Video Encryption

The Cisco cBR-8 supports PowerKey and Privacy Mode Encryption (PME) encryption CA systems for Video On Demand (VOD) sessions to address security concerns. However, only one encryption type can be installed on the line card. There are two levels to the CA system. The lower level encrypts the actual data streams. The upper level specifies the control words that are used to encrypt the data streams.

- Information About Encryption, page 1
- How to Configure Encryption for the Data Stream, page 2
- Configuration Examples for Encryption, page 3
- Configuring Privacy Mode Encryption, page 3
- Feature Information for Encryption, page 6

Information About Encryption

The encrypted sessions can be created on any QAM carriers on a line card. Only the Single Program Transport Stream (SPTS) VOD session can be encrypted. Encryption is not supported on the Pass-through, and Data-piping sessions.

The VOD session can be encrypted in any of the following types of encryption:

- PowerKey for video session management protocol GQI
- Privacy Mode Encryption (PME) for Table-based session
- Digital Video Broadcasting (DVB)

The scrambler mode varies based on the type of encryption, as given in the following table:

<table>
<thead>
<tr>
<th>Encryption Type</th>
<th>Scrambler Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>PowerKey</td>
<td>DES, 3DES</td>
</tr>
<tr>
<td>PME</td>
<td>DVS-042</td>
</tr>
</tbody>
</table>

Table 1: Supported Encryption Types and Scrambler Modes
<table>
<thead>
<tr>
<th>Encryption Type</th>
<th>Scrambler Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVB</td>
<td>DVB-CSA</td>
</tr>
</tbody>
</table>

**Prerequisites for Encryption**

You should configure the Virtual Carrier Group (VCG) to setup an encrypted session. For more details, see the [Configuring Virtual Carrier Group](#) on page 2.

**How to Configure Encryption for the Data Stream**

This section describes how to configure encryption for the video session on Cisco cBR-8.

- Enforcing Data Stream Encryption Type, on page 2
- Configuring Virtual Carrier Group, on page 2
- Verifying Encryption Configuration, on page 3

**Enforcing Data Stream Encryption Type**

> **Note**

Once the line card and VCG are configured for PowerKey encryption, further configuration of the Cisco cBR-8 is not required.

To configure the encryption type for a VOD session, perform the following steps:

**Before You Begin**

Configure the Virtual Carrier Group (VCG) to setup an encrypted session. For more details, see .

```
enable
cfg-term
 cable video
 encryption
 linecard slot/bay ca-system {dvb | pme | powerkey} scrambler scrambler-type
 exit
```

**Configuring Virtual Carrier Group**

To configure the Virtual Carrier Group (VCG) for setting up an encrypted session, perform the following steps:

```
enable
cfg-term
 cable video
 virtual-carrier-group name {id #}
 rf-channel start-channel#-end-channel# tsid start-tsid-end-tsid output-port-number start-number-end-num
```
Verifying Encryption Configuration

To verify the encryption configurations, use the following command:

```
show cable video encryption linecard [all | slot number]
```

**Example 1:**
```
Router#show cable video encryption linecard 7/0 Line card: 7/0
CA System Scrambler
-----------------------------------------------
powerkey des
```

**Example 2:**
```
Router#show cable video encryption linecard all Line card: 7/0
CA System Scrambler
-----------------------------------------------
powerkey des
```

Configuration Examples for Encryption

This section provides configuration examples for the Encryption feature.

**Example: Enforcing Data Stream Encryption Type**

The following is a sample in which the line card in slot 7 is configured for powerkey encryption.

```
Router(config)#cable video
Router(config-video)#encryption
Router(config-video-encrypt)#linecard 7/0 ca-system powerkey scrambler des
```

**Example: Configuring Virtual Carrier Group**

The following is a sample in which the QAM channel from 64 to 158 are encryption capable if the virtual channels are successfully bound to a Service Distribution Group. The sessions created on those QAM carriers are encrypted using the scrambler installed on the line card.

```
Router(config)#cable video
Router(config-video)#virtual-carrier-group sdv-grp
Router(config-video-vcg)#rf-channel 64-158 tsid 64-158 output-port-number 64-158
Router(config-video-vcg)virtual-edge-input 14.1.1.1 input-port-number 1
Router(config-video-vcg)encrypt
Router(config-video-vcg)#exit
```

**Configuring Privacy Mode Encryption**

Only one device from the MSO site can communicate with the Encryption Renewal System (ERS) and obtain the latest ECM templates. The CEM communicates with the ERS and sends the ECM templates to the Cisco Edge QAM devices in the MSO site.

You can configure the following:
• VODS-ID—IDs assigned by CCAD or ARRIS to the MSO site. The configured VODS-ID on the Cisco cBR-8 and the CEM must be same.

• CEM IP—Interface IP of the Windows/Linux system through which the CEM can be reached by Cisco cBR-8.

• CEM Port—Port number on which the CEM listens for connections from the Cisco cBR-8.

• Management Interface—Source IP address of the Cisco cBR-8 virtual interface through which the connection must be established with the CEM server.

There can be only one entry for VODS-ID, CEM IP, CEM Port, and Management Interface IP. If you configure any new values for these parameters, the previous configuration is cleared. You can clear the configurations using the 'no' form of the command.

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### Configuring VODS-ID

To configure the VODS-ID of the CEM, perform the following steps:

```bash
enable
configure terminal
cable video
encryption
pme vodsid id
exit
```

### Configuring CEM IP and Port

To configure the CEM IP and port of the CEM, perform the following steps:

```bash
enable
configure terminal
cable video
encryption
pme cem ip-address tcp_port
exit
```

### Configuring Management IP

To configure the PME management IP address to establish CEM connection, perform the following steps:

**Before You Begin**

The virtual port group must be configured before configuring the management IP. For more information, see the Configuring a VirtualPortGroup Interface section.

```bash
enable
configure terminal
cable video
encryption
```
**Verifying PME Connection Status**

To verify the connection status between the Cisco Converged EdgeQAMManager (CEM) application and the Cisco cBR-8, use the following command:

```
show cable video encryption linecard (all | slot number)
```

This command displays the following information:

- **VODS-ID**—Specifies the configured VODS-ID on the CEM and Cisco cBR-8.
- **CEM IP**—Specifies the IP through which CEM can be reached by Cisco cBR-8.
- **CEM Port**—Specifies the port on which the CEM obtain connections from Cisco cBR-8.
- **Local Mgmt IP**—Specifies the Cisco cBR-8 interface through which the connection is established with the CEM.
- **Local Port**—Specifies the Local Port number assigned for the connection with the CEM.
- **CEM Connection State**—Specifies the status of the connection with the CEM (Connected (or) Not Connected).
- **Count of ECMs recd**—Specifies the count of ECMs received from the CEM.

**Example:**

This is a sample output of the show command that displays the connection status of PME.

```
Router# show cable video encryption pme status
PME Connection Status:
VODS-ID : 111
CEM IP : 1.200.1.163
CEM Port : 5000
Local Mgmt IP : 1.24.2.6
Local Port : 50394
CEM Connection State : Connected
Count of ECMs recd : 2
```

**Verifying PME Version**

To verify the version information of the PME module loaded in the chassis, use the following command:

```
show cable video encryption pme version
```

The version information is read from the IOS PME subsystem. The version information displays in MAJOR.MINOR version format.

**Example:**

This is a sample output of the show command that displays the version details of PME.

```
Router# show cable video encryption pme version
PME Version: 1.0
```
Verifying PME Sessions on a Line Card

To verify the sessions that use the PME modules that are loaded on a specific line card, use the following command:

```
show cable video encryption pme linecard {slot | bay} session {1-65535 | all | summary}
```

**Example 1:**

This is a sample output of the show command that displays the session details that use PME modules.

```
Router# show cable video encryption pme linecard 7/0 session all
Count of ECMG Streams: 4
Stream ID = 32
ECM requests = 8 ECM replies = 2
ECM ID = 32 CryptoPeriod num = 2
Nominal duration = 40000
CA transfer mode = 1 Stream status = No Error
```

**Feature Information for Encryption**

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which 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.

The table below lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

<table>
<thead>
<tr>
<th>Feature Name</th>
<th>Releases</th>
<th>Feature Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encryption</td>
<td>Cisco IOS XE Everest 16.6.1</td>
<td>This feature was integrated on the Cisco cBR Series Converged Broadband Routers.</td>
</tr>
</tbody>
</table>