<Common.ProtocolInfo> getProtocolList(1:i64 deviceHandle)
```

Parameters

`deviceHandle`	Device for which to get protocols.

Returns

List of available protocols (see ProtocolInfo).

Upon a failure, the list is empty (for the error code, call getLastError()).

4.3.2.9 overrideUnknownProtocol()

Allows an unknown protocol to be set and used as the specified protocol type.

Prototype

```
Common.ErrorCode overrideUnknownProtocol(1:i64 protocolHandle,
                                          2:Common.ProtocolType newType)
```

Parameters

`protocolHandle`	Protocol to override.
`newType`	Type of protocol to use for this connection.

Returns

None.

4.3.2.10 addTcpConnection()

Adds a TCP connection into QUTS. Once the TCP connection is created, it can be used the same as any other connection.

Prototype

```
Common.ProtocolInfo addTcpConnection(1:i64 deviceHandle,
                 2:Common.ProtocolType protocolType,
                 3:bool bIsClient,
                 4:string description,
                 5:string host,
                 6:i64 port)
```

Parameters

`deviceHandle`	The device to which to attach this connection. To create a new device, set to 0.
`protocolType`	What type of protocol this connection is (see AppException).
`bIsClient`	True if QUTS is a TCP client, false if QUTS is a TCP server.
`Description`	A human readable description of the connection.
`Host`	Host name or IP address. If bIsClient is true, this can be empty.
`Port`	Port on which to open the TCP connection.

Returns

The instance of the protocol that was created, including the new ProtocolHandle and DeviceHandle for usage with QUTS APIs. See ProtocolInfo.

4.3.2.11 removeTcpConnection()

Removes a TCP connection from QUTS. This is simply to clean up calls to addTcpConnection().

Prototype

```
Common.ErrorCode removeTcpConnection(1:i64 protocolHandle)
```

Parameters

`protocolHandle`	Protocol instance to remove

Returns

None.

4.3.2.12 startTcpServer()

Starts a TCP server to listen for incoming connection requests.

Prototype

```
Common.ErrorCode startTcpServer(1:Common.ProtocolType protocolType,
2:i32 port)
```

Parameters

`protocolType`	Type of protocol to use ProtocolType.
`port`	The port on which the server should poll for clients.

Returns

None.

4.3.2.13 stopTcpServer()

Stops the TCP server on the specified port.

Prototype

```
Common.ErrorCode stopTcpServer(1:i32 port)
```

Parameters

`port`	Port being used to service the server.

Returns

None.

4.3.2.14 getDeviceBuildId ()

Returns a structure containing build details for a device.

Prototype

```
Common.BuildInfo getDeviceBuildId(1:i64 deviceHandle)
```

Parameters

`deviceHandle`	Handle of the device .

Returns

Structure containing details about the build on the device.

4.3.2.15 getChipName ()

Returns the chip name of the device.

Prototype

```
string getChipName(1:i64 deviceHandle,2:i64 protocolHandle)
```

Parameters

`deviceHandle`	Handle of the device .
`protocolHandle`	Protocol handle of the diag protocol associated with the device. 0 can be passed if only one diag service is running on the device. If more than one diag protocol is present on the device and 0 is passed for protocolHandle, then the result will contain all the chip names of the diag protocols, each separated by "/".

Returns

String containing the name of the chip.

4.3.2.16 startLogging()

Initializes the session to begin saving log files at the current time.

Prototype

```
Common.ErrorCode startLogging()
```

Detailed description

Calling startLogging() is required to save logs (calling either saveLogFiles or saveLogFilesWithFilenames). Calling more than once does not do anything.

Returns

None.

4.3.2.17 saveLogFiles()

Saves the log files from all protocols that are used or were used by any service in the client session.

Prototype

```
list<string> saveLogFiles(1:string saveFolder)
```

Parameters

`saveFolder`	Location in which to save all log files.

Detailed description

Saving the file saves everything from the last save point until the function is called. Therefore, saving the file multiple times causes multiple fragments, each containing the span between saves.

This will throw an exception if the client did not call startLogging.

Returns

A list of log files that were saved by this function.

4.3.2.18 saveLogFilesWithFilenames()

Saves the log files from all protocols that are used or were used by any service in the client session.

Prototype

```
list<string> saveLogFilesWithFilenames(1:map<i64,string> logNamesByHandle)
```

Parameters

`logNamesByHandle`	Map of log file names per protocol handle.

Detailed description

This API works similar to the saveLogFiles API, but it will only save logs for the protocol handles specified in the map.

Returns

A list of log files that were saved by this function.

4.3.2.19 resetLogFiles()

Starts new log files.

Prototype

```
Common.ErrorCode resetLogFiles()
```

Detailed description

Closes the current log file and starts a new one for each connected protocol. This will throw an exception if the client did not call startLogging.

Returns

None.

4.3.2.20 logAnnotation()

Writes the annotation to the specified log file(s).

Prototype

```
Common.ErrorCode logAnnotation(1:string annotation,
                               2:i64 messageId,
                               3:i64 protocolHandle)
```

Parameters

`annotation`	Annotation text to log.
`messageId`	Id to associate with the annotation. (useful for filtering)
`protocolHandle`	The protocol this annotation should be logged with, or -1 to log into all protocol logs.

Returns

None.

4.3.2.21 openLogSession()

Creates a log session service to allow post processing of saved QUTS log sessions.

Prototype

```
string openLogSession(1:list<string> logFiles)
```

Parameters

`logFiles`	A list of log files to load into the session. Logs must be from the same original logging session or the API will fail.

Detailed description

Calling openLogSession creates a new Thrift service of a log session service. The name of this service is returned, on which a log session service object must be used to communicate with the log session service's APIs. For usage, see Postprocessing log sessions.

Returns

The name of the log session service on which to create the Thrift service object.

4.3.2.22 resetPhone()

Resets the device and returns true if the device is up before the reset timeout. QUTS will attempt to reset the device based on what protocols are available. It will first attempt to reset using any available diag protocols. If that is unsuccessful it will attempt to reset using ADB, Sahara, or Fastboot depending on which protocol is available at the time the API is called.

Prototype

```
Common.ErrorCode resetPhone(1:i64 deviceHandle, 2:i32 resetTimeoutMs)
```

Parameters

`deviceHandle`	Handle of the device
`resetTimeoutMs`	QUTS will wait for this duration (in milliseconds) for the device to come back up. If the device comes back up successfully by then, it will return TRUE; otherwise FALSE. Setting this value as 0 will make the API return immediately.

Returns

None.

4.3.2.23 getThroughputStatistics()

Returns the byte and packet counts and the instantaneous throughput of the given protocol.

Prototype

```
Common.RxTxInfo getThroughputStatistics(1:i64 protocolHandle)
```

Parameters

`protocolHandle`	Handle of the protocol for which to get statistics.

Returns

RxTxInfo structure with throughput info (See RxTxInfo).

4.3.2.24 getCurrentLogFileSize()

Returns the log file size of the given protocol in bytes.

Prototype

```
i64 getCurrentLogFileSize(1:i64 protocolHandle)
```

Parameters

`protocolHandle`	Handle of the protocol for which to get log file size.

Returns

Size of the current log file for the current client in bytes.

4.3.2.25 getThroughput ()

Returns details about the rate, number of bytes, and number of packets received and sent.

Prototype

```
Common.RxTxInfo getThroughput(1:i64 protocolHandle)
```

Parameters

`protocolHandle`	Protocol whose details are required.

Detailed description

For a protocol, the API would return the structure RxTxInfo filled out containing the details of number of packets received and sent, the number of bytes received and sent since connected, and the rate at which the packets were received in the last 0.5 sec interval.

Returns

RxTxInfo structure.

4.3.2.26 checkSpc()

Checks if the given SPC is correct or not on the device.

Prototype

```
SpcStatus checkSpc(
1:i64 deviceHandle,
2:i64 diagProtocolHandle,
3:string spc
)
```

Parameters

`deviceHandle`	Device whose details are required.
`diagProtocolHandle`	diagProtocol on which to check the SPC. Can pass in 0 if there is only a single diag handle present, and the lone diag protocol available will be selected as default.
`Spc`	SPC to test

Detailed description

Helps to check if the entered SPC on the device is correct or not.

Returns

SpcStatus struct with status set to true if the SPC is correct, else false.

4.3.2.27 getOperatingMode()

Gets the operating mode.

Prototype

```
OperatingModeInfo getOperatingMode(
1:i64 deviceHandle,
2:i64 diagProtocolHandle
)
```

Parameters

`deviceHandle`	Device whose details are required.
`diagProtocolHandle`	diagProtocol on which to check the SPC. Can pass in 0 if there is only a single diag handle present, and the lone diag protocol available will be selected as default.

Detailed description

Gets the operating mode.

Returns

OperatingModeInfo

4.3.2.28 setOperatingMode()

Changes the operating mode of the device diag handle to the ones defined in OperatingMode.

Prototype

```
Common.ErrorCode setOperatingMode(1:i64 deviceHandle,
2:i64 diagProtocolHandle, 3:OperatingMode mode)
```

Parameters

`deviceHandle`	Handle of the device
`diagProtocolHandle`	Diag protocol handle. If there is single diag protocol, can pass in 0 to select it as default.
`Mode`	The operating mode to set the device to. See OperatingMode: The last three values in OperatingMode (OFFLINE, RESET and Net_TEST_GW) are not valid for setOperatingMode.

Detailed description

Sets the operating mode. This is not supported on all devices; the device must have a diag protocol and must support command code 41. Some devices (for instance fusion) may not support this command, in which case an error will be returned.

Returns

None

4.3.2.29 setImei()

Sets the Imei on the device.

Prototype

```
Common.ErrorCode setImei(1:i64 deviceHandle, 2:i64 protocolHandle,
3:binary imei, 4:i32 subscriptionId)
```

Parameters

`deviceHandle`	Handle of the device
`diagProtocolHandle`	Diag protocol handle. If there is single diag protocol, can pass in 0 to select it as default.
`imei`	The 9 bytes Imei value to set
`subscriptionId`	SIM to write to. Default: `NO_SUBSCRIPTION_ID`.

Returns

None

4.3.2.30 getImei()

Gets Imei of the device.

Prototype

```
binary getImei(1:i64 deviceHandle, 2:i64 protocolHandle, 3:i32
subscriptionId)
```

Parameters

`deviceHandle`	Handle of the device
`diagProtocolHandle`	Diag protocol handle. If there is single diag protocol, can pass in 0 to select it as default.
`subscriptionId`	SIM to write to. Default: `NO_SUBSCRIPTION_ID`.

Returns

Binary (byte array) representing Imei value.

4.3.2.31 setMeid()

Sets the Meid on the device.

Prototype

```
Common.ErrorCode setMeid(1:i64 deviceHandle, 2:i64 protocolHandle,
3:i64 meid, 4:i32 subscriptionId)
```

Parameters

`deviceHandle`	Handle of the device
`diagProtocolHandle`	Diag protocol handle. If there is single diag protocol, can pass in 0 to select it as default.
`meid`	The meid value to set
`subscriptionId`	SIM to write to. Default: `NO_SUBSCRIPTION_ID`.

Returns

None.

4.3.2.32 getMeid()

Gets the Meid of the device.

Prototype

```
i64 getMeid(1:i64 deviceHandle, 2:i64 protocolHandle, 3:i32
subscriptionId)
```

Parameters

`deviceHandle`	Handle of the device.
`diagProtocolHandle`	Diag protocol handle. If there is single diag protocol, can pass in 0 to select it as default.
`subscriptionId`	SIM to write to. Default: `NO_SUBSCRIPTION_ID`.

Returns

Meid of device.

4.3.2.33 getActiveLogSession()

Gets the current active log session. Used for live processing.

Prototype

```
logSession getActiveLogSession()
```

Parameters

None

Returns

The logSession service handle associated with current active log session.

4.3.2.34 getProtocolLockStatus ()

Gets the lock status of a protocol.

Prototype

```
Common.LockStatus getProtocolLockStatus(1:i64 protocolHandle)
```

Parameters

`protocolHandle`	Protocol handle.

Detailed description

Gets the detailed lock information of a protocol including lock state, locking client and reason.

Returns

LockStatus

4.3.2.35 enableFunctionLog ()

Enable logging in certain functional areas.

Prototype

```
Common.ErrorCode enableFunctionLog(1:i64 deviceHandle,
2:list<Common.FunctionArea> areas, 3:Common.LogOptions options)
```

Parameters

`deviceHandle`	Handle of the device.
`areas`	List of functional areas to be logged.
`options`	Logging options. Logging level, logging format and logging layout are not applicable. Each functional area has its own preset to maintain consistent file format for parsing purpose. If not specified, ■ Default log file size is 100,00KB ■ Default save log path is “C:\ProgramData\Qualcomm\QUTS\Logs”.

Detailed description

Once enabled, logging will remain active until QUTS exits or disableFunctionLog is called on the same device.

Returns

None.

4.3.2.36 disableFunctionLog ()

Disable logging in certain functional areas.

Prototype

```
Common.ErrorCode disableFunctionLog(1:i64 deviceHandle,
2:list<Common.FunctionArea> areas)
```

Parameters

`deviceHandle`	Handle of the device.
`areas`	List of functional areas to be logged.

Returns

None.

4.3.2.37 enableProtocolLog ()

Enable logging for a protocol.

Prototype

```
Common.ErrorCode enableProtocolLog(1:i64 protocolHandle,
2:Common.LogOptions options)
```

Parameters

`deviceHandle`	Handle of the device.
`options`	Logging options. If not specified, ■ Default logging format is LOG_CSV ■ Default logging level mask is LOG_Data only ■ Default layout is LOG_DATETIME, LOG_MESSAGE, LOG_LEVEL, LOG_LOGGER, LOG_CALLERFILE, LOG_CALLERMETHOD, LOG_CALLERLINE and LOG_TID ■ Default log file size is 100,00KB ■ Default save log path is “C:\ProgramData\Qualcomm\QUTS\Logs”.

Detailed description

Once enabled, logging will remain active until QUTS exits or disableProtocolLog is called on the same protocol.

Returns

None.

4.3.2.38 disableProtocolLog ()

Disable logging for a protocol.

Prototype

```
Common.ErrorCode disableProtocolLog (1:i64 protocolHandle)
```

Parameters

`deviceHandle`	Handle of the device.

Returns

None.

4.4 ClientCallback interface

This interface provides functions that QUTS can call to notify the client of changes or query the client for input. To receive this information, the client must implement this interface and create a Thrift multiplexed server with a single service called QUTS callback on port client port + 1.

4.4.1 Types

4.4.1.1 MessageLevel

Provides the level of a message that returns through onMessage().

```
enum MessageLevel
{
   INFO         = 0,
   WARNING      = 1,
   EXCEPTION    = 2
}
```

4.4.1.2 YesNo

Provides the answers available for getYesOrNo().

```
enum YesNo
{
   NO = 0,
   YES = 1
}
```

4.4.1.3 OkCancel

Provides the answers available for getOkOrCancel().

```
enum OkCancel
{
   CANCEL = 0,
   OK = 1
}
```

4.4.1.4 ConnectionState

Enumerates the possible states of an opened connection. Used when signaling onProtocolStateChange().

```
enum ConnectionState
{
   STATE_AVAILABLE = 0,
   STATE_DISCONNECTED = 1,
   STATE_UNRESPONSIVE = 2,
}
```

4.4.1.5 RxTxInfo

Return type for the request to get the RxTxInfo.

```
struct RxTxInfo
{
   1: required  i64 rxCount;
   2: required  i64 txCount;
   3: required  i64 rate;
   4: required  i64 byteRxCount;
   5: required  i64 byteTxCount;
}
```

Fields

`rxCount`	The number of packets received.
`txCount`	The number of packets sent.
`rate`	The rate at which the packets were sent and received.

`byteRxCount`	The bytes of data received.
`byteTxCount`	The bytes of data sent.

4.4.2 Functions

4.4.2.1 onMessage()

Sends a message regarding the state of the QUTS server.

Prototype

```
oneway void onMessage(1:MessageLevel level,
                      2:string location,
                      3:string title,
                      4:string description)
```

Parameters

`Level`	MessageLevel of the information provided.
`Location`	Place from which the message originated.
`Title`	Type of information contained.
`Description`	Actual message being conveyed.

Returns

None.

4.4.2.2 onDeviceConnected()

Notifies the client that a device was connected.

Prototype

```
oneway void onDeviceConnected(1:i64 deviceHandle)
```

Parameters

`deviceHandle`	Device that was connected.

Returns

None.

4.4.2.3 onDeviceDisconnected()

Notifies the client that a device was disconnected.

Prototype

```
oneway void onDeviceDisconnected(1:i64 deviceHandle)
```

Parameters

`deviceHandle`	Device that was disconnected.

Returns

None.

4.4.2.4 onDeviceModeChange()

Notifies the client about a mode change for a device.

Prototype

```
oneway void onDeviceModeChange(1:i64 deviceHandle,
                                  2:DeviceMode newMode)
```

Parameters

`deviceHandle`	Device that changed mode.
`newMode`	New mode of the device.

Returns

None.

4.4.2.5 onProtocolAdded()

Notifies the client that a protocol was added to an existing device.

Prototype

```
oneway void onProtocolAdded(1:i64 deviceHandle,
                            2:i64 protocolHandle)
```

Parameters

`deviceHandle`	Device on which the protocol was added.
`protocolHandle`	Protocol that was added.

Returns

None.

4.4.2.6 onProtocolRemoved()

Notifies the client that a protocol was removed from an existing device.

Prototype

```
oneway void onProtocolRemoved(1:i64 deviceHandle,
                              2:i64 protocolHandle)
```

Parameters

`deviceHandle`	Device on which the protocol was removed.
`protocolHandle`	Protocol that was removed.

Returns

None.

4.4.2.7 onProtocolStateChange()

Notifies the client about a state change for an opened protocol.

Prototype

```
oneway void onProtocolStateChange(1:i64 protocolHandle,
                                  2:ProtocolState newState)
```

Parameters

`protocolHandle`	Protocol that changed state.
`newState`	New state of the protocol.

Returns

None.

4.4.2.8 onProtocolFlowControlStatusChange()

Notifies the client about a flow control status change for an opened protocol.

Prototype

```
oneway void onProtocolFlowControlStatusChange(1:i64 protocolHandle,
                        2:Common.Direction dir,
                        3:Common.FlowControlStatus newStatus)
```

Parameters

`protocolHandle`	Protocol that has a flow control status change.
`dir`	Flow control direction

`newStatus`	New flow control status of the protocol for the given direction.

Returns

None.

4.4.2.9 onProtocolLockStatusChange ()

Notifies the client about a lock status change for an opened protocol.

Prototype

```
oneway void onProtocolLockStatusChange(1:i64 protocolHandle,
                                    2:Common.LockStatus newStatus)
```

Parameters

`protocolHandle`	Protocol that has a lock status change.
`newStatus`	New lock status of the protocol.

Returns

None.

4.4.2.10 onAsyncResponse()

Notifies the client about a response being received for an asynchronous request.

Prototype

```
oneway void onAsyncResponse(1:i64 protocolHandle,
                            2:i64 transactionId)
```

Parameters

`protocolHandle`	Protocol that received the response.
`transactionId`	Transaction ID of the request.

Returns

None.

4.4.2.11 onDataQueueUpdated()

Signals when a data queue has new data to be retrieved. This function is used in conjunction with createDataQueue().

Prototype

```
oneway void onDataQueueUpdated(1:string queueName, 2:i32 queueSize)
```

Parameters

`queueName`	Name of the queue that has new items.
`queueSize`	The number of items currently in the queue.

Detailed description

This function is called once every 50 milliseconds at most, even if multiple items were added during that duration.

NOTE: The queueSize is valid at the time the calculation of data queue is initiated but not necessarily by the time the user receives the event. The callback only works as an indicator that the user should check for new data.

Returns

None.

4.4.2.12 onServiceAvailable()

Signals that a service has become available on a device.

Prototype

```
oneway void onServiceAvailable(1:string serviceName,
                               2:i64 deviceHandle)
```

Parameters

`serviceName`	Service that became available.
`deviceHandle`	Device on which the service is available.

Returns

None.

4.4.2.13 onServiceEnded()

Signals that a service is no longer available on a device.

Prototype

```
oneway void onServiceEnded(1:string serviceName,
                           2:i64 deviceHandle)
```

Parameters

`serviceName`	Service that ended.
`deviceHandle`	Device on which the service ended.

Returns

None.

4.4.2.14 onServiceEvent()

Callback for an event that occurred in one of the Thrift services. The actual payload of the parameters is defined per service.

Prototype

```
oneway void onServiceEvent(1:string serviceName,
                           2:i64 eventId,
                           3:string eventDescription)
```

Parameters

`serviceName`	Service in which the event occurred.
`eventId`	Service-defined ID of the event.
`eventDescription`	Optional description of the event.

4.4.2.15 onQShrinkStateUpdated()

Callback indicating that the state of loading a QShrink4 hash file has changed in QUTS for the given protocol.

Prototype

```
oneway void onQShrinkStateUpdated(1:i64 protocolHandle,
2:Common.QShrink4DownloadState newState)
```

Parameters

`protocolHandle`	Protocol instance that has an updated state regarding QShrink4 loading
`newState`	The current load state for QShrink4 on that protocol (See QShrink4DownloadState).

4.4.2.16 onDataViewUpdated()

Signals when a data view has new data to be retrieved. This function is used in conjunction with createDataView().

Prototype

```
oneway void onDataViewUpdated(1:string viewName, 2:i32 viewSize, 3:bool
finished),
```

Parameters

`viewName`	Name of the data view that has new items.

`viewSize`	The number of items currently in the data view.
`finished`	True when the data view is done loading file and all items are available.

Detailed description

This function is called once every 50 milliseconds at most, even if multiple items were added during that duration.

Returns

None.

4.4.2.17 onMissingQShrinkHashFile()

Signals when a QShrink4 file with particular GUID is not found or not loaded for decoding in the live session. Users can listen to this call back and then load a qshrink file, see loadQShrinkFile ().

Prototype

```
oneway void onMissingQShrinkHashFile(1:i64 protocolHandle, 2:string
missingFileGuid)
```

Parameters

`protocolHandle`	Diag protocol which was missing the QShrink hash file
`missingFileGuid`	Missing qshrink4 file with particular guid

Returns

None.

4.4.2.18 onLogSessionMissingQShrinkHashFile()

Signals when a QShrink4 file with particular GUID is not found or not loaded for decoding in a post processing log session. Users can listen to this call back and then load a QShrink file. Refer to loadQShrinkFile() on Log Session.

Prototype

```
oneway void onLogSessionMissingQShrinkHashFile(1:string
logSessionInstance, 2:i64 protocolHandle, 3:string missingFileGuid)
```

Parameters

`logSessionInstance`	Which log session is missing the QShrink file. This is the name generated when opening a log session in Device Manager openLogSession() 4.3.2.21
`protocolHandle`	Diag protocol which was missing the QShrink hash file
`missingFileGuid`	Missing qshrink4 file with particular guid

Returns

None.

4.5 LogSession interface

A LogSession is designed to allow postprocessing log files that were generated by a previous instance of QUTS. The LogSession recombines the logs to be processed in the correct order in which items were received, but all logs must have originated from the same run of QUTS. To create a LogSesion, see openLogSession().

4.5.1 Types

4.5.1.1 IndexType

Specifies whether an index or range of indexes should refer to the protocol, session, or data view index.

```
enum IndexType
{
   PROTOCOL_INDEX = 0,
   SESSION_INDEX = 1,
   DATA_VIEW_INDEX = 2
}
```

Index types

PROTOCOL_INDEX	Indexes for a specific instance of an index
SESSION_INDEX	Global index across all instances of all protocols that are connected
DATA_VIEW_INDEX	Index relative to the specified filtered subset of packets

4.5.1.2 PacketRange

Specifies a range of packets. Only the endIndex or count field is used at a time.

```
struct PacketRange
{
   1: optional IndexType indexType;
   2: optional i64 beginIndex;
   3: optional i64 endIndex;
   4: optional i64 count;
}
```

Fields

`indexType`	If different indexes could be used, this specifies which one to create a range on (see IndexType).
`beginIndex`	Specifies the first item in the range to return.
`endIndex`	Specifies the last item in the range.
`Count`	Gives the number of items to return.

4.5.1.3 DataPacketFilter

Aggregates all possible packet filter items.

```
struct DataPacketFilter
{
   1: list<i64> protocolHandleList;
   2: optional map<i64, PacketRange> protocolRange;
   3: optional Common.DiagPacketFilter diagFilter;
   4: optional Common.QmiPacketFilter qmiFilter;
   5: optional Common.AdbPacketFilter adbFilter;
   6: optional Common.SaharaPacketFilter saharaFilter;
   7: optional Common.FastbootPacketFilter fastbootFilter;
   8: optional Common.NmeaPacketFilter nmeaFilter;
   9: optional Common.AnnotationPacketFilter annotationsFilter;
   10: optional bool registerMaskToDevice
}
```

Fields

`protocolHandleList`	List of protocols to include in this filter.
`protocolRange`	The range of packets to retrieve for each protocol. If empty all packets will be retrieved.
`diagFilter`	Diag-specific filter (see DiagPacketFilter).
`qmiFilter`	QMI-specific filter (see QmiPacketFilter).
`adbFilter`	ADB-specific filter (see AdbPacketFilter).
`saharaFilter`	Sahara-specific filter (see SaharaPacketFilter).
`fastBootFilter`	Fastboot-specific filter (see FastbootPacketFilter).
`nmeaFilter`	NMEA-specific filter (see NmeaPacketFilter)
`annotationsFilter`	Annotation-specific filter (see AnnotationPacketFilter).
`registerMaskToDevice`	Specifies whether the masks in the filters need to be applied to device or not. Default is false.

4.5.1.4 DataPacket

Aggregates all possible data packets.

```
struct DataPacket
{
   1: i64 protocolHandle;
      2: optional Common.DiagPacket diagPacket;
      3: optional Common.QmiPacket qmiPacket;
      4: optional Common.AdbPacket adbPacket;
   5: optional Common.SaharaPacket saharaPacket;
   6: optional Common.FastbootPacket fastbootPacket;
   7: optional Common.AdplPacket adplPacket;
   8: optional Common.NmeaPacket nmeaPacket;
   9: optional Common.AnnotationPacket annotationPacket;
}
```

Fields

`protocolHandle`	Which protocol the packet came from
`diagPacket`	Populated if protocolHandle is a diag protocol. See DiagPacket.
`qmiPacket`	Populated if protocolHandle is a QMI protocol. See QmiPacket.
`adbPacket`	Populated if protocolHandle is a ADB protocol. See AdbPacket.
`saharaPacket`	Populated if protocolHandle is a Sahara protocol. See SaharaPacket.
`fastbootPacket`	Populated if protocolHandle is a FastBoot protocol. See FastbootPacket.
`adplPacket`	Populated if protocolHandle is a ADPL protocol. See AdplPacket.
`nmeaPacket`	Populated if protocolHandle is a Nmea protocol. See NmeaPacket.
`annotationPacket`	Populated if Annotation filters are enabled. See AnnotationPacket.

4.5.1.5 PacketReturnConfig

Aggregates all possible return config structures.

```
struct PacketReturnConfig
{
   1: optional Common.DiagReturnConfig diagConfig;
   2: optional Common.QmiReturnConfig qmiConfig;
   3: optional Common.AdbReturnConfig adbConfig;
   4: optional Common.SaharaReturnConfig saharaConfig;
}
```

Fields

`diagConfig`	Configuration for any Diag protocols. See DiagReturnConfig.
`qmiConfig`	Configuration for any QMI protocols. See QmiReturnConfig.
`adbConfig`	Configuration for any ADB protocols. See AdbReturnConfig.
`saharaConfig`	Configuration for any Sahara protocols. See SaharaReturnConfig.
`nmeaConfig`	Configuration for any Nmea protocols. See NmeaReturnConfig.

4.5.1.6 ViewConfigurationUpdate

Type of update operation on filters of existing log session.

```
enum ViewConfigurationUpdate
{
   ADD_NEW_CONFIG_ITEMS = 0,
   REPLACE_CURRENT_CONFIG_ITEMS = 1,
   REMOVE_SELECTED_CONFIG_ITEMS = 2
}
```

4.5.1.7 DataViewServiceEvent

Event type to notify data view updates..

```
enum DataViewServiceEvent
{
   INITIALIZE = 0,
   SAVE_ITEMS_BY_VIEW_INDEX = 1
}
```

4.5.1.8 DataViewInfo

Contains the information for creating a data type. Used in an array in createDataViewSet to create multiple views at a single time for better performance.

```
struct DataViewInfo
{
   1:string viewName;
   2:DataPacketFilter filter;
   3:PacketReturnConfig returnConfig;
}
```

Fields

`viewName`	The name of a view. Must be unique within this LogSession.
`filter`	Packet filter. See 4.5.1.3 .
`returnConfig`	Default return configuration for the view. See 4.5.1.5 .

4.5.2 Functions

4.5.2.1 getLastError()

Queries for the error from the last function call.

Prototype

```
Common.ErrorType getLastError()
```

Returns

Error code and description.

4.5.2.2 destroyLogSession()

Removes the current log session from QUTS.

Prototype

```
Common.ErrorCode destroyService()
```

Returns

None.

4.5.2.1 getDeviceList()

Gets the information for all devices that were connected in the log session.

Prototype

```
list<Common.DeviceInfo> getDeviceList()
```

Returns

List of devices (see DeviceInfo).

Upon a failure, the list is empty (for the error code, call getLastError()).

4.5.2.2 getProtocolList()

Gets a list of protocols that were logged on a specified device.

Prototype

```
list<Common.ProtocolInfo> getProtocolList(1:i64 deviceHandle)
```

Parameters

`deviceHandle`	Device to get protocols for.

Returns

List of available protocols (see ProtocolInfo).

Upon a failure, the list is empty (for the error code, call getLastError()).

4.5.2.3 getDataPacketCount()

Gets the number of packets logged by the specified protocol in the session.

Prototype

```
i64 getDataPacketCount(1:i64 protocolHandle)
```

Returns

The number of packets in the given protocol.

Upon failure, returns 0 (for the error code, call getLastError()).

4.5.2.4 createDataView()

Creates a view over a subset of packets based on the filter definition. For live log sessions, the registerMaskToDevice parameter in the DataPacketFilter can be used to specify if the filters should also be used to set mask on device. Default is False.

Prototype

```
Common.ErrorCode createDataView(1:string viewName,
    2:DataPacketFilter filter,
    3:PacketReturnConfig returnConfig)
```

Parameters

viewName	A unique view name within this log session
filter	What packets to include in this view
returnConfig	What information to return when returning data items in getDataViewItemsgetDataViewItemCount().

4.5.2.5 createDefaultDataView()

Creates a view over all packets from a given set of protocols. This processing can become very expensive; during high data rate this view could cause processing delays or increased memory consumption. It is recommended to avoid using this API and instead use createDataView() with a filtered subset specifying exactly what is desired.

Prototype

```
Common.ErrorCode createDefaultDataView(1:string viewName,
    2:list<i64> protocolHandleList,
    3:PacketReturnConfig returnConfig)
```

Parameters

viewName	A unique view name within this log session
protocolHandleList	What protocols to gather packets from
returnConfig	What information to return when returning data items in getDataViewItemCount().

4.5.2.6 removeDataView()

Removes a view created in createDataView().

Prototype

```
Common.ErrorCode removeDataView(1:string viewName)
```

Parameters

`viewName`	The view to remove from QUTS.

4.5.2.7 getDataViewItemCount()

Gets a number of items currently in the given view.

Prototype

```
i32 getDataViewItemCount(1:string viewName)
```

Parameters

`viewName`	The name of the view.

Returns

The number of items in the given view.

4.5.2.8 getDataViewItems()

Gets a range of items from the given view. The return information is specified in the queue creation to avoid redundant passing/parsing of the information during each call to getDataViewItems().

Prototype

```
list<DataPacket> getDataViewItems(1:string viewName, 2:PacketRange
packets)
```

Parameters

`viewName`	The name of the view to retrieve items from.
`packets`	The range of packets to retrieve from the view (see PacketRange).

Returns

A list of DataPackets from the view (see DataPacket).

Upon failure, returns an empty list (for the error code, call getLastError()).

4.5.2.9 getDataViewItemsForConfiguration()

This API is the same as getDataViewItems, except it allows overriding the return config for just this API call.

Prototype

```
list<DataPacket> getDataViewItems(1:string viewName, 2:PacketRange
packets, 3:PacketReturnConfig returnConfig)
```

Parameters

`viewName`	The name of the view to retrieve items from.
`packets`	The range of packets to retrieve from the view (see PacketRange).
`returnConfig`	What information to return when returning data items.

Returns

A list of DataPackets from the view (see DataPacket).

Upon failure, returns an empty list (for the error code, call getLastError()).

4.5.2.10 createDefaultDataView()

Creates a default view without any filtering of the packets.

Prototype

```
Common.ErrorCode createDefaultDataView(1:string viewName,
                 2: list<i64> protocolHandleList,
                 3:PacketReturnConfig returnConfig)
```

Parameters

`viewName`	A unique view name within this log session.
`protocolHandleList`	List of protocol handles to open in the log session.
`returnConfig`	What information to return when returning data items in getDataViewItemCount().

4.5.2.11 saveDataViewItemsByIndex()

Save data view items by indexes to a new HDFs at destination folder. API to copy the subset of items from data view to new HDFs.

Prototype

```
Common.ErrorCode saveDataViewItemsByIndex(1:string viewName,
                  2:string destinationFolder,
                  3:list<i64> dataViewIndexes)
```

Parameters

`viewName`	The view name.
`destinationFolder`	Target folder name to save the data view items. New HDF files will be created in this folder with selected items.
`dataViewIndexes`	List of data view item indexes to be copied to new folder in new HDF files.

4.5.2.12 saveDataViewItemsByIndexWithFilenames()

This API works similar to the saveDataViewItemsByIndex API. This API will only save files for the protocol handles specified in the map.

Prototype

```
Common.ErrorCode saveDataViewItemsByIndexWithFilenames(
          1:string viewName,
          2:list<i64> dataViewIndexes,
          3:map<i64,string> logNamesByHandle)
```

Parameters

`viewName`	The view name.
`dataViewIndexes`	List of data view item indexes to be copied to new folder in new HDF files.
`logNamesByHandle`	A map of log filenames by protocol handle.

4.5.2.13 saveLogFiles()

Saves the converted log files from this log session.

Prototype

```
list<string> saveLogFiles(1:string saveFolder)
```

Parameters

`saveFolder`	Location in which to save all log files.

Detailed description

This will save the entire session into HDF logs. This API is only meant for post-processing and will throw an exception if this is a live session. For live sessions, call DeviceManager.saveLogFiles().

Returns

A list of log files that were saved by this function.

4.5.2.14 getDurationByProtocol()

Prototype

```
string getDurationByProtocol(1:i64 protocolHandle)
```

Parameters

`protocolHandle`	Handle of the protocol for which to get log duration

Returns

The duration of the log session for a specific protocol

4.5.2.15 updatePacketFilters()

Update filters in current log session.

NOTE: The registerMaskToDevice field in the DataPacketFilter filter does not take effect in this case and is ignored. If registerMaskToDevice needs to be set, it needs to be specified in createDataView or CreateDataViewSet only and the value will remain in effect for the duration of the dataView.

Prototype

```
Common.ErrorCode updatePacketFilters(1:string viewName,
                        2:DataPacketFilter filter,
                        3:ViewConfigurationUpdate updateType)
```

Parameters

`viewName`	A unique view name within this log session.
`filter`	New DataPacketFilter configuration (see DataPacketFilter)
`updateType`	Type of update on the log session (see ViewConfigurationUpdate)

4.5.2.16 updatePacketReturnConfig()

Replace exiting packet return config with a new return configuration.

Prototype

```
Common.ErrorCode updatePacketReturnConfig(1:string viewName,
                      2:PacketReturnConfig returnConfig)
```

Parameters

`viewName`	A unique view name within this log session.
`returnConfig`	New return configuration (see PacketReturnConfig)

4.5.2.17 getAvailablePacketIds()

Get the packet IDs available/received on a protocol.

Prototype

```
DataPacketFilter getAvailablePacketIds(1:i64 protocolHandle)
```

Parameters

`protocolHandle`	Handle of the protocol for which to get log duration

Returns

The DataPacketFilter with packet information available on the protocol.

4.5.2.18 loadQShrinkFile ()

Loads a QShrink file from given path.

Prototype

```
void loadQShrinkFile(1:i64 protocolHandle, 2:string path)
```

Detailed description

The QShrink file specified in the path is loaded and the symbols from that Qshrink file are used.

Returns

None.

4.5.2.19 createDataViewSet()

Creates a set of data views to run in a batch to achieve better performance. This is the same as calling createDataView (4.5.2.4) multiple times but allows a single disk access pointer to reduce thrashing and improve performance.

Prototype

```
Common.ErrorCode createDataViewSet(1:list<DataViewInfo> dataViewDefinitions)
```

Parameters

`dataViewDefinitions`	Any array of data view definitions. See 4.5.1.8 .

Returns

None

4.5.2.20 setWcdmaProtocolRevision()

Set WCDMA protocol revision value from the values in the enum WcdmaProtocolRevision.

Prototype

```
Common.ErrorCode setWcdmaProtocolRevision(
                1:i64 protocolHandle,
                2:WcdmaProtocolRevision revision)
```

Detailed description

This function allows the user to set the WCDMA protocol revision that is used when parsing WCDMA OTA log items.

Returns

None.

4.5.2.21 setCdmaProtocolRevision()

Set CDMA protocol revision value from the values in the enum CdmaProtocolRevision.

Prototype

```
Common.ErrorCode setCdmaProtocolRevision(
                 1:i64 protocolHandle,
                 2:CdmaProtocolRevision revision)
```

Detailed description

This function allows the user to set the CDMA protocol revision that is used when parsing CDMA OTA log items.

Returns

None.

4.5.2.22 setPilotInc()

Sets the value of Pilot inc. The value is within the range (0:5).

Prototype

```
Common.ErrorCode setPilotInc(1:i64 protocolHandle, 2:i16 pilotInc)
```

Returns

None.

4.6 UtilityService interface

A UtilityService handle can be obtained by calling GetUtilityService() on a QutsClient object in Perl/Python/C# or Java. The following functions are then available on the UtilityService handle obtained.

4.6.1 Types

4.6.1.1 QmiUnpackReturn

Return type for QmiUnpack API containing the unpacked XML string containing the TLV and message name to which the TLV corresponds to.

```
struct QmiUnpackReturn
{
   1: optional string msgName;
   2: optional string tlvXml;
}
```

Fields

`msgName`	The request/response/indication message name corresponding to the input bytes.
`tlvXml`	The unpacked TLVs in form of XML string

4.6.2 Functions

4.6.2.1 qmiPack()

Packs/converts a QMI message from XML format to bytes.

Prototype

```
binary qmiPack(
         1:string serviceIdOrName,
         2:string messageIdOrName,
         3:string xmlRequest)
```

Parameters

`serviceIdOrName`	QMI service name or ID (for example “NAS” or “3)
`messageIdOrName`	QMI message name or ID (for example, QMI_NAS_GET_SIGNAL_STRENGTH_REQ”)
`xmlRequest`	QMI message with inputs in XML format. For example: `'<opt> <request_mask><request_mask>1</request_mask></request_mask> </opt>'`

Returns

Binary output representing packed bytes for the given QMI message.

4.6.2.2 qmiUnPack()

Unpacks/converts a QMI message from bytes to XML format.

Prototype

```
Common.QmiUnpackReturn qmiUnPack(
         1:string serviceIdOrName,
         2:binary input
)
```

Parameters

`serviceIdOrName`	QMI service name or ID (for example, “NAS” or “3”)
`input`	Binary input representing packed bytes for a QMI message within the serviceId.

Returns

String representing QMI message in XML format.

4.6.2.1 nvGetAllItems ()

Returns all NVs with ID, Name, Description and Category.

Prototype

```
list<Common.NvItem> nvGetAllItems()
```

Parameters

None

Returns

List of NvItems.

4.6.2.2 nvGetItemDefintion ()

Returns the definition of the NV item from the ID or name.

Prototype

```
string nvGetItemDefintion(1:string nvItemNameOrId)
```

Parameters

`nvItemNameOrId`	NV item name or ID. Either the NV ID or legacy name.

Returns

JSON containing the definition of the NvItem.

4.6.2.3 convertToHdf ()

Converts a list of qmdl2/bin files from the same log session and converts to one or more HDF log files.

Prototype

```
List<string> convertToHdf(1:list<string> logFiles, 2:string saveFolder)
```

Parameters

`logFiles`	List of files to convert to HDF.
`saveFolder`	Folder to save the converted log file(s).

Returns

The list of converted HDF log files.

5 QUTS services interfaces

All device functions are made available on the DeviceManager interface. If functions return a failure indicator, call getLastError() to determine what caused the failure.

5.1 Device config service

The device config service provides functions for interacting with NV items, encrypted file system (EFS), and MCFG binaries (MBN) settings of the device. The service also provides support for backing up and restoring these items. This service attempts to lock the diag protocol so that it cannot be shared by other clients. If another client is already using the diag protocol with sharing enabled, then it shares with the existing client. This may cause inconsistent states and behaviors on the device. A warning is sent if this is the case. The QMI protocol is shared.

5.1.1 Constants

5.1.1.1 PDC_CONFIGURATION_VALUE_INVALID

Returned as an error indication from pdcGetConfiguration().

```
const i32 PDC_CONFIGURATION_VALUE_INVALID = 0xFFFFFFFF
```

5.1.1.2 NO_SUBSCRIPTION_ID

Used in NV functions to indicate use of the default SIM card for operations.

```
const i32 NO_SUBSCRIPTION_ID = 0xFFFFFFFF
```

5.1.2 Types

5.1.2.1 PdcMbnType

Used in PDC functions to specify the type of configuration memory store on which to operate.

```
enum PdcMbnType
{
   PDC_CONFIG_TYPE_MODEM_PLATFORM = 0,
   PDC_CONFIG_TYPE_MODEM_SW = 1
}
```

5.1.2.2 PdcConfigurationType

Specifies the configuration item to operate on in pdcGetConfiguration() and pdcSetConfiguration().

```
enum PdcConfigurationType
{
   SELECTION_MODE = 0,
   CARRIER        = 1,
   FLEX_MAPPING   = 2,
   REFRESH_MODE   = 3,
   MULTISIM       = 4,
   OS             = 5,
   MARKET         = 6,
   DEPLOYMENT     = 7,
   IMS_FEATURE    = 8,
   VARIANT        = 9,
   COUNTRY        = 10
}
```

5.1.2.3 PdcMbnInfo

Returns information about a specified MBN.

```
struct PdcMbnInfo {
   1: Common.ErrorCode errorCode;
   2: optional i32 type;
   3: optional i32 size;
   4: optional i32 version;
   5: optional i32 baseVersion;
   6: optional i32 storageType;
   7: optional binary configId;
   8: optional string description;
   9: optional string path;
}
```

5.1.2.4 PdcMbnResult

Returns validation information from pdcValidateMbn().

```
struct PdcMbnResult {
   1: Common.ErrorCode errorCode;
   2: optional i32 version,
   3: optional string frame
}
```

5.1.2.5 NvReturnFlags

Flags for requesting the types of data to return when calling functions that return an NvData value.

```
enum NvReturnFlags
{
   BINARY_PAYLOAD = 0x00000001,
   PARSED_TEXT = 0x00000002,
   PARSED_JSON = 0x00000003,
   VALUE_LIST = 0x00000004
}
```

5.1.2.6 NvReturns

Specifies what information to return for NV read calls.

```
struct NvReturns
{
   1: NvReturnFlags flags;
   2: optional list<string> fieldQueries;
}
```

Fields

`flags`	What fields to return in resulting NvData.
`queries`	Specifies queries to make for field values in the log packet. For information on queries, see Field queries.

5.1.2.7 NvData

Return types for functions that request an NvData value.

This structure contains optional fields that can be filled using the NvReturnFlags type. All fields other than `errorCode` are available only if ErrorCode is `DEVICE_NO_ERROR (0)`. Other fields are optionally available depending on the values specified in NvReturnFlags.

```
struct NvData
{
   1: Common.ErrorCode errorCode;
   2: optional binary payload;
   3: optional string parsedText;
   4: optional string parsedJson;
   5: optional string valueList;
   6: optional string queryResultJson;
}
```

Fields

`errorCode`	Code if an error occurred. All other fields available only when `DEVICE_NO_ERROR (0)` is set in ErrorCode.
`payload`	Raw binary payload of the response starting at the command code. Available when `BINARY_PAYLOAD` is set in NvReturnFlags.sendRawRequest()
`parsedText`	Parsed text of the payload. Available when `PARSED_TEXT` is set in NvReturnFlags..
`parsedJson`	Payload parsed into JSON format Available when `PARSED_JSON` is set in NvReturnFlags.
`valueList`	Payload parsed into comma separated list format. Available when `VALUE_LIST` is set in NvReturnFlags.
`queryResultJson`	Returns the results of any queries specified in NvReturnFlags in a single JSON formatted string.

5.1.2.8 FileSystem

For all EFS functions, the FileSystem dictates whether the command should be executed on the primary file system or the alternate file system.

```
enum FileSystem
{
   FS_PRIMARY = 0,
   FS_ALTERNATE = 1
}
```

5.1.2.9 EfsType

Specifies the type of EFS entry being referred to in EfsItem.

```
enum EfsType
{
   DIRECTORY = 0,
   FILE = 1
}
```

5.1.2.10 EfsItem

Contains directory entry information for items returned in efsGetDirectoryContents().

```
struct EfsItem
{
   1: EfsType type;
   2: string name;
}
```

5.1.2.11 EfsFileAttributes

Return type for efsGetFileAttributes()

This structure contains optional fields that correspond to file attributes.

```
struct EfsFileAttributes
{
          1: string modifiedTime;
2: string createdTime;
         3: string attributes;
4: i32     mode;
5: i32    nLinks;
6: i64    fileSize;
}
```

The attributes sub field in the EfsFileAttributes structure has a three letter string format that carries information about file attributes, buffering options, and cleanup options as follows:

- File attributes – First letter in the attributes string. It provides information about the attributes of the file. Possible values are:
  - U – Unrestricted
  - P – Permanent; cannot be removed or truncated
  - R – Read only
  - S – System permanent; file will remain after a system reformat
  - * – Remote file; resides outside file system address space
  - _ – Unknown, could not determine/received invalid response from device
- Buffering option – Second letter in the attributes string. It indicates whether to allow file buffering for the file. Possible values are:
  - P – Prohibit file buffering. Physical writes must be completed on the device before write operations are acknowledged
  - A – Allow file buffering. The EFS may use RAM to buffer written data to an open file. This increases the slight possibility of data loss in the event of an abnormal power down of the DMSS
  - _ – Unknown. Could not determine/received invalid response from device
- Cleanup option – Third letter in the attributes string. Cleanup option in case of failure. Valid values are:
  - C – Close file as-is
  - D – Delete file and remove from directory
  - T – Truncate file from specified position
  - R – Revert to last check-pointed version
  - _ – Unknown. Could not determine/received invalid response from device.

5.1.2.12 DeviceConfigConnectionOptions

Supports special options for connections. This can be used if Diag is needed to be started with some special connection options.

NOTE: DiagconnectionOptions has few different options that can be used when DiagService is created, however for DeviceConfigService, only the enableHdlcOnly option is supported among the options available in DiagConnectionOptions. Even if other options are passed in from DeviceConfigService, they will be ignored. If HDLC only mode is needed, enableHdlcOnly needs to be set by the first client creating diag service on QUTS for that QUTS instance. If not set to firsttime, then QUTS will switch to nonHdlc by default and it will remain in effect until the last diag client is disconnected. This enableHdlcOnly feature is available in both deviceconfigService and diagService initializeServicewithOptions, so whichever service is first created, it needs to set this to true if HDLC only mode is desired.

```
struct DeviceConfigConnectionOptions
{
    1: optional DiagService.DiagConnectionOptions diagConnectionOptions;
    2: optional Common.QmiConnectionOptions qmiConnectionOptions;
}
```

5.1.3 Functions

5.1.3.1 getLastError()

Queries for the error from the last function call.

Prototype

```
Common.ErrorType getLastError()
```

Returns

Error code and description.

5.1.3.2 getDevice()

Gets the device handle on which this service was created.

Prototype

```
i64 getDevice()
```

Returns

Device handle.

5.1.3.3 initializeService()

Opens DIAG and QMI connections and starts a service.

If there is more than one diag protocol, this function will fail. For such devices, use initializeServiceByProtocol() instead. If more than one QMI protocol is available on the device, QUTS tries to find a default QMI protocol handle by finding the one which does not have “MUX” in the description name. For example, for a given device which enumerates QMI as described below, QUTS would select “Qualcomm HS-USB WWAN Adapter 9035” for getting the QMI handle.

```
Qualcomm HS-USB WWAN Adapter 9035
Qualcomm HS-USB WWAN Adapter 9035-81(MUX2)
Qualcomm HS-USB WWAN Adapter 9035-82(MUX3)
Qualcomm HS-USB WWAN Adapter 9035-83(MUX4)
Qualcomm HS-USB WWAN Adapter 9035-84(MUX5)
Qualcomm HS-USB WWAN Adapter 9035-85(MUX6)
Qualcomm HS-USB WWAN Adapter 9035-86(MUX7)
Qualcomm HS-USB WWAN Adapter 9035-80(MUX1)
```

Conversely, if more than one QMI protocol is present that has “MUX” in the description, QUTS would select any one of them for acquiring the QMI protocol handle.

Prototype

```
Common.ErrorCode initializeService()
```

Returns

None.

5.1.3.4 initializeServiceByProtocol()

Opens diag and QMI connections and starts a service. In the case that a device has multiple diag or QMI connections (such as fusion devices), this API must be used instead of initializeService.

Call getProtocolList() on the device that is to be connected, determine the appropriate instances of diag and QMI, and pass those handles in as parameters to this function. The second argument for QMI is optional. If no argument is passed in for the second QMI argument, QUTS selects a default QMI protocol. The logic for selecting the default QMI protocol is to find one without “MUX” in the description name. If more than one such QMI protocol is present, QUTS will select any one. If only “MUX” named protocols are present, QUTS will select any one. To use specific QMI protocol, pass in the protocol as second argument.

Prototype

```
Common.ErrorCode initializeServiceByProtocol(1:i64 diagProtocolHandle,
                                             2:i64 qmiProtocolHandle)
```

Parameters

`diagProtocolHandle`	Specific diag protocol to use for the service.
`qmiProtocolHandle`	Specific QMI protocol to use for the service.

Returns

None.

5.1.3.5 destroyService()

Ends this instance of a service.

Prototype

```
Common.ErrorCode destroyService()
```

5.1.3.6 backupToXqcn()

Collects and saves configured NV items and EFS files into a XQCN file.

Prototype

```
string backupToXqcn(1:string serviceProgrammingCode,
                    2:bool resetUponCompletion,
                    3:i32 resetTimeout,
                    4:string filter)
```

Parameters

`serviceProgrammingCode`	Six digit SPC for security access to the device.
`resetUponCompletion`	Whether to reset the device to normal operating mode after restoring.
`resetTimeout`	Time in milliseconds to wait for the device to reset if resetUponCompletion is true
`filter`	Optional filter for which items to restore. This parameter is empty if it is not needed.

Returns

Contents of the XQCN file.

5.1.3.7 restoreFromXqcn()

Sets all NV items and EFS files on a device based on data from a specified XQCN file.

Prototype

```
Common.ErrorCode restoreFromXqcn(1:string xqcnFileContents,
                                 2:string serviceProgrammingCode,
                                 3:bool allowEsnMismatch,
                                 4:bool resetUponCompletion,
                                 5:i32 resetTimeout,
                                 6:string filterFileContents)
```

Parameters

`xqcnFileContents`	Full contents of the XQCN file to use for restore.
`serviceProgrammingCode`	Six digit SPC for security access to the device.
`allowEsnMismatch`	Indicates that the operation can proceed if the device ESN does not match the ESN of the XQCN file.
`resetUponCompletion`	Whether to reset the device to normal operating mode after restoring.
`resetTimeout`	Time (in milliseconds) to wait for the device to reset if resetUponCompletion is true
`filterFileContents`	Optional filter for which items to restore. This parameter is empty if it is not needed.

Returns

None.

5.1.3.8 pdcGetMbnMaxStorage()

Checks the MBN storage capacity for a specified MBN type.

Prototype

```
i64 pdcGetMbnMaxStorage(1:PdcMbnType mbnType)
```

Parameters

`mbnType`	Type of configuration memory store on which to operate (PdcMbnType).

Returns

Storage capacity in number of bytes.

5.1.3.9 pdcGetMbnStorageUsage()

Checks the MBN storage used for a specified MBN type.

Prototype

```
i64 pdcGetMbnStorageUsage(1:PdcMbnType mbnType)
```

Parameters

`mbnType`	Type of configuration memory store on which to operate (PdcMbnType).

Returns

Storage used in number of bytes.

5.1.3.10 pdcGetMbnCount()

Checks the MBN count for a specified MBN type.

Prototype

```
i64 pdcGetMbnCount(1:PdcMbnType mbnType)
```

Parameters

`mbnType`	Type of configuration memory store on which to operate (PdcMbnType).

Returns

Number of MBNs.

5.1.3.11 pdcGetMbnList()

Retrieves information of all MBNs for a specified MBN type.

Prototype

```
list<PdcMbnInfo> pdcGetMbnList(1:PdcMbnType mbnType)
```

Parameters

`mbnType`	Type of configuration memory store to operate on (PdcMbnType).

Returns

List of MBN properties.

5.1.3.12 pdcGetDefaultMbnInfo()

Retrieves embedded MBN information for a specified MBN type.

Prototype

```
PdcMbnInfo pdcGetDefaultMbnInfo(1:PdcMbnType mbnType)
```

Parameters

`mbnType`	Type of configuration memory store to operate on (PdcMbnType).

Returns

Properties of the embedded MBN.

5.1.3.13 pdcGetMbnId()

Calculate MBN ID from a MBN configuration.

Prototype

```
binary pdcReadMbn(1:binary mbnContent)
```

Parameters

`mbnContent`	MBN payload buffer.

Returns

20-byte MBN ID.

5.1.3.14 pdcWriteMbn()

Loads an MBN to a device.

Prototype

```
Common.ErrorCode pdcWriteMbn(1:PdcMbnType mbnType,
                             2:binary mbnContent)
```

Parameters

`mbnType`	Type of configuration memory store to operate on (PdcMbnType).
`mbnContent`	MBN payload buffer.

Returns

None.

5.1.3.15 pdcReadMbn()

Reads the MBN payload.

Prototype

```
binary pdcReadMbn(1:PdcMbnType mbnType,
                  2:binary mbnId,
                  3:i32 subId)
```

Parameters

`mbnType`	Type of configuration memory store to operate on (PdcMbnType).
`mbnId`	20-byte MBN ID.
`subId`	Subscription ID to read the MBN from.

Returns

Contents of an MBN stored in the device.

5.1.3.16 pdcRemoveMbn()

Deletes an MBN from a device.

Prototype

```
Common.ErrorCode pdcRemoveMbn(1:PdcMbnType mbnType,
                              2:binary mbnId)
```

Parameters

mbnType	Type of configuration memory store to operate on (PdcMbnType).
mbnId	20-byte MBN ID.

5.1.3.17 pdcGetActiveMbn()

Checks the current MBN in use.

Prototype

```
binary pdcGetActiveMbn(1:PdcMbnType mbnType,
                       2:i32 subId,
                       3:i32 slotId)
```

Parameters

mbnType	Type of configuration memory store to operate on (PdcMbnType).
subId	Subscription ID to check active MBN.
slotId	Slot ID to check the active MBN.

Returns

20-byte MBN ID.

5.1.3.18 pdcGetPendingMbn()

Checks the specified MBN to be used next.

Prototype

```
binary pdcGetPendingMbn(1:PdcMbnType mbnType,
                        2:i32 subId,
                        3:i32 slotId)
```

Parameters

`mbnType`	Type of configuration memory store to operate on (PdcMbnType).
`subId`	Subscription ID to check pending MBN.
`slotId`	Slot ID to check pending MBN.

Returns

20-byte MBN ID.

5.1.3.19 pdcValidateMbn()

Validates an MBN for a specified subscription.

Prototype

```
PdcMbnResult pdcValidateMbn(1:PdcMbnType mbnType,
                            2:binary mbnId,
                            3:i32 subId,
                            4:string remotePath)
```

Parameters

`mbnType`	Type of configuration memory store to operate on (PdcMbnType).
`mbnId`	20-byte MBN ID.
`subId`	Subscription ID to validate the MBN.
`remotePath`	File path in the remote file system.

Returns

Content of the MBN validation result.

5.1.3.20 pdcSelectMbn()

Selects the next MBN to be used.

Prototype

```
Common.ErrorCode pdcSelectMbn(1:PdcMbnType mbnType,
                              2:binary mbnId,
                              3:i32 subId,
                              4:i32 slotId)
```

Parameters

`mbnType`	Type of configuration memory store to operate on (PdcMbnType).
`mbnId`	20-byte MBN ID.
`subId`	Subscription ID to select the MBN.

`slotId`	Slot ID to select the MBN.

Returns

None.

5.1.3.21 pdcActivateMbn()

Activates an MBN that was selected for a specified subscription.

Prototype

```
Common.ErrorCode pdcActivateMbn(1:PdcMbnType mbnType,
                                2:i32 subId,
                                3:i32 slotId,
                                4:i32 mode,
                                5:i32 timeout)
```

Parameters

`mbnType`	Type of configuration memory store to operate on (PdcMbnType).
`subId`	Subscription ID to activate the MBN.
`slotId`	Slot ID to activate the MBN.
`mode`	Activation type, ▪ 0 – Regular activation for selected configuration(s) ▪ 1 – Refresh only without selecting any configuration
`timeout`	Maximum wait time in milliseconds until device is re-enumerated.

Returns

None.

5.1.3.22 pdcDeactivateMbn()

Deactivates an active MBN being used for a specified subscription.

Prototype

```
Common.ErrorCode pdcDeactivateMbn(1:PdcMbnType mbnType,
                                  2:i32 subId)
```

Parameters

`mbnType`	Type of configuration memory store to operate on (PdcMbnType).
`subId`	Subscription ID to deactivate the MBN.

Returns

None.

5.1.3.23 pdcGetConfiguration()

Gets the value of a configuration feature stored on device for the specified slot ID.

Prototype

```
i32 pdcGetConfiguration(1:i32 slotId,
                        2:PdcConfigurationType feature)
```

Parameters

slotId	Slot ID from which to query configuration features.
feature	Type of configuration.

Returns

Value of the configuration.

5.1.3.24 pdcSetConfiguration()

Sets the value of a configuration feature stored on device for specified slot ID.

Prototype

```
Common.ErrorCode pdcSetConfiguration(1:i32 slotId,
                                     2:PdcConfigurationType feature,
                                     3:i32 value)
```

Parameters

slotId	Slot ID to set the configuration features.
feature	Type of configuration.
value	Value of the configuration feature.

Returns

None.

5.1.3.25 nvIsItemSupported()

Checks whether a specified NV item is configured to be available on a device.

Prototype

```
bool nvIsItemSupported(1:string nvItemName,
                       2:i32 subscriptionId)
```

Parameters

nvItemName	EFS NV item name to check.

`subscriptionId`	SIM to check. Default: `NO_SUBSCRIPTION_ID`.

Returns

TRUE when the NV item is configured on the device.

5.1.3.26 nvReadItem()

Reads an NV item from a device.

Prototype

```
NvData nvReadItem(1:string nvItemNameOrId,
                  2:i32 subscriptionId,
                  3:i8 index,
                  4:NvReturns returnConfig)
```

Parameters

`nvItemNameOrId`	NV item name or ID. Either the NV ID or legacy name or the EFS path.
`subscriptionId`	SIM to read from. Default – `NO_SUBSCRIPTION_ID`.
`index`	Optional index for legacy NV Items. Generally this is not used, pass 0 by default.
`returnConfig`	Specifies what data to return based on NvReturnFlags.

Returns

NV item (defined in NvData).

5.1.3.27 nvSetItem()

Sets an NV item on a device.

Prototype

```
Common.ErrorCode nvSetItem(1:string nvItemNameOrId,
                           2:string valueList,
                           3:i32 subscriptionId)
```

Parameters

`nvItemNameOrId`	NV item name or ID. Either the NV ID or legacy name or the EFS path.
`valueList`	Comma-separated values of each NV field (for example, “`1,3,5,2,0`”) or a JSON.
`subscriptionId`	SIM to write to. Default – `NO_SUBSCRIPTION_ID`.

Returns

None.

5.1.3.28 nvGetAllItems ()

Returns all NVs with ID, name, description, and category.

Prototype

```
list<Common.NvItem> nvGetAllItems()
```

Parameters

None

Returns

List of NvItems.

5.1.3.29 nvGetItemDefintion ()

Returns the definition of the NV item from ID or name.

Prototype

```
string nvGetItemDefintion(1:string nvItemNameOrId)
```

Parameters

`nvItemNameOrId`	NV item name or ID: either the NV ID or legacy name.

Returns

JSON containing the definition of the NvItem.

5.1.3.30 efsHasAlternateFileSystem()

Checks if a device supports the alternate file system.

Prototype

```
bool efsHasAlternateFileSystem()
```

Returns

TRUE when the alternate file system is available on the connected device.

5.1.3.31 efsCreateDirectory()

Creates a new directory on in the EFS of a device.

Prototype

```
Common.ErrorCode efsCreateDirectory(1:string pathName,
                                    2:FileSystem efsSystem)
```

Parameters

`pathName`	Name of the directory to create.
`efsSystem`	Primary or alternate FileSystem.

Returns

None.

5.1.3.32 efsRemoveDirectory()

Removes a directory from the EFS of a device.

NOTE: The directory must be empty to be removed. To remove a non-empty directory, use efsRemoveTree().

Prototype

```
Common.ErrorCode efsRemoveDirectory(1:string pathName,
                                    2:FileSystem efsSystem)
```

Parameters

`pathName`	Name of the directory to remove.
`efsSystem`	Primary or alternate FileSystem.

Returns

None.

5.1.3.33 efsRemoveTree()

Removes a directory and any subdirectories and files contained within it.

Prototype

```
Common.ErrorCode efsRemoveTree(1:string pathName,
                               2:FileSystem efsSytem)
```

Parameters

`pathName`	Name of the directory to remove.
`efsSystem`	Primary or alternate FileSystem.

Returns

None.

5.1.3.34 efsGetDirectoryContents()

Returns a list of items that exist in a specified directory.

Prototype

```
list<EfsItem> efsGetDirectoryContents(1:string pathName,
                                      2:FileSystem efsSystem)
```

Parameters

`pathName`	Name of the directory to query.
`efsSystem`	Primary or alternate FileSystem.

Returns

List of items in the directory. See EfsItem type.

5.1.3.35 efsPutFile()

Copies a file into the EFS.

Prototype

```
Common.ErrorCode efsPutFile(1:string pathName,
                            2:binary buffer,
                            3:FileSystem efsSystem)
```

Parameters

`pathName`	Name of the file to write.
`buffer`	File contents to write.
`efsSystem`	Primary or alternate FileSystem.

Returns

None.

5.1.3.36 efsGetFile()

Copies a file from the EFS.

Prototype

```
binary efsGetFile(1:string pathName,
                  2:FileSystem efsSystem)
```

Parameters

`pathName`	Name of the file to read.
`efsSystem`	Primary or alternate FileSystem.

Returns

File contents of pathName.

5.1.3.37 efsDeleteFile()

Deletes a file from the EFS.

Prototype

```
Common.ErrorCode efsDeleteFile(1:string pathName,
                               2:FileSystem efsSystem)
```

Parameters

`pathName`	Name of the file to delete.
`efsSystem`	Primary or alternate FileSystem.

Returns

None.

5.1.3.38 efsRename()

Renames a file or directory in the EFS.

Prototype

```
Common.ErrorCode efsRename(1:string existingName,
                           2:string newName,
                           3:FileSystem efsSystem)
```

Parameters

`existingName`	Name of the existing file or directory to rename.
`newName`	New name to assign to the file or directory.
`efsSystem`	Primary or alternate FileSystem.

Returns

None.

5.1.3.39 efsPathExists()

Checks whether a specified path is a valid location in the EFS.

Prototype

```
bool efsPathExists(1:string pathName,
                   2:FileSystem efsSystem)
```

Parameters

`pathName`	Path to query.
`efsSystem`	Primary or alternate FileSystem.

Returns

TRUE when the path exists on the EFS.

5.1.3.40 efsIsDirectory()

Checks whether a specified path is a valid directory in the EFS.

Prototype

```
bool efsIsDirectory(1:string pathName,
                    2:FileSystem efsSystem)
```

Parameters

`pathName`	Name of the directory to query.
`efsSystem`	Primary or alternate FileSystem.

Returns

TRUE when the path refers to an existing directory in the EFS.

5.1.3.41 efsIsFile()

Checks whether a specified path is a valid file in the EFS.

Prototype

```
bool efsIsFile(1:string pathName,
               2:FileSystem efsSystem)
```

Parameters

`pathName`	Name of the file to query.
`efsSystem`	Primary or alternate FileSystem.

Returns

TRUE when the path refers to an existing file on the EFS.

5.1.3.42 efsIsReady()

Returns TRUE if EFS is ready.

Prototype

```
bool efsIsReady()
```

Returns

TRUE when EFS is ready otherwise returns FALSE.

5.1.3.43 efsGetFileSize()

Gets the size in bytes for a specified file.

Prototype

```
i32 efsGetFileSize(1:string pathName,
                   2:FileSystem efsSystem)
```

Parameters

`pathName`	Name of the file to query.
`efsSystem`	Primary or alternate FileSystem.

Returns

Size in bytes of the file if it exists. Otherwise, 0.

5.1.3.44 efsGetFileCheckSum()

Gets the MD5 checksum of a specified file from DIAG.

Prototype

```
binary efsGetFileCheckSum(1:string pathName,
                          2:FileSystem efsSystem)
```

Parameters

`pathName`	Name of the file to query.
`efsSystem`	Primary or alternate FileSystem.

Returns

16-byte MD5 checksum value.

5.1.3.45 efsGetFileAttributes()

Gets the file attributes.

Prototype

```
EfsFileAttributes efsGetFileAttributes(1:string pathName,
                   2:FileSystem efsSystem)
Parameters
```

`pathName`	Name of the file to query.
`efsSystem`	Primary or alternate FileSystem.

Returns

EFS file attributes (defined in EfsFileAttributes).

5.1.3.46 efsGetAvailableSpace()

Gets the EFS available space.

Prototype

```
I64 efsGetAvailableSpace(1:FileSystem efsSystem)
```

Parameters

`efsSystem`	Primary or alternate FileSystem. Optional, default value is FS_PRIMARY.

Returns

Available space in bytes.

5.1.3.47 forceEfsSync ()

Synchronize any pending EFS updates with storage media immediately.

Currently, sync is time consuming because it is done for whole file system ("/") on the device irrespective of the pathName string passed to it. However, pathName is still added to API to be in line with the legacy device diagnostics interface. If file or directory based partial sync is added to EFS functionality on the device in future, this interface does not need to change.

NOTE: There is an implicit (timer-based) sync which happens on the device upon update of any EFS item. EFS sync also happens upon graceful shutdown of the device. Back to back force sync operations can cause long delays in processing subsequent diagnostic commands and increased power consumption on the device among other side effects.

Prototype

```
Common.ErrorCode forceEfsSync(1:string pathName,
                               2:FileSystem efsSystem)
```

Parameters

`pathName`	File or directory to sync. Refer to the API description for more details.
`efsSystem`	Primary or alternate FileSystem.

Returns

None.

5.1.3.48 initializeServiceWithOptions()

Opens connections and starts a service. This is similar to initializeServiceByProtocol but this needs to be used if diag is to be started with some special options. Currently, only a single option is supported (enableHdlcOnly), which keeps the device in HDLC only mode.

Prototype

```
Common.ErrorCode initializeServiceWithOptions(
1:DeviceConfigConnectionOptions connectionOptions)
```

Parameters

`connectionOptions`	Additional connection options, see DeviceConfigConnectionOptions.

Returns

None.

5.2 Diag service

The diag service provides basic diag I/O, including sending and receiving commands, setting the logging mask, and monitoring data using data queues. This service shares the diag protocol.

NOTE: Diag Service cannot be used to open DPL / ADPL port or logging. Use Raw Service for DPL / ADPL logging. Diag Service should be used only to set log mask and enable 0x11EB log packet.

5.2.1 Types

5.2.1.1 LogMaskFormat

Used to specify the format of a logging mask file in setLoggingMask(). The last three formats are same as the corresponding first three formats but they are used to tell QUTS to enable multisim for the corresponding (CFG/CFG2/DMC) format.

```
enum LogMaskFormat
{
   CFG_FORMAT = 0,
   CFG2_FORMAT,
   DMC_FORMAT,
   CFG_FORMAT_ENABLE_MULTISIM,
   CFG2_FORMAT_ENABLE_MULTISIM,
   DMC_FORMAT_ENABLE_MULTISIM
}
```

5.2.1.2 DiagConnectionOptions

Used to specify the connection options for diag service.

```
struct DiagConnectionOptions
{
   1: optional i64 protocolHandle;
   2: optional bool openQdssPort;
   3: optional bool enableDefaultQdssConfiguration;
   4: optional bool enableHdlcOnly
}
```

`protocolHandle`	Optional diag protocol handle. Protocol handle must be set if the device has more than one diag protocol. Use DiagConnectionOptions.setprotocolHandle()
`openQdssPort`	Optional parameter. Default set to true. Set this to false to manually connect to QDSS port. If set to true, QUTS automatically connects to QDSS port when diag service is created. By default, this is set to true.
`enableDefaultQdssConfiguration`	Optional parameter. Default set to true. Set this to false to manually configure QDSS. If set to true, QUTS automatically configure QDSS port when Diag Service is created. By default this is set to true. QUTS attempts to configure in the following priority order: 1. Diag over ATB 2. Diag over STM 3. Legacy diag
`enableHdlcOnly`	Optional parameter. Default set to false i.e., QUTS will always try to switch the device to non-HDLC mode. If this is set to true, QUTS will not switch the device to non-HDLC mode and device will remain in HDLC mode. Once set, this cannot be changed for the lifetime of the diag instance.

5.2.1.3 Subsystem

Subsystem to specify for health report log packets. See resetHealthReportCounters and SetHealthReportTimer.

```
enum Subsystem
{
   MPSS    = 0x0832,
   APP     = 0x0229,
   LPASS   = 0x0E1F,
   SLPI    = 0x1A31,
   CDSP    = 0x2425,
   NPU     = 0x2623,
   AUDIO   = 0x0067,
   SENSOR  = 0x0068,
   WLAN    = 0x006B,
   CHARGER = 0x006D
}
```

5.2.1.4 HealthReportConfigureStatus

Specifies the status from the responses to health report configure requests. See resetHealthReportCounters and SetHealthReportTimer.

```
enum HealthReportConfigureStatus
{
   INVALID_STATUS          = -1,
   SUCCESS                 = 0,
   UNABLE_TO_GENERATE_REQUESTED_HEALTH_REPORT = 1,
   INVALID_TIMER_UNIT   = 2,
   ERROR_SETTING_TIMER = 3,
   TIMER_UPDATED_BUT_TIMER_NOT_ENABLED_DUE_TO_LOG_MASK = 4
}
```

5.2.2 Functions

5.2.2.1 getLastError()

Queries for the error from the last function call.

Prototype

```
Common.ErrorType getLastError()
```

Returns

Error code and description.

5.2.2.2 getDevice()

Gets the device handle on which a service is created.

Prototype

```
i64 getDevice()
```

Returns

Device handle.

5.2.2.3 initializeService()

Opens connections and starts the service.

NOTE: If more than one DIAG protocol is available on the device, this function fails. For such devices, use initializeServiceByProtocol() instead.

Prototype

```
Common.ErrorCode initializeService()
```

Returns

None.

5.2.2.4 initializeServiceByProtocol()

Opens connections and starts a service. In the case that a device has multiple diag connections (such as fusion devices), this API must be used instead of initializeService(). Call getProtocolList() on the device that is to be connected, determine the appropriate instance of diag, and pass its handle in as a parameter to this function.

Prototype

```
Common.ErrorCode initializeServiceByProtocol(1:i64 protocolHandle)
```

Parameters

`protocolHandle`	Protocol to use for the service.

Returns

None.

5.2.2.5 destroyService()

Ends this instance of a service.

Prototype

```
Common.ErrorCode destroyService()
```

Returns

None.

5.2.2.6 sendRawRequest()

Sends a request over a specified protocol.

Prototype

```
Common.DiagPacket sendRawRequest(1:binary request,
                                 2:Common.DiagReturns returnConfig,
                                 3:i32 timeout)
```

Parameters

`request`	Raw buffer of the request.
`returnConfig`	Specifies what to set in DiagReturns.
`timeout`	Timeout when to stop waiting for the response (in ms). Default set it to -1.

Detailed description

The input is a raw buffer expected to be in the format described by the DIAG ICD.

This function will block until the response is received. For non-blocking, use sendRawRequestAsync().

Returns

DiagPacket structure.

Only `PACKET_NAME`, `BINARY_PAYLOAD` and `PARSED_TEXT` (DiagReturnFlags) are valid for the return value.

5.2.2.7 sendRawRequestAsync()

Sends a request over a specified protocol.

The input is a raw buffer expected to be in the format described by the DIAG ICD.

Prototype

```
i64 sendRawRequestAsync(1:binary request)
```

Parameters

`request`	Raw buffer of the request.

Returns

Transaction ID to use when querying the response using getResponseAsync() or getAllAsyncResponses().

5.2.2.8 sendRequest()

Sends a DIAG request based on a list of fields.

Prototype

```
Common.DiagPacket sendRequest(1:Common.DiagPacketType requestType,
                       2:string requestIdOrName,
                       3:string fieldList,
                       4:Common.DiagReturns returnConfig,
                       5:i32 timeout)
```

Parameters

`requestType`	Whether this is a normal request, subsystem request, or subsystem V2 request. See DiagPacketType.
`requestIdOrName`	The ID or name of the request. See DiagPacketType for details based on Common.DiagPacketType.
`fieldList`	Comma-delimited list of field values to put into the buffer.
`returnConfig`	Specifies what to set in DiagReturns.
`timeout`	Timeout when to stop waiting for the response (in milliseconds). Default is set it to -1.

Detailed description

Using the commandCode, QUTS generates a buffer using the comma-separated values specified in `fieldList`. If `fieldList` does not contain enough fields to fully populate the request structure, all remaining fields are set to 0.

This function will block until the response is received. For non-blocking, use sendRequestAsync().

Returns

DiagPacket structure.

Only `PACKET_NAME`, `BINARY_PAYLOAD`, and `PARSED_TEXT` (DiagReturnFlags) are valid for the return value.

5.2.2.9 sendRequestAsync()

Sends a diag request based on a list of fields.

Prototype

```
i64 sendRequestAsync(1:Common.DiagPacketType requestType,
                     2:string requestIdOrName,
                     3:string fieldList)
```

Parameters

`requestType`	Whether this is a normal request, subsystem request, or subsystem V2 request. See DiagPacketType.
`requestIdOrName`	The ID or name of the request. See DiagPacketType for details based on Common.DiagPacketType.
`fieldList`	Comma-delimited list of field values to put into the buffer.

Detailed description

Using the commandCode, QUTS generates a buffer using the comma-separated values specified in `fieldList`. If `fieldList` does not contain enough fields to fully populate the request structure, all remaining fields are set to 0.

Returns

Transaction ID to use when querying the response using getResponseAsync() or getAllAsyncResponses().

5.2.2.10 getResponseAsync()

Retrieves the response for a specified asynchronous request.

Prototype

```
Common.DiagPacket getResponseAsync(1:i64 transactionId,
                                   2: Common.DiagReturns returnConfig,
                                   3:i32 timeout)
```

Parameters

`transactionId`	Transaction received when calling a Send Asynchronous function.
`returnConfig`	Specifies what to set in DiagReturns.
`timeout`	Timeout when to stop waiting for the response (in milliseconds).

Detailed description

This function returns an empty buffer if the response is not received yet. Use onAsyncResponse() to be notified when the asynchronous response is available.

If there are multiple responses for a specified transaction ID, getResponseAsync() must be called multiple times. Each time, this function returns the next response in the order it was received.

Returns

DiagPacket structure (see DiagPacket).

Only `PACKET_NAME`, `BINARY_PAYLOAD`, and `PARSED_TEXT` (DiagReturnFlags) are valid for the return value.

When a response is successfully retrieved, the return value is cleared in QUTS.

5.2.2.11 getAllAsyncResponses()

Retrieves all responses for an asynchronous request that are received before the timeout.

Prototype

```
list<Common.DiagPacket> getAllAsyncResponses(1:i64 transactionId,
                            2: Common.DiagReturns returnConfig,
                            3:i32 timeout)
```

Parameters

`transactionId`	Transaction received when calling a Send Asynchronous function.
`returnConfig`	Specifies what to set in DiagReturns.
`timeout`	Timeout when to stop waiting for the response (in milliseconds).

Returns

List of DiagPacket (see DiagPacket) responses that corresponding to the request. The list is empty if no response is received before the timeout.

When a response is successfully retrieved, the returned values are cleared in QUTS.

5.2.2.12 createDataQueue()

Creates a queue that can be registered to incoming data packets for external processing.

This function is used in conjunction with protocol-specific register* for Queue functions and getDataQueueItems().

Prototype

```
Common.ErrorCode createDataQueue(1:string queueName,
                                 2:Common.DiagPacketFilter filter,
                                 3:Common.DiagReturnConfig returnConfig)
```

Parameters

`queueName`	Unique name of the queue to be referenced from other functions.
`filter`	Determines what indications to include in this queue. See DiagPacketFilter.
`returnConfig`	Determines what values to populate in returned DiagPackets. See DiagReturnConfig.

Returns

None.

5.2.2.13 removeDataQueue()

Removes a queue created from createDataQueue().

Prototype

```
Common.ErrorCode removeDataQueue(1:string queueName)
```

Parameters

`queueName`	Unique name of the queue to remove.

Returns

None.

5.2.2.14 clearDataQueue()

Removes all items from a specified data queue.

Prototype

```
Common.ErrorCode clearDataQueue(1:string queueName)
```

Parameters

`queueName`	Unique name of the queue to clear.

Returns

None.

5.2.2.15 addDataQueueFilter()

Adds a filter to an existing data queue.

Prototype

```
Common.ErrorCode addDataQueueFilter(1:string queueName,
                                2:Common.DiagPacketFilter filter)
```

Parameters

`queueName`	Unique name of the queue to be referenced from other functions.
`filter`	Determines what indications to include in this queue. See DiagPacketFilter.

Returns

None.

5.2.2.16 removeDataQueueFilter()

Removes a filter from an existing data queue.

Prototype

```
Common.ErrorCode removeDataQueueFilter(1:string queueName,
                                2:Common.DiagPacketFilter filter)
```

Parameters

`queueName`	Unique name of the queue to be referenced from other functions.
`filter`	Determines what indications to include in this queue. See DiagPacketFilter.

Returns

None.

5.2.2.17 getDataQueueItems()

Gets items that have been accumulated in a queue based on the IDs for which the queue is registered.

Prototype

```
list<Common.DiagPacket> getDataQueueItems(1:string queueName,
                                   2:i32 count,
                                   3:i32 timeout)
```

Parameters

`queueName`	Unique name of the queue.
`count`	Number of items to get from the queue.
`timeout`	Timeout when to stop waiting for a count of the items (in milliseconds).

Returns

DiagPacket structure.

5.2.2.18 setLoggingMask()

Sets a logging mask to be enabled on the diag connection from a specified CFG or DMC file.

Prototype

```
Common.ErrorCode setLoggingMask(1:binary maskFileContent,
                                2:LogMaskFormat format)
```

Parameters

`maskFileContent`	Entire contents of the CFG or DMC file.
`format`	Whether the file is CFG, CFG2, or DMC

Detailed description

CFG files are on-device logging configuration files that can be configured and generated in QXDM. These files can be used to configure the log, events, extended debug messages, and QTrace masks.

Returns

None.

5.2.2.19 getQShrinkState()

Returns the current QShrink state.

Prototype

```
QShrink4DownloadState getQShrinkState()
```

Returns

Current state of QShrink.

5.2.2.20 loadQShrinkFile ()

Loads a QShrink file from given path.

Prototype

```
void loadQShrinkFile(1. String path)
```

Detailed description

The QShrink file specified in the path is loaded and the symbols from that Qshrink file are used.

Returns

None.

5.2.2.21 setWcdmaProtocolRevision()

Set WCDMA protocol revision value from the values in the enum WcdmaProtocolRevision.

Prototype

```
Common.ErrorCode setWcdmaProtocolRevision(
                 1:WcdmaProtocolRevision revision)
```

Detailed description

This function allows the user to set the WCDMA protocol revision that is used when parsing WCDMA OTA log items.

Returns

None.

5.2.2.22 setCdmaProtocolRevision()

Set CDMA protocol revision value from the values in the enum CdmaProtocolRevision.

Prototype

```
Common.ErrorCode setCdmaProtocolRevision(
                  1:CdmaProtocolRevision revision)
```

Detailed description

This function allows the user to set the CDMA protocol revision that is used when parsing CDMA OTA log items.

Returns

None.

5.2.2.23 setPilotInc()

Sets the value of Pilot inc. The value is within the range (0:5).

Prototype

```
Common.ErrorCode setPilotInc(1:i16 pilotInc)
```

Returns

None.

5.2.2.24 initializeServiceWithOptions()

Opens connections and starts a service. In the case that a device has multiple diag connections (such as fusion devices), this API must be used instead of initializeService(). Call getProtocolList() on the device that is to be connected, determine the appropriate instance of diag, and pass its handle in as a parameter to this function.

Prototype

```
Common.ErrorCode initializeServiceWithOptions(1:DiagConnectionOptions
diagConnectionOptions)
```

Parameters

`diagConnectionOptions`	Additional connection options, see DiagConnectionOptions.

Returns

None.

5.2.2.25 setLoggingMaskFromFilter()

Sets logging mask from DiagPacketFilter.Prototype

```
Common.ErrorCode setLoggingMaskFromFilter(
     1:Common.DiagPacketFilter filter,
)
```

Parameters

`filter`	Determines what packets to include in this mask. See DiagPacketFilter.

5.2.2.26 resetHealthReportCounters()

Resets the health report counters and sequence number (for log packets 1xCD3 and 1xCDD). This is needed to be called before you start using the values in the health report packets.

Prototype

```
HealthReportConfigureStatus resetHealthReportCounters(1:Subsystem subsystem)
```

Parameters

`subsystem`	Determines what subsystem to reset the health counters and sequence number for. See `Subsystem`

Returns

Configuration reset response status. See `HealthReportConfigureStatus`

5.2.2.27 setHealthReportTimer ()

Sets the health report packets timer interval (for log packets 1xCD3 and 1xCDD). QUTS uses default timer of 15 seconds. This can be changed if needed via call to this method.

Prototype

```
HealthReportConfigureStatus setHealthReportTimer(
    1:Subsystem subsystem,
    2:i32 timer)
```

Parameters

`subsystem`	Determines what subsystem to set the health packet timer for. See `Subsystem`
`timer`	Timer value in milliseconds

Returns

Configuration timer response status. See `HealthReportConfigureStatus`

5.3 Image management service

The image management service provides the ability to read and write image files on the device for supporting build loading and memory dump collection. It uses the Sahara protocol for memory dump collection, and both Sahara and Firehose protocols for loading images to device. The Sahara and Firehose protocols will be locked so that it cannot be shared by other clients.

5.3.1 Types

5.3.1.1 DeviceImageMode

Used to specify the image transfer operation on device.

```
enum DeviceImageMode
{
   DEVICE_IMAGE_MODE_NONE            = 0x00000000,
   DEVICE_IMAGE_MODE_SAHARA_DOWNLOAD = 0x00000001,
   DEVICE_IMAGE_MODE_SAHARA_CRASH    = 0x00000002,
   DEVICE_IMAGE_MODE_SAHARA_EFS_SYNC = 0x00000004
}
```

5.3.1.2 MemoryType

Used to specify the memory storage type on device.

```
enum MemoryType
{
   MEMORY_TYPE_EMMC = 0,
   MEMORY_TYPE_UFS,
   MEMORY_TYPE_NAND,
   MEMORY_TYPE_SPINOR,
   MEMORY_TYPE_UNKNOWN
}
```

5.3.1.3 MemoryDumpStates

Specifies the state of the internal process while processing memory dump collection in collectMemoryDump().

```
enum MemoryDumpStates
{
   INITIALIZE = 0,
   DOWNLOADING_TABLE,
   DOWNLOADING_PARTITION,
   DOWNLOADING_PARTITION_COMPLETE,
   DOWNLOADING_PROGRESS_REPORT,
   DOWNLOADING_DDR_DATA,
   RESETTING
}
```

5.3.1.4 TransferImageResult

Returns results for an image transfer sequence.

```
struct TransferImageResult
{
   1: Common.ErrorCode errorCode;
   2: DeviceImageMode deviceImageMode;
}
```

5.3.1.5 SaharaCommandResults

Returns consolidated device information from Sahara commands.

```
struct SaharaCommandResults {
   1: Common.ErrorCode errorCode;
   2: optional string serialNumber;
   3: optional string version
}
```

5.3.1.6 DownloadBuildOptions

Specifies download options used by downloadBuild.

```
struct DownloadBuildOptions {
   1: MemoryType              memoryType;
   2: optional bool           erase;
   3: optional list<string>   rawXmlList;
   4: optional list<string>   patchXmlList;
   5: optional string         firehoseProgPath;
   6: optional string         signedDigestsPath;
   7: optional string         chainedDigestsPath;
   8: optional bool           skipSahara;
   9: optional string         readImagesPath;
}
```

Fields

`memoryType`	Flash memory type used by Firehose protocol.
`erase`	Boolean flag indicating whether to erase the entire flash memory before programming.
`rawXmlList`	List of raw programmer xml file paths in a flattened build.
`patchXmlList`	List of patch programmer xml file paths in a flattened build.
`firehoseProgPath`	Firehose programmer file path.
`signedDigestsPath`	Signed digests image file path. Must be used together with chainedDigestsPath option.
`chainedDigestsPath`	Chained digests image file path. Must be used together with signedDigestsPath option.

`skipSahara`	Boolean flag indicating whether to go to Firehose directly without transferring device programmer using Sahara.
`readImagesPath`	Path to store images read from device. When this option is used, erase option will be ignored if specified, and downloadBuild will read images from device instead of downloading build.

If both rawXmlList and patchXmlList are not specified, raw XML programmer files with filename containing “rawprogram” and patch XML programmer files with filename containing “patch” will be used as default xml programmers.

If either rawXmlList, or patchXmlList, or both are specified, only those specified XML programmers will be used in Firehose programming process.

5.3.2 Functions

5.3.2.1 getLastError()

Queries for the error from the last function call.

Prototype

```
Common.ErrorType getLastError()
```

Returns

Error code and description.

5.3.2.2 getDevice()

Gets the device handle on which this service is created.

Prototype

```
i64 getDevice()
```

Returns

Device handle.

5.3.2.3 initializeService()

Opens a Sahara connection and starts a service.

If more than one Sahara protocol is available, use initializeServiceByProtocol() to initialize the service.

Prototype

```
Common.ErrorCode initializeService()
```

Returns

None.

5.3.2.4 destroyService()

Ends this instance of a service.

Prototype

```
Common.ErrorCode destroyService()
```

Returns

None.

5.3.2.5 getDeviceImageMode()

Gets the expected image transfer operation on device.

Prototype

```
DeviceImageMode getDeviceImageMode()
```

Parameters

None.

Returns

DeviceImageMode() type.

5.3.2.6 getCommandResults ()

Collect results from all Sahara commands.

Prototype

```
Common.ErrorCode getCommandResults(
                          1:SaharaCommandResults commandResults)
```

Parameters

`commandResults`	Specifies what to set in SaharaCommandResults.

Returns

None.

5.3.2.7 transferImages ()

Send images to device that supports either flashless software loading or flash programmer loading using Sahara protocol.

Prototype

```
TransferImageResult transferImages(1:map<i32, string> imageList)
```

Parameters

imageList	An image file list containing image ID and image path of files to be transferred.

Returns

TransferImageResult structure. QUTS clients should check DeviceImageMode value in TransferImageResult to determine if a crash has happened on device that requires dump collection using the collectMemoryDump() API.

5.3.2.8 downloadBuild ()

Download a flattened build to device that supports flash memory software loading using Firehose protocol.

Prototype

```
Common.ErrorCode downloadBuild(1:string buildPath,
                               2:DownloadBuildOptions options)
```

Parameters

buildPath	Specifies flat build location.
options	Specifies download options, see DownloadBuildOptions.

Returns

None.

5.3.2.9 collectMemoryDump()

Downloads all memory partitions from a device into a specified location in the event of a crash.

Prototype

```
Common.ErrorCode collectMemoryDump(1:string pathName)
```

Parameters

pathName	Folder in which to save the dumps.

Detailed description

The state of the process is provided in the service event callback (onServiceEvent()) using the following values (defined in MemoryDumpStates):

- `INITIALIZE` – Dump collection started.
- `DOWNLOADING_TABLE` – Partitions table is downloading. The count of partitions is provided in the description.
- `DOWNLOADING_PARTITION` – Memory partition is downloading. The name of the partition is provided in the description.
- `DOWNLOADING_PROGRESS_REPORT` – Report current download percentage. The percentage value is provided in the description.

Returns

None.

5.3.2.10 startRemoteEfsSync()

Start a process to syncing remote EFS files from a device into a specified location.

Prototype

```
Common.ErrorCode startRemoteEfsSync(1:string pathName)
```

Parameters

`pathName`	Folder in which to save the remote EFS files.

Detailed description

The syncing process will be running in the background continuously even after API returns. Call stopRemoteEfsSync() to terminate the syncing process.

Returns

None.

5.3.2.11 stopRemoteEfsSync()

Stop the current remote EFS sync process.

Prototype

```
Common.ErrorCode stopRemoteEfsSync()
```

Parameters

None.

Returns

None.

5.3.2.12 setDdrStorePath ()

Set path to store DDR training data.

Prototype

```
Common.ErrorCode setDdrStorePath(1:string ddrStorePath)
```

Parameters

`ddrStorePath`	Specifies path to store DDR training data.

Returns

None.

5.3.2.13 resetDevice()

Resets a device to the normal operating mode after Firehose software download.

```
Common.ErrorCode resetDevice(1:i32 timeout)
```

Parameters

`timeout`	Maximum wait time in seconds until device is re-enumerated.

Returns

The state of the process is provided in the service event callback (onServiceEvent()) using the following values (defined in MemoryDumpStates):

- `RESETTING` – Device reset request has been sent to device.

5.3.2.14 switchToEdl()

Attempts to switch the device to Emergency download mode.

```
Common.ErrorCode switchToEdl()
```

Parameters

None.

Returns

None. QUTS clients can check the device mode through getDeviceImageMode(). Upon success, device image mode will be DEVICE_IMAGE_MODE_SAHARA_DOWNLOAD.

5.4 QMI service

The QMI service provides basic QMI I/O functionality, including sending and receiving commands and monitoring indications. This service shares the QMI protocol.

5.4.1 Functions

5.4.1.1 getLastError()

Queries for the error from the last function call.

Prototype

```
Common.ErrorType getLastError()
```

Returns

Error code and description.

5.4.1.2 getDevice()

Gets the device handle on which this service is created.

Prototype

```
i64 getDevice()
```

Returns

Device handle.

5.4.1.3 initializeService()

Opens a QMI connection and starts a service.

If more than one QMI protocol is available, use initializeServiceByProtocol() to initialize the service.

Prototype

```
Common.ErrorCode initializeService(1:string qmiServiceIdOrName)
```

Parameters

qmiServiceIdOrName	ID or name of the QMI connection on which to run this service.

Returns

None.

5.4.1.4 initializeServiceByProtocol()

Opens a QMI connection on a specified protocol and starts a service. In the case that a device has multiple QMI connections (such as fusion devices), this API must be used instead of initializeService(). Call getProtocolList() on the device that is to be connected, determine the appropriate instance of QMI, and pass its handle in as a parameter to this function.

Prototype

```
Common.ErrorCode initializeServiceByProtocol(1:i64 qmiProtocolHandle,
                                             2:string qmiServiceIdOrName)
```

Parameters

`qmiProtocolHandle`	QMI protocol to use for the service.
`qmiServiceIdOrName`	ID or name of the QMI service on which to run the service.

Returns

None.

5.4.1.5 destroyService()

Ends this instance of a service.

Prototype

```
Common.ErrorCode destroyService()
```

Returns

None.

5.4.1.6 getQmiServiceId()

Returns the QMI service on which the connection is opened.

Prototype

```
i32 getQmiServiceId()
```

Returns

Service ID the QMI connection.

Upon an error, -1.

5.4.1.7 sendRequest()

Sends a QMI request based on an XML string.

Prototype

```
Common.QmiPacket sendRequest(1:string messageIdOrName,
                             2:string xmlDefinition,
                             3:Common.QmiReturnFlags returnFlags,
                             4:i32 timeout)
```

Parameters

`messageIdOrName`	QMI message ID or name for which to make the buffer.
`xmlDefinition`	XML string that defines the values to set for the fields in the request.
`returnConfig`	Specifies what to set in QmiReturns.
`timeout`	Timeout when to stop waiting for the response (in ms).

Detailed description

Using the service ID of the connection and the specified message ID, QUTS generates a buffer using the XML string. Any missing fields are assigned the value of 0.

This function will block until the response is received. For non-blocking, use sendRequestAsync().

Returns

Common.QmiPacket structure (QmiPacket).

5.4.1.8 sendRequestAsync()

Sends a QMI request based on an XML string.

Prototype

```
i64 sendQmiRequestAsync(1:string messageIdOrName,
                        2:string xmlDefinition)
```

Parameters

`messageIdOrName`	QMI message ID or name for which to make the buffer.
`xmlDefinition`	XML string that contains the values to set for the fields in the request.

Detailed description

Using the service ID of the connection and the specified message ID, QUTS generates a buffer using the XML string. Any missing fields are assigned the value of 0.

Returns

Transaction ID to use when querying the response for this request via getResponseAsync().

5.4.1.9 sendRawRequest()

Sends a QMI request based on a raw payload.

Prototype

```
CommonQmiPacket sendRequest(1: binary request,
                            2:Common.QmiReturns returnConfig,
                            3:i32 timeout)
```

Parameters

`request`	Raw buffer of the request.
`returnConfig`	Specifies what to set in QmiReturns.
`timeout`	Timeout when to stop waiting for the response (in ms).

Detailed description

Using the service ID of the connection and the QUTS will send the request as provided in the request parameter.

This function will block until the response is received. For non-blocking, use sendRequestAsync().

Returns

Common.QmiPacket structure (QmiPacket).

5.4.1.10 sendRawRequestAsync()

Sends a QMI request based on a raw payload.

Prototype

```
i64 sendQmiRequestAsync(1: binary request)
```

Parameters

`request`	Raw buffer of the request.

Detailed description

Using the service ID of the connection and the specified message ID, QUTS generates a buffer using the XML string. Any missing fields are assigned the value of 0.

Returns

Transaction ID to use when querying the response for this request via getResponseAsync().

5.4.1.11 getResponseAsync()

Retrieves the response for a specified asynchronous request.

Prototype

```
Common.QmiPacket getResponseAsync(1:i64 transactionId,
                                  2:Common.QmiReturns returnConfig,
                                  3:i32 timeout)
```

Parameters

`transactionId`	Transaction received when calling a sendRequestAsync() function.
`returnConfig`	Specifies what to set in QmiReturns.
`timeout`	Timeout when to stop waiting for the response (in milliseconds).

Detailed description

This function returns an empty buffer if the response is not received yet. Use onAsyncResponse() to notify this function when the asynchronous response is available.

Returns

Common.QmiPacket structure (QmiPacket).

On successful retrieval for a response, the returned value is cleared in QUTS.

5.4.1.12 createIndicationQueue()

Creates a queue that can be registered to incoming data packets for external processing.

This function is used in conjunction with getIndications().

Prototype

```
Common.ErrorCode createDataQueue(1:string queueName
                                 2:Common.QmiPacketFilter filter,
                                 3:Common.QmiReturnConfig returnConfig)
```

Parameters

`queueName`	Unique name of the queue for referencing it from other functions.
`filter`	Determines what indications to include in this queue. See QmiPacketFilter.
`returnConfig`	Determines what values to populate in returned QmiPackets. See QmiReturnConfig.

Returns

None.

5.4.1.13 removeIndicationQueue()

Removes a queue created from createIndicationQueue().

Prototype

```
Common.ErrorCode removeDataQueue(1:string queueName)
```

Parameters

queueName	Unique name of the queue.

Returns

None.

5.4.1.14 clearIndicationQueue()

Removes all items from a specified queue.

Prototype

```
Common.ErrorCode clearIndicationQueue(1:string queueName)
```

Parameters

queueName	Unique name of the queue.

Returns

None.

5.4.1.15 getIndications()

Gets the indications that have been accumulated in a queue based on the IDs for which the queue is registered.

Prototype

```
list<Common.QmiPacket> getIndications(1:string queueName,
                                      2:i32 count,
                                      3:i32 timeout)
```

Parameters

queueName	Unique name of the queue.
count	Number of indications to get from the queue.
timeout	Timeout when to stop waiting for a count of the indications (in ms).

Returns

Common.QmiPacket structure (QmiPacket).

5.5 Raw service

Raw service provides basic I/O functionality, including sending and receiving commands. It is intended for features that are under development and do not yet have official support. It is not recommended to use raw service for any other purposes. Use this service to enable DPL / ADPL logging on the device.

DPL / ADPL logging using Raw Service:

To enable ADPL logging use QUTS Raw Service. Pass the DPL/ADPL protocol handle to initialize this service and connect to it.

QUTS supports loading ".adpl , .adplv2, .adpl v3", .adplv4 files. Use QUTS Log Session to load the files.

QXDM5 + QUTS is verified for ADPL log collection.

Diag Service is not used to start DPL/ADPL logging. Diag Service should be used only to load DMC with 0x11EB packets.

5.5.1 Constants

5.5.2 Types

5.5.2.1 QdssConfiguration

QDSS configuration options for raw service (see ConnectionOptions).

```
struct QdssConfiguration
{
   1: list<i16> stpv2Atids;
   2: list<i16> stmAtids;
   3: optional list<i16> diagEntityId;
}
```

stpv2Atids	List of AT IDs that use the stpv2.protocol
stmAtids	List of AT IDs for stm.
diagEntityId	List of diag entities.

5.5.2.2 ConnectionOptions

Connection options for raw service to configure different protocols.

```
struct ConnectionOptions
{
   1: optional QdssConfiguration qdssConfiguration;
}
```

qdssConfiguration	Set QdssConfiguration options.

5.5.3 Functions

5.5.3.1 getLastError()

Queries for the error from the last function call.

Prototype

```
Common.ErrorType getLastError()
```

Returns

Error code and description.

5.5.3.2 getDevice()

Gets the device to which this service instance is attached.

Prototype

```
i64 getDevice()
```

Returns

Device handle.

5.5.3.3 initializeService()

Creates a connection to a device over a specified protocol.

Prototype

```
Common.ErrorCode initializeService(1:i64 protocolHandle,
                                   2:Common.OpenProp access,
                                   3:Common.OpenProp share)
```

Parameters

`protocolHandle`	Protocol to open.
`access`	Open with read or read/write access.
`share`	Allow sharing the read or read/write access.

Returns

None.

5.5.3.4 initializeServiceQmi()

Creates a QMI connection to a device over a specified protocol and service ID.

Prototype

```
Common.ErrorCode initializeServiceQmi(1:i64 protocolHandle,
                                      2:i32 serviceId,
                                      3:Common.OpenProp access,
                                      4:Common.OpenProp share)
```

Parameters

`protocolHandle`	Protocol to open.
`serviceId`	ID of the QMI service.
`access`	Open with read or read/write access.
`share`	Allow sharing the read or read/write access.

Returns

None.

5.5.3.5 destroyService()

Closes a specified connection to a device and destroys this instance of the raw service.

Prototype

```
Common.ErrorCode destroyService()
```

Returns

None.

5.5.3.6 sendRequest()

Sends a request over a specified protocol.

Prototype

```
binary sendRequest(1:binary request,
                   2:i32 timeout)
```

Parameters

`request`	Binary request payload to send
`timeout`	Timeout when to stop waiting for the response (in milliseconds).

Detailed description

The input is a raw buffer expected to be in the format expected by the protocol that was opened in this service in initializeService()initializeService() or initializeServiceQmi().

This function will block until the response is received or timed out. For non-blocking, use sendRequestAsync().

Returns

Response that corresponds to the request. Upon an error, this return value is empty.

5.5.3.7 sendRequestAsync()

Sends a request over the specified protocol.

Prototype

```
i64 sendRequestAsync(1:binary request)
```

Parameters

`request`	Raw buffer of the request.

Detailed description

The input is a raw buffer expected to be in the format expected by the protocol that was opened in this service in initializeService() or initializeServiceQmi().

Returns

Transaction ID to use when querying the response for this request using getResponseAsync() or getAllResponsesAsync().

5.5.3.8 getResponseAsync()

Retrieves the response for a specified asynchronous request.

Prototype

```
binary getResponseAsync(1:i64 transactionId,
                        2:i32 timeout)
```

Parameters

`transactionId`	Transaction received when calling a sendRequestAsync() function.
`timeout`	Timeout when to stop waiting for the response (in milliseconds).

Detailed description

This function returns an empty buffer if the response is not received yet. Use onAsyncResponse() to notify this function when the asynchronous response is available.

If a specified transaction ID has multiple responses, call getResponseAsync() multiple times. Each time, the function will return the next response in the order it was received.

Alternatively, call getAllResponsesAsync() to retrieve a set of responses.

Returns

Response corresponding to the request. This return is empty if the response has not been received.

If a response is successfully retrieved, the returned value is cleared in QUTS.

5.5.3.9 getAllResponsesAsync()

Retrieves all responses for an asynchronous request if they are received before the timeout.

Prototype

```
list<binary> getAllResponsesAsync(1:i64 transactionId,
                                  2:i32 timeout)
```

Parameters

`transactionId`	Transaction received when calling a sendRequestAsync function.
`timeout`	Timeout when to stop waiting for the response (in milliseconds).

Returns

List of responses corresponding to the request. This list is empty if no response is received before the timeout.

If a response is successfully retrieved, the returned value is cleared in QUTS.

5.5.3.10 isAsyncResponseFinished()

Checks whether any more responses are expected for an asynchronous request.

Prototype

```
bool isAsyncResponseFinished(1:i64 transactionId)
```

Parameters

`transactionId`	Transaction to check.

Returns

TRUE when no further responses are expected for the request.

5.5.3.11 initializeServiceWithOptions()

Creates a QMI connection to a device over a specified protocol and service ID.

Prototype

```
Common.ErrorCode initializeServiceWithOptions(1:i64 protocolHandle,
                                 2:Common.OpenProp access,
                                 3:Common.OpenProp share,
                                  4:ConnectionOptions
connectionOptions)
```

Parameters

`protocolHandle`	Protocol to open.
`access`	Open with read or read/write access.
`share`	Allow sharing the read or read/write access.
`connectionOptions`	Configure connection options for different protocols see ConnectionOptions

Returns

None.

5.6 ADB service

The ADB service provides basic ADB I/O functionality, including sending and receiving commands.

5.6.1 Functions

5.6.1.1 getLastError()

Queries for the error from the last function call.

Prototype

```
Common.ErrorType getLastError()
```

Returns

Error code and description.

5.6.1.2 getDevice()

Gets the device to which this service instance is attached.

Prototype

```
i64 getDevice()
```

Returns

Device handle.

5.6.1.3 initializeService()

Creates a connection to a device over a ADB protocol if only one ADB protocol is present. If more than one ADB protocol is present, this will throw an exception. Use initializeServiceByProtocol() in that case by passing in the specific ADB protocol of interest.

Prototype

```
Common.ErrorCode initializeService(1:Common.OpenProp access,
                                   2:Common.OpenProp share)
```

Parameters

access	Open with read or read/write access.
share	Allow sharing the read or read/write access.

Returns

None.

5.6.1.4 destroyService()

Closes a specified connection to a device and destroys this instance of the ADB service.

Prototype

```
Common.ErrorCode destroyService()
```

Returns

None.

5.6.1.5 sendCommand()

Sends an ADB command. API is blocking until response is received.

Prototype

```
Common.AdbPacket sendCommand(
1:string command,
2:Common.AdbReturnConfig returnConfig,
3:i32 timeout
)
```

Parameters

`command`	ADB request string to send.
`returnConfig`	returnConfig of type AdbReturnConfig with flags set to determine fields in return value.
`timeout`	Timeout when to stop waiting for the response (in ms).

Detailed description

The input is an ADB string (for example, “adb devices”).

This function will block until the response is received or timed out. For non-blocking, use sendCommandAsync().

Returns

AdbPacket object containing the response that corresponds to the ADB command. Fields in this return value are determined by flags set in returnConfig parameter.

5.6.1.6 sendCommandAsync()

Sends an ADB command asynchronously.

Prototype

```
i64 sendCommandAsync(1:string command)
```

Parameters

`command`	Adb string of the request.

Detailed description

The input is an ADB string (for example, “adb devices”).

Returns

Transaction ID to use when querying the response for this request using getResponseAsync() or getAllResponsesAsync().

5.6.1.7 getResponseAsync()

Retrieves the response for a specified asynchronous request.

Prototype

```
Common.AdbPacket getResponseAsync(
1:i64 transactionId,
2:Common.AdbReturnConfig returnConfig,
3:i32 timeout)
```

Parameters

`transactionId`	Transaction received when calling a sendRequestAsync function.
`returnConfig`	returnConfig of type AdbReturnConfig with flags set to determine fields in return value.
`timeout`	Timeout when to stop waiting for the response (in ms).

Detailed description

This function returns an empty buffer if the response is not received yet. Use onAsyncResponse() to notify this function when the asynchronous response is available.

If a specified transaction ID has multiple responses, call getResponseAsync() multiple times. Each time, the function will return the next response in the order it was received.

Alternatively, call getAllResponsesAsync() to retrieve a set of responses.

Returns

AdbPacket object containing the response that corresponds to the ADB command. Fields in this return value are determined by flags set in the returnConfig parameter.

If a response is successfully retrieved, the returned value is cleared in QUTS.

5.6.1.8 getAllResponsesAsync()

Retrieves all responses for an asynchronous request if they are received before the timeout.

Prototype

```
list<Common.AdbPacket> getAllResponsesAsync(
1:i64 transactionId,
2:Common.AdbReturnConfig returnConfig,
3:i32 timeout)
```

Parameters

`transactionId`	Transaction received when calling a Send Asynchronous function.
`returnConfig`	returnConfig of type AdbReturnConfig with flags set to determine fields in return value.
`timeout`	Timeout when to stop waiting for the response (in ms).

Returns

List of AdbPacket objects containing responses that corresponds to the ADB command. Fields in each AdbPacket are determined by flags set in returnConfig parameter.

If a response is successfully retrieved, the returned value is cleared in QUTS.

5.6.1.9 isAsyncResponseFinished()

Checks whether any more responses are expected for an asynchronous request.

Prototype

```
bool isAsyncResponseFinished(1:i64 transactionId)
```

Parameters

`transactionId`	Transaction to check.

Returns

TRUE when no further responses are expected for the request.

5.7 GPS service

The GPS service provides basic GPS functionality getCurrentLocation() for NMEA protocol based devices.

5.7.1.1 Note 1:

Currently QUTS does not have the ability to automatically detect if the protocol shown up by NMEA/GPS device is a NMEA protocol, so it will show up as unknown protocol in protocol list. So once you get the protocolHandle (say via call to getProtocolList) which corresponds to NMEA that you can identify based on the specific GPS device name, you need to tell QUTS that it is a NMEA protocol by calling overrideUnknownProtocol(). This needs to be done before call to createService() on GPS. For example, in python the call would look like:

```
result = deviceManager.overrideUnknownProtocol(
                unknownProtocolHandle,
                Common.ttypes.ProtocolType.PROT_NMEA)
```

```
gpsService = GpsService.GpsService.Client(
    qutsClient.CreateService("GPS Service", deviceId))
```

5.7.1.2 Note 2:

Currently, QUTS uses the baud rate of 4800 to talk to a device over USB. If the NMEA device does not show up in the QUTS protocol list automatically, try changing the baud rate (bits per second) of the device from windows settings (Device Manager -> Ports (COM & LPT) -> Double click the NMEA device among list -> Port Settings Tab -> change the Bits per second to 4800) and retry.

5.7.2 Functions

5.7.2.1 getLastError()

Queries for the error from the last function call.

Prototype

```
Common.ErrorType getLastError()
```

Returns

Error code and description.

5.7.2.2 getDevice()

Gets the device to which this service instance is attached.

Prototype

```
i64 getDevice()
```

Returns

Device handle.

5.7.2.3 initializeService()

Creates a connection to a device over NMEA protocol if only one NMEA protocol is present. If more than one NMEA protocol is present, this will throw an exception. Use initializeServiceByProtocol() in that case by passing in the specific NMEA protocol of interest. See **Note1** and **Note2**.

Prototype

```
Common.ErrorCode initializeService(1:Common.OpenProp access,
                                   2:Common.OpenProp share)
```

Parameters

`access`	Open with read or read/write access.
`share`	Allow sharing the read or read/write access.

Returns

None.

5.7.2.4 initializeServiceByProtocol()

Opens connections and starts a service. If a device has multiple NMEA connections or multiple NMEA devices are attached, this API must be used instead of initializeService(). Call getProtocolList() on the device that is to be connected, determine the appropriate instance of NMEA, and pass its handle in as a parameter to this function.

See **Note1** and **Note2**.

Prototype

```
Common.ErrorCode initializeServiceByProtocol(1:i64 protocolHandle)
```

Parameters

`protocolHandle`	Protocol to use for the service.

Returns

None.

5.7.2.5 destroyService()

Closes a specified connection to a device and destroys this instance of the GPS service.

Prototype

```
Common.ErrorCode destroyService()
```

Returns

None.

5.7.2.6 getCurrentLocation()

Returns the current location as determined by the GPS device.

Prototype

```
Common.GpsPacket getCurrentLocation()
```

Parameters

None

Returns

GpsPacket object containing the GPS details, such as location, speed, etc.

A References

A.1 Acronyms and terms

Acronym or term	Definition
EFS	Encrypting File System
ESN	Electronic Serial Number
MBN	MCFG binaries
NV	Non-volatile
QDSS	Qualcomm Debug Subsystem
QMI	Qualcomm MSM Interface
QSH	Qualcomm Sherlock Holmes
QUTS	Qualcomm Unified Tools Service
RPC	Remote Procedure Call
SPC	Service Programming Code