Modular Cable Modem Termination System
DOCSIS MPEG Transport Manual Mode

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The Modular Cable Modem Termination System (M-CMTS) DOCSIS MPEG Transport (D-MPT) Manual Mode feature on the Cisco RF Gateway 10 (RFGW-10) Universal Edge Quadrature Amplitude Modulation (UEQAM) processes the D-MPT traffic from the M-CMTS core.

You can use the CLI to set up D-MPT sessions manually.

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the “Feature Information for M-CMTS D-MPT Manual Mode” section on page 33.

Use Cisco Feature Navigator to find information about platform support and Cisco IOS, Catalyst OS, and Cisco IOS XE software image support. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.
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- Restrictions for M-CMTS D-MPT Manual Mode, page 28
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Prerequisites for M-CMTS D-MPT Manual Mode

- You must use EQAM software and hardware revisions with Downstream External PHY Interface (DEPI) support.

Restrictions for M-CMTS D-MPT Manual Mode

- The Cisco uBR10000 Series Universal Broadband Router Shared Port Adapter (SPA) Controller configuration should match both the EQAM Gigabit Ethernet and 10 Gigabit Ethernet configuration and the RF configuration.
- The dest_ip_address must be of the front panel Gigabit Ethernet port on the Cisco RFGW-10 UEQAM that is connected to the SPA on the Cisco uBR10000 Series Universal Broadband Router.

Information About M-CMTS D-MPT Manual Mode

The interface between the M-CMTS Core and the EQAM is defined by the Downstream External PHY Interface (DEPI), which is an IP tunnel containing both a data path for DOCSIS frames, and a control path for session set-up, maintenance, and tear-down. It is based on the Layer 2 Tunneling Protocol version 3 (L2TPv3). It defines two basic encapsulation techniques for DOCSIS: the DOCSIS MPT (D-MPT) mode, and the Packet Streaming Protocol (PSP) mode. D-MPT places integer number of MPEG transport packets (TP) into the L2TP payload. This mode is defined for interoperability with legacy video QAM devices. Only one D-MPT flow can be present in a QAM channel. The EQAM extracts the MPEG transport packets within the DEPI payload and forwards them to the output QAM. Bonded DOCSIS through downstream channel bonding is a technique of grouping multiple QAM channels into a bonding group to provide a logical downstream channel with larger aggregated bandwidth. Bonded traffic can be encapsulated in D-MPT. In D-MPT mode, the DOCSIS frame is first encapsulated in 188-byte MPEG-TS packets, and then placed into the L2TPv3. You can place up to 7 MPEG-TS packets in a single IP packet.
- D-MPT traffic from the M-CMTS Core will contain SYNC messages (DOCSIS time stamps). The EQAM will find all the SYNC messages in the D-MPT payload and correct the SYNC values.
The D-MPT mode is considered “best-effort” mode. This means that all attempts are made to process the D-MPT data with the lowest delay through both the network and the EQAM, but no guarantee of quality of service (QoS) is offered.

Note

The PSP mode is not supported in this release.

How to Configure M-CMTS D-MPT Manual Mode

This section describes how to configure M-CMTS D-MPT Manual Mode in Cisco RFGW-10 UEQAM:

- Creating DEPI Manual Sessions, page 29
- Displaying DEPI Manual Sessions, page 31

Creating DEPI Manual Sessions

This section describes how to configure DEPI Manual Sessions.

Restrictions

- The session ID used should match with the controller configuration of the SPA on the Cisco uBR10000 Series Universal Broadband Router.
- The session ID should be unique, and cannot be shared with other DEPI sessions configured in the same chassis.

SUMMARY STEPS

1. enable
2. configure terminal
3. interface qam slot/port/channel
4. cable mode depi local
5. cable depi dest_ip ip_addr session-id id#
6. exit
7. write memory

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DETAILED STEPS

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
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<tbody>
<tr>
<td>Step 1 enable</td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Router&gt; enable</td>
<td></td>
</tr>
<tr>
<td>Step 2 configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Router# configure terminal</td>
<td></td>
</tr>
<tr>
<td>Step 3 interface qam slot/port.channel</td>
<td>Configures the interface on the QAM line card and enters</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Router(config)# interface qam 3/1.1</td>
<td>interface configuration mode.</td>
</tr>
<tr>
<td>Step 4 cable mode depi local</td>
<td>Configures the QAM interface for the DEPI.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Router(config-if)# cable mode depi local</td>
<td>You should set the DEPI mode before further configurations. Although the mode setting is at QAM channel level, all channels in a QAM port should be assigned to DEPI.</td>
</tr>
<tr>
<td>Step 5 cable depi dest_ip ip_addr session-id id#</td>
<td>Configures a DEPI session with the session destination IP address on the Cisco RFGW-10 UEQAM and the session ID.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Router(config-if)# cable depi dest_ip 1.1.1 session-id 1</td>
<td></td>
</tr>
<tr>
<td>Step 6 exit</td>
<td>Exits the interface configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Router(config-depi-class)# exit</td>
<td></td>
</tr>
<tr>
<td>Step 7 write memory</td>
<td>Saves your settings to the nonvolatile random access memory (NVRAM) to ensure that the system retains the settings after a power cycle.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Router# write memory</td>
<td></td>
</tr>
</tbody>
</table>

Example

The following sample output of the `show running interface qam slot/port.channel` command shows the DEPI Manual Session configured on the Cisco RFGW-10 UEQAM:

```
Router# show running interface qam 3/1.1
Building configuration...
Current configuration : 196 bytes
!
interface Qam3/1.1
  cable mode depi local
  no cable downstream rf-shutdown
  cable downstream frequency 477000000
  cable depi dest-ip 11.12.13.15 session-id 311
```
Displaying DEPI Manual Sessions

To display the DEPI Manual Session details, use the following command in privileged EXEC mode:

```
Router# show cable depi-sessions manual {summary | session id}
```

The following is sample output for the `show cable depi-sessions manual summary` command:

```
Router# show cable depi-sessions manual summary
List of the Configured Depi Sessions
ID      Type                State      Qam-info   PWtype
x-------x-------------------x----------x----------x--------
311     MANUAL_DEPI_OVER_IP ACTIVE     Qam3/01.1  DMPT
11012   MANUAL_DEPI_OVER_IP ACTIVE     Qam3/01.2  DMPT
11013   MANUAL_DEPI_OVER_IP ACTIVE     Qam3/01.3  DMPT
30011   MANUAL_DEPI_OVER_IP ACTIVE     Qam5/01.1  DMPT
30012   MANUAL_DEPI_OVER_IP ACTIVE     Qam5/01.2  DMPT
30013   MANUAL_DEPI_OVER_IP ACTIVE     Qam5/01.3  DMPT
```

The following is sample output for the `show cable depi-sessions manual session id` command:

```
Router# show cable depi-sessions manual 311
Detailed Info about Session with id# 311:
Type               : MANUAL_DEPI_OVER_IP
Name               :
State              : ACTIVE
Remote id          : 0
DestIP addr        : 11.12.13.15
Qam slotid         : 3
Qam portid         : 1
Qam ch id          : 1
Payload type       : DEPI_PW_TYPE_D_MPT
Sync Mode          : ENABLE
Sync Intl          : 100
Up time            : 00:08:26

<< Session Statistic >>
Session is off     : 0
Broken seq num     : 0
Bad depi header    : 0
Bad MPEG sync byte : 0
In packet rate     : 417 pps
In bit rate        : 959048 bps
Out bit rate       : 818936 bps

<< Flow Statistic >>
Total packet       : 7060
Total byte         : 1327280
Total segment      : 7060
Discards           : 0
Errors             : 0
Bad pyld size      : 0
Cmd buf ovfw       : 0
```
Additional References

The following sections provide references related to the M-CMTS D-MPT Manual Mode feature.

Related Documents

<table>
<thead>
<tr>
<th>Related Topic</th>
<th>Document Title</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>rf_gateway/command/reference/RFGW-10_Book.html</td>
</tr>
<tr>
<td>New Software Features in Cisco IOS</td>
<td>Cisco RF Gateway 10 Software Feature and Configuration Guide</td>
</tr>
</tbody>
</table>

Standards

<table>
<thead>
<tr>
<th>Standard</th>
<th>Title</th>
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<tr>
<td>CM-SP-DEPI-I07-100115</td>
<td>Data-Over-Cable Service Interface Specifications Modular CMTS Downstream External PHY Interface Specification</td>
</tr>
</tbody>
</table>

MIBs

<table>
<thead>
<tr>
<th>MIB</th>
<th>MIBs Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOCS-IF-MCMTS-MIB</td>
<td>To locate and download MIBs for selected platforms, Cisco IOS releases,</td>
</tr>
<tr>
<td></td>
<td>and feature sets, use Cisco MIB Locator found at the following URL:</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a></td>
</tr>
</tbody>
</table>

RFCs

<table>
<thead>
<tr>
<th>RFC</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>No new or modified RFCs are supported</td>
<td>—</td>
</tr>
</tbody>
</table>
| by this feature, and support for existing RFCs has not been modified by this feature. | —
Technical Assistance

<table>
<thead>
<tr>
<th>Description</th>
<th>Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</td>
<td><a href="http://www.cisco.com/techsupport">http://www.cisco.com/techsupport</a></td>
</tr>
<tr>
<td>To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.</td>
<td></td>
</tr>
<tr>
<td>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</td>
<td></td>
</tr>
</tbody>
</table>

Command Reference


- `interface qam slot/port/channel`
- `cable mode depi local`
- `cable depi dest_ip ip_addr session-id id#`
- `show cable depi-sessions manual {summary | session id}`

Feature Information for M-CMTS D-MPT Manual Mode

Table 1 lists the release history for this feature.

Not all commands may be available in your Cisco IOS software release. For release information about a specific command, see the command reference documentation.

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which Cisco IOS, Catalyst OS, and Cisco IOS XE software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

Note: Table 1 lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release train. Unless noted otherwise, subsequent releases of that Cisco IOS software release train also support that feature.
Table 1: Feature Information for M-CMTS D-MPT Manual Mode

<table>
<thead>
<tr>
<th>Feature Name</th>
<th>Releases</th>
<th>Feature Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-CMTS D-MPT Manual Mode</td>
<td>12.2(44)SQ</td>
<td>This feature was introduced in the Cisco IOS Release 12.2(44)SQ to support the Cisco RF Gateway 10. The following commands were introduced or modified:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• interface qam slot/port/channel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• cable mode depi local</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• cable depi dest_ip ip_addr session-id id#</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• show cable depi-sessions manual {summary</td>
</tr>
</tbody>
</table>

Glossary

DEPI—Downstream External PHY Interface

D-MPT—DOCSIS MPEG Transport

DOCSIS—Data Over Cable Service Interface Specifications

EQAM—Edge Quadrature Amplitude Modulation. A network element, which receives MPEG-TS frames over a network interface such as Ethernet, and modulates them onto QAM carriers for use on an HFC plant.

L2TPv3—Layer 2 Tunneling Protocol version 3

M-CMTS—Modular Cable Modem Termination System

PSP—Packet Streaming Protocol

QoS—Quality of Service

SPA—Shared Port Adapter