



## Cable Commands: cable m

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Revised: March 30, 2009, OL-15510-09

### New Commands

Command	Cisco IOS Software Release
<code>cable modem service-class-name</code>	12.3(23)BC2
<code>cable multicast group-encryption</code>	12.2(33)SCA
<code>cable multicast group-qos</code>	12.2(33)SCA
<code>cable multicast qos group</code>	12.2(33)SCA
<code>cable multicast auth enable default-action</code>	12.2(33)SCB
<code>cable multicast auth profile-name</code>	12.2(33)SCB

### Modified Commands

Command	Cisco IOS Software Release
<code>cable modem remote-query</code>	12.3(23)BC

# cable map-advance

To configure the dynamic map advance algorithm, use the **cable map-advance** command in cable interface configuration mode. Use the **no** form of this command to disable this function.

**cable map-advance** [**dynamic** [*safety*] | **static**] [*max-delay*]

**no cable map-advance**

## Syntax Description

<b>dynamic</b> <i>safety</i>	Enables the dynamic MAP advance algorithm that automatically tunes lookahead time in MAPs based on the current farthest CM on a particular upstream port. The <i>safety</i> argument specifies a safety factor for the dynamic map advance algorithm in microseconds. This value controls the amount of extra lookahead time in MAPs to account for inaccuracies of the measurement system and internal software latencies. The valid range is 300 to 1500 microseconds, with a default of 1000.
	<b>Note</b> Using larger safety factors increases the run time lookahead in MAPs, but reduces the upstream performance.
<b>static</b>	Enables the static map advance algorithm that uses a fixed lookahead time value in MAPs based on the worst-case propagation delay of 100 mile HFC cable network.
<i>max-delay</i>	Specifies the maximum round trip delay between the cable plant and furthest CM in microseconds. The valid range is 100 to 2000 microseconds, with a default of 1800. The typical delay for a mile of coaxial cable is approximately 7 microseconds. The typical delay for a mile of fiber cable is approximately 8 microseconds.

## Defaults

Dynamic map advance with a *safety* factor of 1000 microseconds and a *max-delay* of 1800 microseconds

## Command Modes

Interface configuration (cable interface only)

## Command History

Release	Modification
12.1T	This command was introduced.
12.0(9)SC, 12.1(2)EC1	The <b>dynamic</b> option was added.
12.1(10)EC	The <i>max-delay</i> option was added. The dynamic MAP algorithm was also enhanced so that it can quickly determine whether the furthest CM is now offline, so that the MAP advance algorithm can be updated accordingly.
12.2(8)BC1	The range for the <i>max-delay</i> option was changed to the current values of between 100 and 2000 microseconds.

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**Usage Guidelines**

The *max-delay* option, which was introduced in Cisco IOS Release 12.1(10)EC, specifies the maximum possible round-trip delay between the cable plant and furthest CM in the cable network. A CM will not be allowed to exceed the maximum timing offset given by the *max-delay* value (in **static** mode) or given by the combination of the *max-delay* and *safety* values (in **dynamic** mode). If a CM reports a timing offset beyond the maximum value, the CMTS will reset its offset to the maximum value and put an exclamation point (!) next to its offset value in the **show cable modem** display.

In dynamic MAP operation, Cisco IOS 12.1(10)EC also implements a regular polling of the furthest CM, to determine if that CM is now offline. If the furthest CM has gone offline, the CMTS scans the currently online CMs to determine which CM is now the furthest offline and updates the dynamic MAP advance algorithm with the new value.

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**Examples**

The following example shows how to configure the dynamic map advance to 1500 microseconds:

```
router(config-if)# cable map-advance dynamic 1500
```

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**Related Commands**

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<b>show cable modem</b>	Displays statistics for the connected CMs.
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# cable match address

To specify that IP multicast streams be encrypted, use the **cable match address** command in cable interface configuration mode. To specify that multicast streams should not be encrypted, use the **no** form of this command.

**cable match address** *access-list*

**no cable match address**

## Syntax Description

*access-list* Specifies that the IP multicast streams defined by the access list be encrypted. Access lists can be IP access list numbers or an IP access list name. Valid access list numbers are from 100 to 199.

## Command Default

No default behavior or values

## Command Modes

Interface configuration—cable interface only (config-if)

## Command History

Release	Modification
12.1 T	This command was introduced.
12.3BC	This command was integrated into Cisco IOS Release 12.3BC.
12.2(33)SCA	This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.

## Usage Guidelines

The **cable match address** command binds an access-list to a cable interface, allowing multicast encryption to be performed on traffic through that interface. To configure the access list, use the **ip access-list** command.



### Note

This command is not available for cable subinterfaces.

For additional information on configuring for multicast operations, see the chapters on IP Multicast in the *Release 12.2 Cisco IOS IP Configuration Guide* and in Volume 3 of the *Cisco IOS IP Command Reference*.



### Note

This command is available only on images that support Baseline Privacy Interface (BPI) and Baseline Privacy Interface Plus (BPI+) encryption.

## Examples

The following example shows how to specify that the multicast stream defined by the access list named **reno** be encrypted on cable interface 3/0:

```
Router(config)# interface c3/0
```

```
Router(config-if)# cable match address reno
```

The following example shows how to specify that the multicast stream defined by the access list number 102 be encrypted:

```
Router(config)# interface c3/0  
Router(config-if)# cable match address 102
```

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**Related Commands**

Command	Description
<b>ip access-list</b>	Defines an IP access list by name.

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# cable max-hosts

To specify the maximum number of hosts that can be attached to a subscriber's CM, use the **cable max-hosts** command in cable interface configuration mode. Use the **no** form of this command to reset the allowable number of hosts attached to a CM to the default value of 0 hosts.

**cable max-hosts** *n*

**no cable max-hosts**

## Syntax Description

*n* Specify the maximum number of hosts that can be attached to a CM on this interface. Valid range is from 0 to 255 hosts. Default value is 0.

## Command Default

0

## Command Modes

Interface configuration (cable interface only)

## Command History

Release	Modification
12.0(4)XI	This command was introduced.
12.0(6)SC, 12.1(2)EC1	Support was added on the Cisco IOS 12.0 SC and 12.1 EC release trains.

## Usage Guidelines

The Cisco CMTS uses three commands set the maximum number of hosts for a particular CM, for all CMs on a particular cable interface, or for all CMs using the Cisco CMTS router:

- **cable modem max-hosts**—Sets the maximum number of hosts for a particular CM.
- **cable max-hosts**—Sets the maximum number of hosts for all CMs on a particular cable interface.
- **cable modem max-cpe**—Sets the maximum number of hosts for all CMs using the Cisco CMTS router.

The more specific commands override the settings of the less specific commands. For example, if you use the **cable modem max-cpe** command to set the maximum number of hosts to 2 for all CMs, you can still use the **cable modem max-hosts** command to give a particular CM a larger maximum host value.



### Note

The CMTS assigns the MAX Host value to a cable modem at the time that the cable modem registers with the CMTS. Changing any of the MAX Host commands affects only cable modems that register after the change.



### Tip

For more information on how these commands interact to set the maximum CPE values, see the chapter *Maximum CPE or Host Parameters for the Cisco Cable Modem Termination System* in the *Cisco CMTS Feature Guide*, available on Cisco.com and the Documentation CD-ROM.

**Examples**

The following example shows how to set the maximum hosts for CMs on this particular cable interface to 15:

```
Router(config)# interface c6/0  
Router(config-if)# cable max-hosts 15
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>cable modem access-group</b>	Specifies an access group for a CM.
<b>cable modem change-frequency</b>	Changes the downstream frequency or upstream channel ID.
<b>cable modem max-cpe</b>	Sets the maximum number of hosts for all CMs using the Cisco CMTS router.
<b>cable modem max-hosts</b>	Sets the maximum number of hosts for a particular CM.
<b>show cable modem</b>	Displays CM configuration settings.

# cable metering data-per-session

To view the number of cable metering data flows per session for a cable modem termination system, use the **cable metering data-per-session** command in the global configuration mode. To disable this feature, use the **no** form of this command.

**cable metering data-per-session** *data-per-session* **timer** *timer value*

**no cable metering data-per-session** *data-per-session* **timer** *timer value*

## Syntax Description

<i>data-per-session</i>	The number of data flows per session. The range is from 3 to 30. The default is 5.
<b>timer</b>	Displays the cable line card timer to wake up.
<i>timer value</i>	The timer wake up interval value in milliseconds. The range is from 8 to 500. The default is 100.

## Command Default

The cable metering data flow values will not be visible.

## Command Modes

Global configuration mode

## Command History

Release	Modification
12.2(33)SCB1	This command was introduced.
12.3(23)BC7	This command was integrated into Cisco IOS Release 12.3(23)BC7.

## Usage Guidelines

The **cable metering data-per-session** command allows users to view the number of cable metering data flows per session. The command limits or throttles the data collection between the cable line card and the route processor.

## Examples

The following example displays the number of cable metering data flows per session:

```
Router#configure terminal
Router(config)#cable metering data-per-session 8 timer 100
Router#show run | inc metering
cable metering destination 2.7.36.88 6789 0 15 non-secure
cable metering data-per-session 8 timer 100
```

## Related Commands

Command	Description
<b>show cable metering-status</b>	Displays information about the most recent successful usage-based billing operation.
<b>cable metering destination</b>	Enables usage-based billing and to stream the billing records to an external collection server,

## cable metering destination

To enable usage-based billing and to stream the billing records to an external collection server, use the **cable metering destination** command in global configuration mode. To disable usage-based billing, use the **no** form of this command.

**cable metering destination** *ip-address port* [*ip-address2 port2*] *retries minutes* {**non-secure** | **secure**} [**cpe-list-suppress**] [**flow-aggregate**]

**no cable metering**

Syntax	Description
<i>ip-address port</i>	Specifies the address and TCP port number for the billing application on the external server: <ul style="list-style-type: none"> <li><i>ip-address</i> = IP address for the external collection server.</li> <li><i>port</i> = TCP port number for the billing collection application on the server. The valid range is 0 to 65535, but the port should not be one of the well-known TCP port numbers (0 to 1024).</li> </ul>
<i>ip-address2 port2</i>	(Optional) Specifies the IP address and TCP port number for a billing application on a secondary external server that will be used if the primary server fails to respond: <ul style="list-style-type: none"> <li><i>ip-address2</i> = IP address for the secondary external server.</li> <li><i>port2</i> = TCP port number for the billing collection application on the secondary server. The valid range is 0 to 65535, but the port should not be one of the well-known TCP port numbers (0 to 1024).</li> </ul>
<i>retries</i>	Specifies the number of retry attempts that the CMTS will make to establish a secure connection with the external server before using the secondary server (if configured) and sending an SNMP trap about the failure. The valid range for <i>n</i> is 0 to 5, with a default of 1 retry attempt.
<i>minutes</i>	Specifies how often, in minutes, the billing records are streamed to the external server. The valid range is 15 to 1440 minutes (24 hours), with no default. <p><b>Note</b> We recommend a minimum interval of 30 minutes.</p>
<b>non-secure</b>	Specifies that the Cisco CMTS should use an unencrypted TCP connection when connecting with the billing application on the external server.
<b>secure</b>	Specifies that the Cisco CMTS should use a secure socket layer (SSL) TCP connection when connecting with the billing application on the external server. <p><b>Note</b> This option is available only on CMTS software images that support Baseline Privacy Interface (BPI) encryption.</p>
<b>cpe-list-suppress</b>	(Optional) Eliminates the customer premises equipment (CPE) IP addresses from the billing records to improve performance. <p><b>Note</b> The default is for CPE addresses to be included in the billing record, up to a maximum of 5 CPE IP addresses for each cable modem.</p>
<b>flow-aggregate</b>	(Optional) Combines all information for an individual cable modem into one record. Separate counters are maintained for upstream and downstream traffic, but those counters include all service flows in that direction.

**Defaults**

Usage billing is disabled. When enabled, CPE IP addresses (a maximum of five per cable modem) are included in the billing records by default.

**Command Modes**

Global configuration

**Command History**

Release	Modification
12.3(9a)BC	This command was introduced.
	<p><b>Note</b> In Cisco IOS Release 12.3(9a)BC, this command supports the monitoring of all service flows for DOCSIS 1.0, 1.1, and 2.0 cable modems:</p> <ul style="list-style-type: none"> <li>- upstream and downstream</li> <li>- primary</li> <li>- secondary</li> <li>- dynamic</li> </ul>

**Usage Guidelines**

The **cable metering destination** command enables usage-based billing and configures it for streaming mode, where the Cisco CMTS creates the billing records and regularly sends them to an external server for use by the billing application.

The Cisco CMTS attempts to establish a connection with the first (primary) external server, and if this fails, the CMTS sends an SNMP trap about the failure. The Cisco CMTS retries the connection for the number of times specified in the **cable metering destination** command, and if all of those attempts fail, the Cisco CMTS switches to the secondary external server, if configured. The Cisco CMTS repeats this sequence at every interval, and always tries to connect to the primary server first before attempting to use the secondary server.

**Note**

You can enable usage-based billing using either the **cable metering filesystem** or **cable metering destination** command, but not both. If you give these commands twice, the second command will overwrite the first.

If the CMTS cannot transmit the billing record to the external server, and if metering traps have been enabled using the **snmp-server enable traps cable metering** command, the CMTS sends an SNMP trap to the SNMP manager describing the reason for the failure. Typically, the reason is either that a timeout occurred with the external server, or that the billing record no longer exists on the local filesystem. An SNMP trap is sent for each connection failure.

To disable usage-based billing, use the **no cable metering** command. This immediately stops the collection of billing information, except when the billing records are currently being streamed to the external server. If a billing operation is in progress when you give the **no cable metering** command, the system displays the message “CMTS Metering in progress. Ignoring current config.” Wait until the billing operation is finished and then reenter the **no cable metering** command.

**Note**

If the **show cable metering-status** command displays the status of a streaming operation as “success” but the records were not received on the billing application server, verify that the Cisco CMTS and server are configured for the same type of communications (non-secure TCP or secure SSL). If the

Cisco CMTS is configured for non-secure TCP and the server is configured for secure SSL, the Cisco CMTS transmits the billing record successfully, but the server discards all of the data, because it did not arrive in a secure SSL stream.

## Examples

The following example shows how to enable usage-based billing for streaming mode, with the CMTS transmitting the billing records every 60 minutes to the server at the IP address of 10.10.10.37 and TCP port of 5215, using a secure socket layer (SSL) TCP connection. A secondary external service is also defined. The CMTS will retry the connection three times before giving up and switching to the secondary server, as well as sending an SNMPv3 trap to notify the SNMP management system of the failure:

```
U7246VXR# configure terminal
U7246VXR(config)# cable metering destination 10.10.10.37 5215 10.10.10.41 5215 3 60 secure
U7246VXR(config)#
```

The following example shows how to enable usage-based billing for streaming mode, with the CMTS transmitting the billing records every 30 minutes to the server at the IP address of 10.10.10.37 and TCP port of 8181, using an unencrypted TCP connection. No secondary server is defined. The CMTS will retry the connection only once before giving up and sending an SNMPv3 trap to notify the SNMP management system of the failure:

```
Router# configure terminal
Router(config)# cable metering destination 10.10.10.37 8181 1 30 non-secure
Router(config)#
```

The following example shows how to enable usage-based billing, using the same configuration as above, except that the billing records do not include the IP addresses for the CPE devices.

```
Router# configure terminal
Router(config)# cable metering destination 10.10.10.37 8181 1 30 non-secure
cpe-list-suppress
Router(config)#
```

## Related Commands

Command	Description
<b>cable metering filesystem</b>	Enables usage-based billing and writes the billing records to a file on a local file system.
<b>cable metering source-interface</b>	Enables debugging of usage-based billing operations.
<b>show cable metering-status</b>	Displays information about the most recent usage-based billing operation.
<b>snmp-server enable traps cable</b>	Enables the sending of Simple Network Management Protocol (SNMP) traps for cable-related events.

# cable metering filesystem

To enable usage-based billing and to write the records to a file on a local file system, use the **cable metering filesystem** command in global configuration mode. To disable usage-based billing, use the **no** form of this command.

**cable metering filesystem** *filesys* [**cpe-list-suppress**] [**flow-aggregate**]

**no cable metering**

## Syntax Description

<b>filesys</b>	Specifies the file system where the billing record file should be written. The <i>filesys</i> parameter has a maximum length of 25 characters and must specify a valid file system on the router (such as slot0, disk1, or flash).
	<b>Note</b> The system will write the billing records to this file system using a file name that consists of the router's hostname followed by a timestamp when the record was written.
<b>cpe-list-suppress</b>	(Optional) Eliminates the customer premises equipment (CPE) IP addresses from the billing records to improve performance.
	<b>Note</b> If this option is not selected, a maximum of 5 CPE IP addresses are included in the billing record for each cable modem.
<b>flow-aggregate</b>	(Optional) Combines all information for an individual cable modem into one record. Separate counters are maintained for upstream and downstream traffic, but those counters include all service flows in that direction.

## Defaults

Usage-based billing is disabled. When usage-based billing is enabled, CPE IP addresses (a maximum of five) are included in the billing records by default.

## Command Modes

Global configuration

## Command History

Release	Modification
12.3(9a)BC	This command was introduced.
	<b>Note</b> In Cisco IOS Release 12.3(9a)BC, this command supports the monitoring of all service flows for DOCSIS 1.0, 1.1, and 2.0 cable modems:
	<ul style="list-style-type: none"> <li>– upstream and downstream</li> <li>– primary</li> <li>– secondary</li> <li>– dynamic</li> </ul>

## Usage Guidelines

The **cable metering filesystem** command enables usage-based filling and configures it for file mode, where the CMTS writes the billing records to the local file system. The system writes the billing record to the filesystem specified by this command, using a file name that consists of the router's hostname followed by a timestamp for when the file was created.

When the CMTS writes a billing record, it can also optionally send an SNMPv3 trap to notify the billing application that a billing record is available for pickup. The billing application can then log into the Cisco CMTS and use the File Transfer Protocol (FTP) or Secure Copy (SCP) to pick up the file.

**Note**

You can enable usage-based billing using either the **cable metering filesystem** or **cable metering destination** command, but not both. If you give these commands twice, the second command will overwrite the first.

If the CMTS cannot write the billing record to the local filesystem, and if metering traps have been enabled using the **snmp-server enable traps cable metering** command, the CMTS sends an SNMP trap to the SNMP manager describing the reason for the failure. Typically, the reason is either that the disk is full or that an disk error occurred (such as no PCMCIA card in the slot).

To disable usage-based billing, use the **no cable metering** command. This immediately stops the collection of billing information, except when the billing records are currently being written to the local file system. If a billing operation is in progress when you give the **no cable metering** command, the system displays the message “CMTS Metering in progress. Ignoring current config.” Wait until the billing operation is finished and then reenter the **no cable metering** command.

**Examples**

The following example shows how to enable usage-based billing, writing the records to a file on the disk0: device.

```
U7246VXR# configure terminal
U7246VXR(config)# cable metering filesystem disk0:
U7246VXR(config)#
```

The following example shows how to enable usage-based billing, writing the records to files on the disk2 device on an NPE-G1 processor:

```
Router# configure terminal
Router(config)# cable metering filesystem disk2:
Router(config)#
```

The following example shows how to enable usage-based billing, writing the records to files in Flash Memory. The IP addresses for the CPE devices are not included in the billing records.

```
Router# configure terminal
Router(config)# cable metering filesystem flash: cpe-list-suppress
Router(config)#
```

**Related Commands**

Command	Description
<b>cable metering destination</b>	Enables usage-based billing and streams the billing records to an external server.
<b>cable metering source-interface</b>	Enables debugging of usage-based billing operations.
<b>show cable metering-status</b>	Displays information about the most recent usage-based billing operation.
<b>snmp-server enable traps cable</b>	Enables the sending of Simple Network Management Protocol (SNMP) traps for cable-related events.

# cable metering source-interface

To enable specification of the source-interface for the billing packets, use the **cable metering source-interface** command in privileged EXEC mode. To turn off the specified source-interface, use the **no** form of this command.

**cable metering source-interface** *interface*

**no cable metering source-interface** *interface*

## Syntax Description

<i>interface</i>	Specifies the source of the usage based billing packets originated by the router using the <b>cable metering source-interface</b> command. This is often used to set the source-interface as the ip address of the loopback interface.
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## Defaults

Usage billing is disabled. When enabled, CPE IP addresses (a maximum of five per cable modem) are included in the billing records by default.

## Command Modes

Global configuration

## Command History

Release	Modification
12.3(21)BC	This command was introduced.

## Usage Guidelines

The **cable metering source-interface** command enables the user to specify the source-interface of the usage based billing packets. All billing packets are usually automatically assigned a source-interface, but users using the **cable metering source-interface** command can set the source-interface to be the ip address of the loopback interface.

If the user does not specify the source-interface configuration, SAMIS will pick the highest IP address of the loopback interface as the source interface. If the loopback interface is not there, then SAMIS will select the highest IP of the physical interface for source interface.

Refer the DDTS for more info CSCek39658.



### Note

If a loopback interface is specified, the mac address would be that of the management interface in the docID in the billing packet.



### Note

The option of specifying the source-interface for metering is available only after the metering mode is configured.

If the **cable metering source-interface** command is used when the Usage-Based Billing feature is operating in the File Mode, the CMTS IP address in the billing packets will be changed to the ip address of the source-interface as specified through **cable metering source-interface** command or through setting the **ccmtrCollectionSrcIfIndex** object. The mac address in the billing packets' header will also be changed to the mac address of the source-interface.

If the **cable metering source-interface** command is used when the Usage-Based Billing feature is operating in the Streaming Mode, the CMTS IP address in the billing packets, as well as the source IP address of the billing packets, will be changed to the ip address of the source-interface as specified through **cable metering source-interface** command or through setting the **cmtrCollectionSrcIfIndex** object. The mac address in the billing packets' header will also be changed to the mac address of the source-interface.

When defining the source-interface, the following possible error checks can be performed to determine if the source-interface that the user has defined is a valid source-interface for metering:

1. Verify that the interface specified is up and has an ip address.
2. Verify that the ip address is in the same subnet/majornet as that of the destination address.



#### Note

Even after performing these error checks, there are no guarantees that the billing packets will be sent out since the TCP connection may not succeed due to the absence of a physical connection between the CMTS and the collection server.

#### Examples

The following is an example where the source-interface specified was a loopback interface and it had a mac-address of 000C31F6F400 and an ip address of 1.100.100.100.

```
Router# configure terminal
Router(config)# cable metering source-interface loopback 1.100.100.100

<?xmlversion="1.0" encoding="UTF8" ?><IPDRDocxmlns="http://www.ipdr.org/namespaces/ipdr"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="DOCSIS-3.5-A.0.xsd" docId="C7B1B20E-0000-0000-0000-000C31F6F400"
creationTime="2006-03-02T18:03:58Z" IPDRRecorderInfo="VXR3" version="3.5-A.0"><IPDR
xsi:type="DOCSIS-Type"><IPDRcreationTime>2006-03-02T18:03:58Z</IPDRcreationTime><CMTShostn
ame>VXR3</CMTShostname><CMTSipAddress>1.100.100.100</CMTSipAddress><CMTSsysUpTime>185867
</CMTSsysUpTime><CMTScatvIfName>Cable4/0</CMTScatvIfName><CMTScatvIfIndex>16</CMTScatvIfIn
dex><CMTSupIfName>Ca4/0-upstream0</CMTSupIfName><CMTSupIfType>129</CMTSupIfType><CMTSdownI
fName>Ca4/0-downstream</CMTSdownIfName><CMmacAddress>00-07-0E-07-0B-0D</CMmacAddress><CMip
Address>11.11.0.2</CMipAddress><CMdocsisMode>1.0</CMdocsisMode><Rectype>1</Rectype><servic
eIdentifier>0</serviceIdentifier><serviceClassName></serviceClassName><serviceDirection>1<
/serviceDirection><serviceOctetsPassed>6225</serviceOctetsPassed><servicePktsPassed>21</s
ervicePktsPassed><serviceSlaDropPkts>0</serviceSlaDropPkts><serviceSlaDelayPkts>1</serviceS
laDelayPkts><serviceTimeCreated>0</serviceTimeCreated><serviceTimeActive>0</serviceTimeAct
ive></IPDR><IPDR
xsi:type="DOCSIS-Type"><IPDRcreationTime>2006-03-02T18:03:58Z</IPDRcreationTime><CMTShostn
ame>VXR3</CMTShostname><CMTSipAddress>1.100.100.100</CMTSipAddress><CMTSsysUpTime>185867
</CMTSsysUpTime><CMTScatvIfName>Cable4/0</CMTScatvIfName><CMTScatvIfIndex>16</CMTScatvIfIn
dex><CMTSupIfName>Ca4/0-upstream0</CMTSupIfName><CMTSupIfType>129</CMTSupIfType><CMTSdownI
fName>Ca4/0-downstream</CMTSdownIfName><CMmacAddress>00-07-0E-07-0B-0D</CMmacAddress><CMip
Address>11.11.0.2</CMipAddress><CMdocsisMode>1.0</CMdocsisMode><Rectype>1</Rectype><servic
eIdentifier>0</serviceIdentifier><serviceClassName></serviceClassName><serviceDirection>2<
/serviceDirection><serviceOctetsPassed>12300</serviceOctetsPassed><servicePktsPassed>29</s
ervicePktsPassed><serviceSlaDropPkts>0</serviceSlaDropPkts><serviceSlaDelayPkts>13</servic
eSlaDelayPkts><serviceTimeCreated>0</serviceTimeCreated><serviceTimeActive>0</serviceTimeA
ctive></IPDR><IPDRDoc.End count="2" endTime="2006-03-02T18:03:59Z"/></IPDRDoc>

Router(config)#
```

The following is an example where the source-interface specified was a loopback interface and it had a mac-address of 00027D67DC0 and an ip address of 2.90.100.100.

```
Router# configure terminal
Router(config)# cable metering source-interface loopback 2.90.100.10

Accept 2.90.100.100:42380
```

```
<?xmlversion="1.0"encoding="UTF8"?><IPDRDocxmlns="http://www.ipdr.org/namespaces/ipdr"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="DOCSIS-3.5-A.0.xsd" docId="C7B701D1-0000-0000-0000-00027D67DC00"
creationTime="2006-03-06T18:45:37Z" IPDRRecorderInfo="ubr7246-R7427"
version="3.5-A.0"><IPDR
xsi:type="DOCSIS-Type"><IPDRcreationTime>2006-03-06T18:45:37Z</IPDRcreationTime><CMTShostn
ame>ubr7246-R7427</CMTShostname><CMTSipAddress>2.90.100.100</CMTSipAddress><CMTSsysUpTime>
372172
</CMTSsysUpTime><CMTScatvIfName>Cable3/0</CMTScatvIfName><CMTScatvIfIndex>5</CMTScatvIfInd
ex><CMTSupIfName>Ca3/0-upstream0</CMTSupIfName><CMTSupIfType>129</CMTSupIfType><CMTSdownIf
Name>Ca3/0-downstream</CMTSdownIfName><CMmacAddress>00-50-04-F9-EF-88</CMmacAddress><CMipA
ddress>11.40.1.2</CMipAddress><CMdocsisMode>1.0</CMdocsisMode><Rectype>1</Rectype><service
Identifier>3</serviceIdentifier><serviceName></serviceName><serviceDirection>2</
serviceDirection><serviceOctetsPassed>228392</serviceOctetsPassed><servicePktsPassed>2216</
servicePktsPassed><serviceSlaDropPkts>0</serviceSlaDropPkts><serviceSlaDelayPkts>0</servi
ceSlaDelayPkts><serviceTimeCreated>6500</serviceTimeCreated><serviceTimeActive>3648</servi
ceTimeActive></IPDR><IPDR
xsi:type="DOCSIS-Type"><IPDRcreationTime>2006-03-06T18:45:37Z</IPDRcreationTime><CMTShostn
ame>ubr7246-R7427</CMTShostname><CMTSipAddress>2.90.100.100</CMTSipAddress><CMTSsysUpTime>
372172
</CMTSsysUpTime><CMTScatvIfName>Cable3/0</CMTScatvIfName><CMTScatvIfIndex>5</CMTScatvIfInd
ex><CMTSupIfName>Ca3/0-upstream0</CMTSupIfName><CMTSupIfType>129</CMTSupIfType><CMTSdownIf
Name>Ca3/0-downstream</CMTSdownIfName><CMmacAddress>00-50-04-F9-EF-88</CMmacAddress><CMipA
ddress>11.40.1.2</CMipAddress><CMdocsisMode>1.0</CMdocsisMode><Rectype>1</Rectype><service
Identifier>4</serviceIdentifier><serviceName></serviceName><serviceDirection>1</
serviceDirection><serviceOctetsPassed>200134</serviceOctetsPassed><servicePktsPassed>2197</
servicePktsPassed><serviceSlaDropPkts>0</serviceSlaDropPkts><serviceSlaDelayPkts>0</servi
ceSlaDelayPkts><serviceTimeCreated>6500</serviceTimeCreated><serviceTimeActive>3648</servi
ceTimeActive></IPDR><IPDRDoc.End count="2" endTime="2006-03-06T18:45:37Z"/></IPDRDoc>
Closing socket 2.90.100.100:42380
```

Router (config) #

## Related Commands

Command	Description
<b>cable metering source-interface</b>	Enables usage-based billing and streams the billing records to an external server.
<b>cable metering filesystem</b>	Enables usage-based billing and writes the billing records to a file on a local file system.
<b>debug cable remote-query</b>	Turns on debugging to gather information from remote CMs.
<b>show cable metering-status</b>	Displays information about the most recent usage-based billing operation.
<b>snmp-server enable traps cable</b>	Enables the sending of Simple Network Management Protocol (SNMP) traps for cable-related events.

# cable modem access-group

To configure the access-group for a CM, use the **cable modem access-group** command in privileged EXEC mode. To disable the specification, use the **no access-group** form of this command.

```
cable modem {mac-addr | ip-addr} access-group [access-list | access-name]
```

```
cable modem {mac-addr | ip-addr} no access-group
```



## Note

The **cable modem access-group** command is not supported on the Cisco uBR10012 universal broadband router.

## Syntax Description

<i>ip-addr</i>	Specifies the IP address for the CM.
<i>mac-address</i>	Specifies the MAC address for the CM.
<i>access-list</i>	Specifies the IP access list (standard or extended). Valid values are 1 to 199.
<i>access-name</i>	Specifies the access-list name.

## Command Default

No default behaviors or values

## Command Modes

Privileged EXEC

## Command History

Release	Modification
11.3(8) NA	This command was introduced.
12.2(4)BC1	The functionality of this command was made identical to that of the <b>cable host access-group</b> command, but both commands were retained for backwards compatibility.

## Examples

The following example shows the **cable modem access-group** command assigning access-list 1 to the CM with the MAC address of **abcd.ef01.2345**:

```
Router# cable modem abcd.ef01.2345 access-group 1
Router#
```

## Related Commands

Command	Description
<b>cable host access-group</b>	Configures the access list for a host.
<b>cable modem change-frequency</b>	Changes the downstream frequency or upstream channel ID.
<b>cable modem max-hosts</b>	Specifies the maximum hosts for a CM.
<b>cable modem qos profile</b>	Specifies the QoS profile for a CM.
<b>show cable modem</b>	Displays CM configuration settings.

# cable modem change-frequency

To override the frequency used by a CM, use the **cable modem change-frequency** command in privileged EXEC mode.

```
cable modem {mac-addr | ip-addr} change-frequency
           {ds-frequency-hz [us-channel-id] | us-channel-id}
```

Syntax Description		
<i>ip-addr</i>	Specifies the IP address for the CM.	
<i>mac-address</i>	Specifies the MAC address for the CM.	
<i>ds-frequency-hz</i>	Specifies the downstream frequency for the CM (in Hertz).	
<i>us-channel-id</i>	Specifies the upstream channel ID.	

**Command Default** No default behavior or values

**Command Modes** Privileged EXEC

Command History	Release	Modification
	12.0(4)XI	This command was introduced.

**Usage Guidelines** This command allows the CMTS administrator to change the downstream frequency for a CM, overriding the DOCSIS configuration file setting. This command is not applicable on Cisco IOS Release 12.1(3a)EC.

**Examples** The following example shows how to change the downstream frequency of the CM having IP address 172.172.172.12 to 570 MHz:

```
Router# cable modem 172.172.172.12 change-freq 57000000
Router#
```

Related Commands	Command	Description
	<b>cable modem access-group</b>	Specifies an access group for a CM.
	<b>cable modem max-hosts</b>	Specifies the maximum hosts for a CM.
	<b>cable modem qos profile</b>	Specifies the QoS profile for a CM.
	<b>show cable modem</b>	Displays CM configuration settings.

# cable modem max-cpe

To specify a maximum number of permitted hosts per modem (overriding the max-cpe value in the CM configuration file), use the **cable modem max-cpe** command in global configuration mode.

**cable modem max-cpe** [*n* | **unlimited**]

## Syntax Description

*n* Specifies the configuration file value. Valid range is 1 to 255.

**unlimited** Specifies the maximum CPE value to be unlimited.

## Command Default

The max-cpe value provided in the configuration file will be used by the CMTS to limit the number of hosts connected to a single CM (**no cable modem max-cpe**).

## Command Modes

Global configuration

## Command History

Release	Modification
12.0(10)SC, 12.1(2)EC	This command was introduced.

## Examples

The following example shows how to override the **max-cpe** setting in a CM configuration file:

```
Router(config)# cable modem max-cpe unlimited
```

## Usage Guidelines

The CMTS enables up to *n* number of hosts for a modem. When set to **unlimited**, or *n* is larger than the **max-cpe** value in the configuration file of a CM, this command overrides the configuration file value.



### Note

When setting to **unlimited** or *n* is greater than the **max-cpe** value in the configuration file of a CM, the CM has to control the maximum number of hosts, and the DHCP server has to control the number of IP addresses assigned to hosts behind a single CM.



### Caution

Use of this command might open a security hole in the system by enabling denial of service attacks. Specifically, it might enable a user to obtain a large number of IP addresses, thereby taking down the entire network, after all the available IP addresses have been reserved by this single user. Cisco recommends that, if this command is enabled, the number of IP addresses assigned to hosts behind a single modem be strictly controlled by the DHCP server.

The Cisco CMTS uses three commands set the maximum number of hosts for a particular CM, for all CMs on a particular cable interface, or for all CMs using the Cisco CMTS router:

- **cable modem max-hosts**—Sets the maximum number of hosts for a particular CM.
- **cable max-hosts**—Sets the maximum number of hosts for all CMs on a particular cable interface.

- **cable modem max-cpe**—Sets the maximum number of hosts for all CMs using the Cisco CMTS router.

The more specific commands override the settings of the less specific commands. For example, if you use the **cable modem max-cpe** command to set the maximum number of hosts to 2 for all CMs, you can still use the **cable modem max-hosts** command to give a particular CM a larger maximum host value.

**Note**

The CMTS assigns the MAX Host value to a cable modem at the time that the cable modem registers with the CMTS. Changing any of the MAX Host commands affects only cable modems that register after the change.

**Tip**

For more information on how these commands interact to set the maximum CPE values, see the chapter *Maximum CPE or Host Parameters for the Cisco Cable Modem Termination System* in the *Cisco CMTS Feature Guide*, available on Cisco.com and the Documentation CD-ROM.

**Note**

The “Number of CPES” field in the **show cable modem** command shows the maximum CPE value for the CM, not the value for the CMTS that is set by the **cable modem max-cpe** command.

**Related Commands**

Command	Description
<b>cable max-hosts</b>	Sets the maximum number of hosts for all CMs on a particular cable interface.
<b>cable modem access-group</b>	Specifies an access group for a CM.
<b>cable modem change-frequency</b>	Changes the downstream frequency or upstream channel ID.
<b>cable modem max-hosts</b>	Sets the maximum number of hosts for a particular CM.
<b>cable modem qos profile</b>	Specifies the QoS profile for a CM.
<b>show cable modem</b>	Displays CM configuration settings.

# cable modem max-hosts

To specify the maximum number of customer premises equipment (CPE) devices (hosts) that can be supported by a specific CM, use the **cable modem max-hosts** command in privileged EXEC mode.

```
cable modem {mac-addr | ip-addr} max-hosts {n | default}
```

Syntax Description		
	<i>ip-addr</i>	Specifies the IP address for the CM.
	<i>mac-address</i>	Specifies the MAC address for the CM.
	<b>max-hosts</b> { <i>n</i>   <b>default</b> }	Specifies either the maximum number of hosts supported by the CM (from 0 to 255), or specifies the default value of 0.

**Command Default** 0

**Command Modes** Privileged EXEC

Command History	Release	Modification
	12.0(4)XI	This command was introduced.

**Usage Guidelines** The Cisco CMTS uses three commands set the maximum number of hosts for a particular CM, for all CMs on a particular cable interface, or for all CMs using the Cisco CMTS router:

- **cable modem max-hosts**—Sets the maximum number of hosts for a particular CM.
- **cable max-hosts**—Sets the maximum number of hosts for all CMs on a particular cable interface.
- **cable modem max-cpe**—Sets the maximum number of hosts for all CMs using the Cisco CMTS router.

The more specific commands override the settings of the less specific commands. For example, if you use the **cable modem max-cpe** command to set the maximum number of hosts to 2 for all CMs, you can still use the **cable modem max-hosts** command to give a particular CM a larger maximum host value.



**Note**

The CMTS assigns the MAX Host value to a cable modem at the time that the cable modem registers with the CMTS. Changing any of the MAX Host commands affects only cable modems that register after the change.



**Tip**

For more information on how these commands interact to set the maximum CPE values, see the chapter *Maximum CPE or Host Parameters for the Cisco Cable Modem Termination System* in the *Cisco CMTS Feature Guide*, available on Cisco.com and the Documentation CD-ROM.

**Examples**

The following example shows sets the CM with the IP address of 172.172.172.12 to a maximum of 40 attached CPE devices:

```
Router# cable modem 172.172.172.12 max-hosts 40
```

**Related Commands**

Command	Description
<b>cable modem access-group</b>	Specifies an access group for a CM.
<b>cable modem change-frequency</b>	Changes the downstream frequency or upstream channel ID.
<b>cable max-hosts</b>	Sets the maximum number of hosts for all CMs on a particular cable interface.
<b>cable modem max-cpe</b>	Sets the maximum number of hosts for all CMs using the Cisco CMTS router.
<b>cable modem qos profile</b>	Specifies the QoS profile for a CM.
<b>show cable modem</b>	Displays CM configuration settings.

# cable modem qos profile

To force a DOCSIS 1.0 CM to use a specific quality-of-service (QoS) profile, use the **cable modem qos profile** command in global configuration mode.

```
cable modem {mac-addr | ip-addr} qos profile qos-profile-index [no-persistence]
```

## Syntax Description

<i>ip-addr</i>	Specifies the IP address for the CM.
<i>mac-address</i>	Specifies the MAC address for the CM.
<i>qos-profile-index</i>	Specifies QoS profile index values. The valid range is 1 to 255, with no default. In Cisco IOS Release 12.2(15)BC1 and later releases, this profile must be created on the Cisco CMTS using the <b>cable qos profile</b> command. In addition, this profile should specify a maximum upstream bandwidth equal to or less than the current bandwidth. If the new profile specifies a higher bandwidth, it is ignored, and the cable modem continues to use the bandwidth that was specified at registration time.
<b>no-persistence</b>	(Optional) Specifies that the QoS profile should not remain in force when a cable modem reboots. Instead, when a cable modem reboots, it uses the QoS profile specified in its DOCSIS configuration file.  The default is without this option, so that the QoS profile remains in force for cable modems across reboots.

## Command Default

No default behaviors or values

## Command Modes

Global configuration

## Command History

Release	Modification
12.0(4)XI	This command was introduced.
12.1(11)EC	This command was supported on Cisco IOS Release 12.1 EC.
12.2(8)BC1	This command was enhanced to allow a DOCSIS 1.1 CMTS to temporarily change the QoS profile for DOCSIS 1.0 and 1.0+ CMs.
12.2(15)BC1	This command was changed so that it does not have any effect unless both the QoS profile specified by this command and the QoS profile specified for the CM in its DOCSIS configuration file are already created on the Cisco CMTS. This restriction did not exist in previous releases.
12.2(15)BC2	The <b>no-persistence</b> option was added. Also, the restriction on changing CM-created profiles that was implemented in Cisco IOS Release 12.2(15)BC1 was removed, so that this command can again be used to change the profile of a CM that is using a CM-created profile, as was the case in earlier releases.

## Usage Guidelines

On a Cisco CMTS running DOCSIS 1.0 software, the **cable modem qos profile** command forces a CM to use a specific QoS profile.

On a Cisco CMTS running DOCSIS 1.1 software, the **cable modem qos profile** command temporarily forces a DOCSIS 1.0 or DOCSIS 1.0+ CM to use a specific QoS profile, without forcing the CM to first go off-line and re-register. For DOCSIS 1.0+ CMs, this command affects only the primary SID on the CM.

**Note**

In Cisco IOS Release 12.2(15)BC1, this command has an effect only when the profile that it specifies and the original QoS profile on the CM have been created already on the Cisco CMTS, using the **cable qos profile** command. In Cisco IOS Release 12.2(15)BC2 and later releases, this restriction is removed and this command can also be used to change the profile for a CM even when it is using a CM-created QoS profile.

This command does not affect DOCSIS 1.1 CMs, which support dynamic service change messages that allow the QoS profile to be changed dynamically.

**Note**

This command acts as a toggle. Give the **cable modem qos profile** command once to enforce a QoS profile. Give the same command again with the same parameters to cancel the enforcement of that profile (the CM will return to using its registered profile.)

When the **no-persistence** option is specified, the QoS profile is not applied when a cable modem reboots. Instead, the Cisco CMTS allows the cable modem to use the QoS profile that is specified in its DOCSIS configuration file.

The **no-persistence** option can be used when initially when identifying potential problem applications and users. When repeat offenders are identified, the service provider can remove the **no-persistence** option, so that these users continue to use the specified QoS profile even if they reboot their cable modems.

**Examples**

The following example shows how to specify a QoS profile index to a CM:

```
Router# cable modem qos profile 255
Router#
```

**Related Commands**

Command	Description
<b>cable modem access-group</b>	Specifies an access group for a CM.
<b>cable modem change-frequency</b>	Changes the downstream frequency or upstream channel ID.
<b>cable modem max-hosts</b>	Specifies the maximum hosts for a CM.
<b>show cable modem</b>	Displays CM configuration settings.

# cable modem remote-query

To enable and configure the remote-query feature to gather CM performance statistics on the CMTS, use the **cable modem remote-query** command in global configuration mode. To disable the gathering of CM statistics, use the **no** form of this command.

**cable modem remote-query** [*polling-interval* *community-string*] [**src-ip** *ip-address*]

**no cable modem remote-query** [**src-ip** *ip-address*]

## Syntax Description

<i>polling-interval</i>	Specifies the delay between each poll that the CMTS makes to collect the CM statistics. When the CMTS completes one remote-query poll, the CMTS waits this time period before beginning another poll. Valid range is from 1 to 86,400 seconds, with a recommended default value of 30 seconds.
<i>community-string</i>	Defines the Simple Network Management Protocol (SNMP) community string. <b>Note</b> If resetting a configured SNMP community string value, first disable the remote query feature with the <b>no</b> form of this command, then set the new community string using the <b>cable modem remote-query</b> command when the polling delays is timed out.
<b>src-ip</b> <i>ip-address</i>	Specifies the source IP address for SNMP requests. <b>Note</b> You should enable the remote-query feature before configuring <b>src-ip</b> option.

## Command Default

No default behavior or values

## Command Modes

Global configuration

## Command History

Release	Modification
12.0(7)XR, 12.1(2)T	This command was introduced.
12.1(2)EC1	Support for this command was added to the 12.1 EC train. <b>Note</b> This command is not supported on Cisco IOS Release 12.1(3a)EC1 but is supported on Cisco IOS Release 12.1(4)EC and later 12.1 EC releases.
12.2(4)BC1b	Support for this command was added to the 12.2 BC train.
12.2(15)BC1, 12.2(15)CX	The sysDescr field is now obtained for each cable modem when the remote-query feature is enabled. (This value can be displayed using the <b>verbose</b> option of the <b>show cable modem</b> command.)
12.3(23)BC	Support for the <b>scr-ip</b> option was added to this release.

**Usage Guidelines**

To use the remote-query feature, you must configure the CM and Cisco CMTS as follows:

- Configure a read-only SNMP community string on the CM for use with the remote-query feature. This typically should be a separate community string from the read-write string used to remotely monitor and configure the CM.
- Configure a matching community string on the Cisco CMTS using the **snmp-server community community-string** and **snmp-server manager** commands.
- Enable the remote-query feature on the Cisco CMTS with the **cable modem remote-query polling-interval community-string** command. The *polling-interval* should be chosen so that the statistics can be obtained in a timely manner without seriously impacting system performance. Cisco recommends initially setting the *polling-interval* to 30 seconds and adjusting that time period as needed.

**Note**

The *polling-interval* time period determines only how long the Cisco CMTS waits after completing one polling cycle before beginning a new polling cycle. It does not indicate how long the Cisco CMTS spends in each polling cycle, which depends on the number of cable modems being polled. To calculate the approximate time for a polling cycle, assume 4 to 5 CMs per second (100 to 200 milliseconds per CM). Also take into account the possibility that one or more cable modems might not respond, with an approximate timeout period of 90 seconds.

You must specify matching community strings for the CM, the **snmp-server community community-string** command, and the **cable modem remote-query** command.

**Note**

You can reissue the **cable modem remote-query** command to change the polling interval at any time, and the change becomes effective immediately. However, to change the SNMP community string, you must first disable remote polling with the **no snmp manager** and **no cable modem remote-query** commands. Then reconfigure the new community string with the **snmp-server community community-string**, **snmp-server manager**, and **cable modem remote-query** commands.

You must configure the remote-query feature before configuring the **scr-ip** option.

**Tip**

After enabling the remote-query feature, you can display the collected statistics with the **show cable modem remote-query** command. You can also display these statistics by querying the attributes in the [CISCO-DOCS-REMOTE-QUERY-MIB](#) MIB.

**Resetting the Community String for Cable Modem Remote Query**

In Cisco IOS Release 12.3BC and later releases, if you wish to reconfigure the SNMP *community string* for the cable modem remote query feature, perform these brief steps.

1. Disable the remote query feature with the **no** form of this command.
2. Reset the timers on the Cisco CMTS with short timeout values for the polling interval, so that timeout commences quickly. Use the **cable modem remote-query** command in privileged EXEC mode, using a very low value for the *polling interval* value.
3. Once timeouts are applied, reset the *community string* value with the **cable modem remote-query** command.
4. Change the *polling interval* timers on the Cisco CMTS back to preferred levels using the **cable modem remote-query** command in privileged EXEC mode.

**Examples**

The following example illustrates how to set the polling interval to 5 seconds and the SNMP community string to **private**:

```
Router# configure terminal
Router(config)# cable modem remote-query 5 private
Router(config)# snmp-server community private
Router(config)# snmp-server manager
```

The following example demonstrates how to change the remote-query configuration, by first deleting the existing configuration and then giving the new configuration:

```
Router# configure terminal
Router(config)# no cable modem remote-query
Router(config)# no snmp-server manager
Router(config)# cable modem remote-query 10 public
Router(config)# snmp-server community public
Router(config)# snmp-server manager
```

**Related Commands**

Command	Description
<b>debug cable remote-query</b>	Turns on debugging to gather information from remote CMs.
<b>show cable modem</b>	Displays information for the registered and unregistered CMs.
<b>show cable modem phy</b>	Displays DOCSIS PHY layer information for one or more CMs.
<b>show cable modem remote-query</b>	Displays the statistics accumulated by the remote-query feature.
<b>snmp-server enable traps cable</b>	Enables traps that are sent when the remote polling of CMs has been completed.

# cable modem service-class-name

To change a QoS service class for a particular cable modem (CM), use the **cable modem service-class-name** command in privileged EXEC mode. To remove a specified QoS service class, use the **no** form of this command.

**cable modem** {*ip-address* | *mac-address*} **service-class-name** *name*

**no cable modem** {*ip-address* | *mac-address*} **service-class-name** *name*

## Syntax Description

<i>ip-address</i>	Specifies the IP address of the CM to be assigned the named service class.
<i>mac-address</i>	Specifies the MAC address of the CM to be assigned the named service class.
<i>name</i>	Specifies the name of the QoS service class.

## Command Default

No default behavior or values

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
12.3(23)BC2	This command was introduced.

## Usage Guidelines

This command has the following restrictions:

- The command is supported only on DOCSIS 1.1 CMs primary service flows.
- You can specify this command only after the CM has been online for at least 200 seconds.
- The parameters defined by the named service class should always be a compatible subset of the registered set of parameters for the CM. Only certain options can be changed using a CMTS router service class, such as the **max-rate**, **priority**, or **tos-overwrite** options. The **max-burst** option in both the enforced and registered CMTS router service classes must strictly match the value for max-burst in the registered DOCSIS configuration file. If the service class value does not match, then CM registration will fail with a reject-c state, or the enforced class will fail.

## Examples

The following example changes the QoS parameter set for the CM with MAC address aaaa.bbbb.cccc to the service class named "test":

```
Router# cable modem aaaa.bbbb.cccc service-class-name test
```

Related Commands	Command	Description
	<b>cable service class</b>	Sets parameters for a DOCSIS 1.1 cable service class.
	<b>service-class (enforce-rule)</b>	Identifies a particular service class for cable modem monitoring in an enforce-rule.

# cable modem vendor

To associate the name of a vendor with its Organizational Unique Identifier (OUI), use the **cable modem vendor** command in global configuration mode. To remove the association of the vendor name with its OUI, use the **no** form of this command.

**cable modem vendor** *OUI* [*vendor-name*]

**no cable modem vendor** *OUI* [*vendor-name*]

## Syntax Description

*OUI* Specifies the Organizational Unique Identifier (OUI). An OUI is the first 3 octets (3 bytes, 6 hexadecimal digits) of the CM MAC address and typically indicates the vendor for the CM. The octets can be specified as one string (for example: **000102**), or each octet can be separated by a hyphen, period, or colon (for example: **00-01-02** or **00:01:02** or **00.01.02**).

**Note** You can use either a period or colon as the separator between octets when manually entering this command, but the command that is written to the running and startup configuration files will always use a period.

*vendor-name* (Optional) Specifies an arbitrary string identifying the vendor for this OUI.

## Command Default

A default database contains approximately 300 OUIs associated with approximately 60 vendor names.

## Command Modes

Global configuration

## Command History

Release	Modification
12.2(8)BC2	This command was introduced.

## Usage Guidelines

The **cable modem vendor** command allows you to associate an arbitrary string with an OUI to identify the vendor of the associated CM. The vendor name is then displayed as part of the **show cable modem vendor** command.

The **show cable modem vendor** command uses a default database of approximately 300 OUIs. If the OUI and vendor are not in that database, the **show cable modem vendor** command displays the OUI as the vendor name, but you can use the **cable modem vendor** command to associate a vendor name with the new OUI.

If you specify an OUI with the **cable modem vendor** command that already exists in the OUI database, the previous value is overwritten with the new value. You can use the **default** prefix to restore the original value for an OUI in the default database.

You can also use the **no cable modem vendor** command to remove the association between an OUI and a vendor name. The **show cable modem vendor** command then displays only the OUI as the vendor name.

**Tip**

The Institute of Electrical and Electronics Engineers (IEEE) is the official issuer of OUI values. The IEEE OUI web site is at <http://standards.ieee.org/regauth/oui/index.shtml>.

**Examples**

The following shows several examples of the **cable modem vendor** command using Cisco OUIs:

```
Router(config)# cable modem vendor 00:01:42 Cisco
Router(config)# cable modem vendor 00:01:43 Cisco
Router(config)# cable modem vendor 00:01:63 Cisco
Router(config)# cable modem vendor 00:01:64 Cisco
Router(config)# cable modem vendor 00:0A:41 Cisco
Router(config)# cable modem vendor 00:0A:42 Cisco
Router(config)#
```

The following shows an example of the **default cable modem vendor** command being used to restore the original association between Cisco and its company OUI of 00:00:0C. Any previous user-defined vendor name is deleted from the OUI database.

```
Router(config)# default cable modem vendor 00000C
```

The following shows an example of the **no cable modem vendor** command being used to remove the association between Cisco and an OUI of 00:0A:42. If any CMs exist with that OUI, the **show cable modem vendor** command will display the OUI (“00:0A:42”) as the vendor name.

```
Router(config)# no cable modem vendor 00:0A:42
Router(config)#
```

**Related Commands**

Command	Description
<b>show cable modem vendor</b>	Displays the vendor name or Organizational Unique Identifier (OUI) for the CMs on each cable interface.

# cable modulation-profile

To define a modulation profile for use on the router, use the **cable modulation-profile** command in global configuration mode. To remove the entire modulation profile or to reset a default profile to its default values, use the **no** form of this command.

## DOCSIS 1.0 and 1.1 Mixed Mode:

```
cable modulation-profile profile { mix | qam-16 | qpsk | robust-mix }
```

```
no cable modulation-profile profile { iuc | mix | qam-16 | qpsk | robust-mix }
```

```
cable modulation-profile profile iuc fec-tbytes fec-len burst-len guard-t mod scrambler seed diff  
pre-len last-cw uw-len
```

## DOCSIS 1.x/2.0 Mixed Mode:

```
cable modulation-profile profile { mix-high | mix-low | mix-mid | mix-qam | qam-16 | qpsk |  
robust-mix-high | robust-mix-mid | robust-mix-qam }
```

```
no cable modulation-profile profile { iuc | mix-high | mix-low | mix-mid | mix-qam | qam-16 |  
qpsk | robust-mix-high | robust-mix-mid | robust-mix-qam }
```

```
cable modulation-profile profile iuc fec-tbytes fec-len burst-len guard-t mod scrambler seed diff  
pre-len last-cw uw-len
```

## DOCSIS 2.0 A-TDMA Mode:

```
cable modulation-profile profile { mix-high | mix-low | mix-mid | mix-qam | qam-8 | qam-16 |  
qam-32 | qam-64 | qpsk | robust-mix-high | robust-mix-low | robust-mix-mid }
```

```
no cable modulation-profile profile { iuc | mix-high | mix-low | mix-mid | mix-qam | qam-8 |  
qam-16 | qam-32 | qam-64 | qpsk | robust-mix-high | robust-mix-low | robust-mix-mid }
```

```
cable modulation-profile profile iuc fec-tbytes fec-len burst-len guard-t mod scrambler seed diff  
pre-len last-cw uw-len
```

**Syntax Description**

<i>profile</i>	<p>Specifies the modulation profile number. The valid values for the profile number depend on the cable interface being used and the upstream's mode of operation. Use the following as guidelines, and see <a href="#">Table 0-6 on page 318</a> for specifics.</p> <ul style="list-style-type: none"> <li>• If the upstream is configured for DOCSIS 1.0 and DOCSIS 1.1 mode, the valid range is from 1 to 99, depending on the cable interface. The system creates profile 1 as the default DOCSIS 1.x profile.</li> <li>• If the upstream is configured for DOCSIS 1.x and DOCSIS 2.0 mixed mode, the valid range is from 100 to 199, depending on the cable interface. The system creates profile 141 as the default mixed mode profile.</li> <li>• If the upstream is configured for DOCSIS 2.0 A-TDMA mode, the valid range is from 200 to 299, depending on the cable interface. The system creates profile 241 as the default DOCSIS 2.0 A-TDMA profile.</li> </ul> <p>In Cisco IOS Release 12.2(15)CX and later releases, you can create a maximum of 10 profiles for each mode of operation, for a total of 30 profiles. In earlier software releases, you can create a maximum of 8 profiles only for DOCSIS 1.0 and DOCSIS 1.1 mode.</p>
<b>mix</b>	(DOCSIS 1.0 and DOCSIS 1.1 mode only) Creates a default QPSK/16-QAM mix modulation profile where short and long grant bursts are sent using 16-QAM, while request, initial ranging, and station maintenance bursts are sent using QPSK. The burst parameters are set to their default values for each burst type.
<b>mix-high</b>	(DOCSIS 1.x/2.0 mixed and DOCSIS 2.0 modes only) Creates a default QPSK/64-QAM modulation profile.
<b>mix-low</b>	(DOCSIS 1.x/2.0 mixed and DOCSIS 2.0 modes only) Creates a default QPSK/16-QAM modulation profile.
<b>mix-mid</b>	(DOCSIS 1.x/2.0 mixed and DOCSIS 2.0 A-TDMA modes only) Creates a default QPSK/32-QAM modulation profile.
<b>mix-qam</b>	(DOCSIS 1.x/2.0 mixed and DOCSIS 2.0 A-TDMA modes only) Creates a default 16-QAM/64-QAM modulation profile.
<b>qam-8</b>	(DOCSIS 2.0 A-TDMA mode only) Creates a default 8-QAM modulation profile.
<b>qam-16</b>	Creates a default 16-QAM modulation profile.
<b>qam-32</b>	(DOCSIS 2.0 A-TDMA mode only) Creates a default 32-QAM modulation profile.
<b>qam-64</b>	(DOCSIS 2.0 A-TDMA mode only) Creates a default 64-QAM modulation profile.
<b>qpsk</b>	Creates a default QPSK modulation profile.
<b>robust-mix</b>	(DOCSIS 1.0 and DOCSIS 1.1 mode only) Creates a default QPSK/16-QAM modulation profile with a longer preamble that is more robust and more able to deal with noise on the upstream better than the <b>mix</b> profile.
<b>robust-mix-high</b>	(DOCSIS 1.x/2.0 mixed and DOCSIS 2.0 A-TDMA modes only) Creates a default QPSK/64-QAM mixed modulation profile with a longer preamble that is more robust and more able to deal with noise on the upstream better than the <b>mix-high</b> profile.
<b>robust-mix-low</b>	(DOCSIS 2.0 A-TDMA mode only) Creates a default QPSK/16-QAM modulation profile with a longer preamble that is more robust and better able to deal with noise on the upstream than the <b>mix-low</b> profile.

<b>robust-mix-mid</b>	(DOCSIS 1.x/2.0 mixed and DOCSIS 2.0 A-TDMA modes only) Creates a default QPSK/32-QAM modulation profile with a longer preamble that is more robust and better able to deal with noise on the upstream than the <b>mix-mid</b> profile.
<b>robust-mix-qam</b>	(DOCSIS 1.x/2.0 mixed mode only) Creates a default 16-QAM/64-QAM mixed modulation profile with a longer preamble that is more robust and better able to deal with noise on the upstream than the <b>mix-qam</b> profile.
<i>iuc</i>	Interval usage code. Valid entries depend on the mode of operation: <ul style="list-style-type: none"> <li>• If the upstream is configured for DOCSIS 1.0 and DOCSIS 1.1 modulation profiles, the valid values are <b>initial</b>, <b>long</b>, <b>request</b>, <b>reqdata</b>, <b>short</b>, or <b>station</b>.</li> <li>• If the upstream is configured for DOCSIS 1.x and DOCSIS 2.0 mixed modulation profiles, the valid values are <b>a-long</b>, <b>a-short</b>, <b>a-ugs</b>, <b>initial</b>, <b>long</b>, <b>request</b>, <b>reqdata</b>, <b>short</b>, or <b>station</b>.</li> <li>• If the upstream is configured for DOCSIS 2.0 A-TDMA modulation profiles, the valid values are <b>a-long</b>, <b>a-short</b>, <b>a-ugs</b>, <b>initial</b>, <b>long</b>, <b>request</b>, <b>reqdata</b>, <b>short</b>, or <b>station</b>.</li> </ul> <p><b>Note</b> The <b>reqdata</b> burst type is included as a placeholder for scripts that might reference it, but the DOCSIS MAC scheduler on the Cisco CMTS does not use this type of burst.</p>
<i>preamble</i>	(DOCSIS 1.x/2.0 mixed and DOCSIS 2.0 A-TDMA modes only, for <b>a-long</b> and <b>a-short</b> options) Specifies the preamble format. Valid values are <b>qpsk0</b> and <b>qpsk1</b> .
<i>rs-interleave-depth</i>	(DOCSIS 1.x/2.0 mixed and DOCSIS 2.0 A-TDMA modes only, for <b>a-long</b> and <b>a-short</b> options) Specifies the RS interleave depth. The valid range is from 0 to 114.
<i>rs-interleave-block</i>	(DOCSIS 1.x/2.0 mixed and DOCSIS 2.0 A-TDMA modes only, for <b>a-long</b> and <b>a-short</b> options) Specifies the RS interleave block size. The valid range is from 18 to 2048.
<i>fec-tbytes</i>	The number of bytes that can be corrected per FEC code word. For DOCSIS 1.0 and DOCSIS 1.1 mode, valid values are from 0 to 10 (decimal), where 0 means no FEC. For DOCSIS 2.0 A-TDMA mode, the valid values are from 0 to 16 (decimal), where 0 means no FEC.
<i>fec-len</i>	FEC code-word length. Valid values are from 16 to 253.
<i>burst-len</i>	Maximum burst length in minislots. Valid values are from 0 to 255, where 0 means no limit.
<i>guard-t</i>	Guard time in symbols. The time between successive bursts, with a range from 22 to 255. (In Cisco IOS Release 12.2(15)BC2 and earlier releases, the minimum guard time was 0 symbols, but we do not recommend using a guard time smaller than 22 symbols.)
<i>mod</i>	Modulation. Valid entries are <b>16qam</b> and <b>qpsk</b> for DOCSIS 1.0 and DOCSIS 1.1 upstreams. Valid entries are <b>8qam</b> , <b>16qam</b> , <b>32qam</b> , <b>64qam</b> , and <b>qpsk</b> for DOCSIS 2.0 upstreams.
<i>scrambler</i>	Enable or disable scrambler. Valid entries are <b>scrambler</b> and <b>no-scrambler</b> .
<i>seed</i>	(Required if <b>scrambler</b> option used) Scrambler seed in hexadecimal format. Valid values are from 0000 to 7FFF.

<i>diff</i>	Enable or disable differential encoding. Valid entries are <b>diff</b> and <b>no-diff</b> . <b>Note</b> In DOCSIS 2.0 mode, differential encoding cannot be enabled for the 8-QAM, 32-QAM, and 64-QAM modulations.
<i>pre-len</i>	Preamble length in bits. Valid values are from 2 to 512.
<i>last-cw</i>	Handling of FEC for last code word. Valid entries are <b>fixed</b> for fixed code-word length and <b>shortened</b> for shortened last code word.
<i>uw-len</i>	Upstream unique word length. Enter <b>uw8</b> for 8-bit unique code words or <b>uw16</b> for 16-bit unique code words.

**Command Default**

Modulation profile 1 is defined as a **qpsk** Time Division Multiple Access (TDMA) profile.

In Cisco IOS Release 12.2(15)CX, Release 12.2(15)BC2 and later releases, additional modulation profiles are defined as the default mixed TDMA/A-TDMA profile and the default Advanced TDMA (A-TDMA) profile. The modulation profile numbers for these default values are 1, 41, 101, 121, 201, 221, or 241, depending on the cable interface line cards being used (see [Table 0-6 on page 318](#)).

**Note**

The default profiles (1, 41, 101, 121, 201, 221, or 241) cannot be deleted. Using the **no cable modulation-profile** command on these particular profiles resets them to their original, default values.

**Command Modes**

Global configuration

**Command History**

Release	Modification
11.3 NA	This command was introduced.
12.0(7)XR2	This command was supported.
12.0(6)SC and 12.1(3a)EC1	The <b>mix</b> , <b>qpsk</b> , and <b>qam-16</b> options were added.
12.2(8)BC2	Support was added for the Cisco uBR10012 router.
12.2(11)CY	Support was added for the Cisco uBR-MC5X20S cable interface line card. This includes creating default modulation profile 21 for the card.
12.2(15)CX	Support was added for the Cisco uBR-MC16U/X and Cisco uBR-MC28U/X cable interface line card, including support for DOCSIS 2.0 A-TDMA and mixed modulation profiles on this card.  The <b>robust</b> predefined modulation profiles were also added for all modes of operation. The robust profiles use a longer preamble to provide better handling of noise on the upstream, but they also consume more bandwidth at the PHY layer than the other profiles.
12.2(15)BC2	Support was added for the Cisco uBR-MC5X20S/U cable interface line cards, including support for DOCSIS 2.0 A-TDMA and mixed modulation profiles. Support for the IUC-11 burst profile (Advanced UGS, <b>a-ugs</b> ) was also added for mixed TDMA/A-TDMA modulation profiles.

**Usage Guidelines**

A modulation profile is a collection of at least six burst profiles that are sent out in an upstream channel descriptor (UCD) message to configure a modem's transmit parameters.

You can use the **no cable modulation-profile** command to remove all modulation profiles except the default modulation profiles (1, 21, 41, 101, 121, 201, 221, and 241, depending on the cable interface line cards being used). In the case of the default modulation profiles, the **no cable modulation-profile** command resets the default profile to its default values.

**Note**

You cannot delete the default modulation profiles (1, 21, 41, 101, 121, 201, 221, and 241). Using the **no cable modulation-profile** command on these particular profiles resets them to their original, default values.

We recommend that you use the predefined profiles instead of manually specifying the individual bursts for a modulation profile. The predefined profiles are optimized for the default of 32 symbols per minislots for each particular modulation scheme. The **robust** predefined profiles use a longer preamble for better handling of noise on the upstream, but at the cost of consuming more PHY layer bandwidth than the other non-robust profiles.

If you want to manually specify the individual bursts, enter a line with all parameters for each upstream burst type. Then repeat this command for each burst type, which also must be fully specified. A profile with incomplete or missing bursts can cause unreliable operation or loss of modem connectivity.

**Caution**

Changes to modulation profiles causes changes to the physical layer. Because changing physical layer characteristics affects router performance and function, this task should be reserved for expert users who have a thorough understanding of DOCSIS systems and how each parameter affects the network.

**Note**

The **reqdata** burst type is included as a placeholder for SNMP scripts that might reference it, but it has no effect. You can use this command (and SNMP commands) to specify the **reqdata** types, but the DOCSIS MAC scheduler on the Cisco CMTS does not use this type of burst.

**Modulation Profile Ranges**

The valid range for modulation profiles depends on the cable interface being used and the type of modulation profile being created. [Table 0-6](#) lists the valid ranges according to cable interface and modulation type.

**Table 0-6 Allowable Ranges for Modulation Profiles**

Cable Interface	DOCSIS 1.X (TDMA)	Mixed DOCSIS 1.X/2.0	DOCSIS 2.0 (A-TDMA)
Cisco uBR7100 series	1 to 10 <sup>1</sup> , default=1	N/A	N/A
Cisco uBR-MC16C	1 to 10, default=1	N/A	N/A
Cisco uBR-MC16S	1 to 10, default=1	N/A	N/A
Cisco uBR-MC28C	1 to 10, default=1	N/A	N/A
Cisco uBR-MC5X20S, Cisco uBR-MC5X20U	21 to 30, default=21	121 to 130, default=121	221 to 230, default=221
Cisco uBR-MC16U/X, Cisco uBR-MC28U/X	41 to 50, default=41	141 to 150, default=141	241 to 250, default=241

1. Only 8 modulation profiles are supported in Cisco IOS software releases before 12.2(15)BC1, so in these releases the valid range is from 1 to 8.

**Note**

You cannot delete the default modulation profiles (1, 21, 41, 101, 121, 201, 221, and 241).

**DOCSIS 1.0 and DOCSIS 1.1 Support**

For DOCSIS 1.0 and 1.1 cable modems, the following burst types are required: request, request data, initial maintenance, station maintenance, short grant, and long grant. You must issue this command six times for each individual burst type to correctly create a new modulation profile.

The three default profiles can be used to quickly create modulation profiles, without having to specify the parameters for each individual burst: **mix**, **qpsk**, and **qam-16**. The burst parameters for the request, initial, station maintenance, short, and long bursts are set to their default values for each burst type. (The **reqdata** burst type is not created when using the default modulation profiles because it is not used by the MAC scheduler.)

The default profiles allow basic profiles to be implemented for initial network connectivity. As the characteristics of a cable plant become better known, the profiles can then be adjusted accordingly.

**Note**

Do not use the **qam-16** mode unless you have verified that your cable plant can support that modulation profile. Most cable plants should instead use the **qpsk** or **mix** modulation profile for the primary profile.

**Caution**

Turning the scrambler off can cause packet loss and is used only in lab testing environments.

Errors or incompatible configurations in the burst profiles cause CMs to drop connectivity, to drop short or long data packets, or to fail to connect to the network. It is possible to build a burst profile set for which no implementation of a DOCSIS receiver is capable of receiving the modem's transmission.

Data rates of 160 Ksymbol/sec and 2560 Ksymbol/sec are highly sensitive to unique word length, preamble length, and FEC sizing. Incorrect choices for these values can cause poor, or no, connectivity at these symbol rates.

**DOCSIS 2.0 Support**

Cisco IOS Release 12.2(11)CY, 12.2(15)BC1, and later releases support 10 modulation profiles for each of the three DOCSIS modes (DOCSIS 1.X, DOCSIS 2.0, and mixed mode), for a total maximum of 30 modulation profiles. In addition, the router also creates several default modulation profiles (1, 21, 41, 101, 121, 141, 201, 221, and 241, depending on the cable interface line cards that are installed).

**Note**

The default profiles (1, 21, 41, 101, 121, 141, 201, 221, and 241) cannot be deleted. Using the **no cable modulation-profile** command on these particular profiles resets them to their original, default values.

**Examples**

The following example shows how to create a mixed modulation profile, using 16-QAM for the short and long grant bursts and QPSK for the request, initial ranging, and station maintenance bursts. The burst parameters are set to their default values for each burst type.

```
Router(config)# cable modulation-profile 8 mix
Router(config)# exit
```

```
Router# show cable modulation-profile 8
```

Mod IUC	Type	Preamb length	Diff enco	FEC T	FEC CW	Scrambl seed	Max B	Guard time	Last CW	Scrambl	Preamb offset

					BYTES	size	size	size	short			
8	request	qpsk	64	no	0x0	0x10	0x152	0	8	no	yes	0
8	initial	qpsk	128	no	0x5	0x22	0x152	0	48	no	yes	0
8	station	qpsk	128	no	0x5	0x22	0x152	0	48	no	yes	0
8	short	qam	144	no	0x6	0x4B	0x152	6	8	yes	yes	0
8	long	qam	160	no	0x8	0xDC	0x152	0	8	yes	yes	0

Router#



#### Note

The above example shows the default values for the burst parameters. The main differences in the default values between 16-QAM and QPSK bursts are in the Type and Preamble Length fields.

The following example shows how to define the burst parameters for profile 2 with the following parameters: 0 fec-tbytes, 16 kbytes fec-len, a burst-len of 1, a guard time of 8, a mod value of **qpsk**, scrambler enabled with a seed value of 152, differential encoding disabled, a preamble length of 64 bits, a fixed code-word length, and 8-bit unique words for upstream unique word length.

```
Router(config)# cable modulation-profile 2 request 0 16 1 8 qpsk scrambler 152 no-diff 64
fixed uw8
Router(config)# cable modulation-profile 2 reqdata 0 16 1 8 qpsk scrambler 152 no-diff 64
fixed uw8
Router(config)# cable modulation-profile 2 initial 5 34 0 48 qpsk scrambler 152 no-diff
128 fixed uw16
Router(config)# cable modulation-profile 2 station 5 34 0 48 qpsk scrambler 152 no-diff
128 fixed uw16
Router(config)# cable modulation-profile 2 short 6 75 6 8 16qam scrambler 152 no-diff 144
fixed uw8
Router(config)# cable modulation-profile 2 long 8 220 0 8 16qam scrambler 152 no-diff 160
fixed uw8
```



#### Note

You must create all of the bursts (request, initial, station, short and long) for this modulation profile, using the **modulation profile** command. The reqdata burst is optional.

The following example shows an example of a DOCSIS 1.X/DOCSIS 2.0 mixed modulation profile:

```
Router# configure terminal
Router(config)# cable modulation-profile 142 request 0 16 0 8 qpsk scrambler 152 no-diff
64 fixed uw8
Router(config)# cable modulation-profile 142 initial 5 34 0 48 qpsk scrambler 152 no-diff
32 fixed uw16
Router(config)# cable modulation-profile 142 station 5 34 0 48 qpsk scrambler 152 no-diff
32 fixed uw16
Router(config)# cable modulation-profile 142 short 5 75 6 8 qpsk scrambler 152 no-diff 72
shortened uw8
Router(config)# cable modulation-profile 142 long 8 220 0 8 qpsk scrambler 152 no-diff 80
shortened uw8
Router(config)# cable modulation-profile 142 a-short qpsk0 0 18 5 99 10 8 64qam scrambler
152 no-diff 128 shortened uw8
Router(config)# cable modulation-profile 142 a-long qpsk0 0 18 15 200 0 8 64qam scrambler
152 no-diff 128 shortened uw8
Router(config)#
```

The following example shows an example of a DOCSIS 2.0 A-TDMA modulation profile:

```
Router# configure terminal
Router(config)# cable modulation-profile 242 request qpsk0 0 0 0 16 0 8 qpsk scrambler 152
no-diff 64 fixed uw8
Router(config)# cable modulation-profile 242 initial qpsk0 0 0 5 34 0 48 qpsk scrambler
152 no-diff 32 fixed uw16
Router(config)# cable modulation-profile 242 station qpsk0 0 0 5 34 0 48 qpsk scrambler
152 no-diff 32 fixed uw16
```

```

Router(config)# cable modulation-profile 242 short qpsk0 0 0 5 75 6 8 qpsk scrambler 152
no-diff 72 shortened uw8
Router(config)# cable modulation-profile 242 long qpsk0 0 0 8 220 0 8 qpsk scrambler 152
no-diff 80 shortened uw8
Router(config)# cable modulation-profile 242 a-short qpsk0 0 18 5 99 10 8 64qam scrambler
152 no-diff 128 shortened uw8
Router(config)# cable modulation-profile 242 a-long qpsk0 0 18 15 200 0 8 64qam scrambler
152 no-diff 128 shortened uw8
Router(config)#

```

See the **show cable modulation-profile** command for a description of the output display fields.

#### Related Commands

Command	Description
<b>cable upstream modulation-profile</b>	Assigns a modulation profile to an interface.
<b>show cable modulation-profile</b>	Displays a modulation profile group's information.

# cable monitor

To enable the forwarding of selected packets on the cable interface to an external LAN analyzer, use the **cable monitor** command in cable interface configuration mode. To disable this function, use the **no** form of this command.

```
cable monitor [incoming | outbound] [timestamp]
interface interface {access-list {name | number} | mac-address address | sid sid-number}
[packet-type {data docsis | data ethernet | mac [type type] } ]
```

```
no cable monitor
```

## Syntax Description

<b>incoming</b>	Forwards only packets being received on the upstream.
<b>outbound</b>	Forwards only packets being transmitted on the downstream.
<b>timestamp</b>	Enables packet time-stamping by appending a four-byte value to the forwarded packets. The timestamp value is in hundredths of a second.
<b>interface</b> <i>interface</i>	Specifies the WAN interface to which an external LAN analyzer is attached, and to which packets should be forwarded. You can forward packets only to an Ethernet, Fast Ethernet, Gigabit Ethernet, or Ten Gigabit Ethernet interface.
<b>access-list</b> <i>name</i>   <i>number</i>	Specifies the IP access list name or number (1 to 2699).
<b>mac-address</b> <i>address</i>	Specifies the MAC address of the device being monitored.
<b>sid</b> <i>sid-number</i>	Specifies the service ID for the packets that should be forwarded (1 to 16384).  <b>Note</b> This option is supported only in Cisco IOS releases that support DOCSIS 1.1 operations.
<b>packet-type</b>	(Optional) Specifies whether data or MAC packets are forwarded.
<b>data docsis</b>	Specifies that complete DOCSIS packets (both the DOCSIS header and the complete Ethernet frame) should be forwarded.  <b>Note</b> Enabling this option can result in %LINK-4-TOOBIG messages being generated if the original Ethernet frame is at or near the maximum Ethernet size of 1500 bytes. This is because this option adds additional bytes (the DOCSIS header) to the Ethernet frame, which can result in a total frame size that exceeds the maximum size that is allowed for standard Ethernet frames.
<b>data ethernet</b>	Specifies that the DOCSIS header should be stripped from the packet and that only the Ethernet frame should be forwarded.
<b>mac</b> [ <b>type</b> <i>type</i> ]	Specifies that only DOCSIS MAC-layer packets should be forwarded. If you are using the <b>sid</b> option, you can also optionally specify the <b>type</b> option with one of the following keywords to indicate that only the specific type of MAC-layer traffic should be forwarded:  <ul style="list-style-type: none"> <li><b>dsa</b>—Dynamic service addition</li> <li><b>dsc</b>—Dynamic service change</li> <li><b>dsd</b>—Dynamic service deletion</li> <li><b>map-grant</b>—Grants</li> <li><b>map-req</b>—Requests</li> </ul>

**Command Default** Both upstream (**incoming**) and downstream (**outbound**) traffic is forwarded.

**Command Modes** Interface configuration—cable interface only (config-if)

Release	Modification
12.1(3a)EC	This command was introduced.
12.1(4)CX	The sid option was added for DOCSIS 1.1 support.
12.2(4)XF	Support was added for the Cisco uBR10012 universal broadband router.
12.2(4)BC1	Support was added to the Release 12.2 BC train.
12.3(13a)BC	Supports the Cisco MC5x20U-D broadband processing engine (BPE) and the Cisco MC28U cable interface line card.
12.3(17a)BC	<ul style="list-style-type: none"> <li>Access Control Lists are now supported on the Cisco uBR-MC5X20U/D and Cisco uBR-MC28U cable interface line cards</li> <li>Unconditional downstream sniffing now enables downstream packets to be monitored, either for MAC or data packets. This enhancement supports both DOCSIS and Ethernet packet encapsulation.</li> </ul>
12.2(33)SCA	This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.
12.2(33)SCB	Support was added for the Ten Gigabit Ethernet interface type.

**Usage Guidelines** The **cable monitor** command allows an external LAN packet analyzer to monitor inbound and outbound data packets for specific types of traffic between the Cisco CMTS and the CMs on a cable interface. This feature enables the CMTS administrator to analyze traffic problems with customer data exchanges.

The interface used for forwarding packets can be used only for the external LAN analyzer; and cannot be used for other purposes. For complete information on configuring and using this feature, see the *Cable Monitor for the Cisco CMTS* chapter in the *Cisco CMTS Feature Guide* or the *Cisco IOS CMTS Cable Software Configuration Guide*, available on Cisco.com and the Customer Documentation CD-ROM.



**Tip**

One possible software utility you can use for decoding the DOCSIS MAC frames is release 0.9.6 or later of the Ethereal software, which is available for Windows and Unix systems at <http://www.ethereal.com>.

For additional information about the Cable Monitor feature, and enhanced support for broadband processing engines and other DOCSIS support, refer to the following document on Cisco.com:

- Cable Monitor and Intercept Features on the Cisco CMTS Routers*

[http://www.cisco.com/en/US/docs/ios/cable/configuration/guide/cmts\\_mon\\_intrept\\_ps2209\\_TSD\\_Products\\_Configuration\\_Guide\\_Chapter.html](http://www.cisco.com/en/US/docs/ios/cable/configuration/guide/cmts_mon_intrept_ps2209_TSD_Products_Configuration_Guide_Chapter.html)

**Examples** The following example shows how to configure the Cisco CMTS so that it monitors incoming MAC-layer packets for the CM with the MAC address of 0123.4567.89ab and forwards copies of the packets to the LAN analyzer on the Ethernet interface in slot 1, port 2:

```
Router(config-if)# cable monitor incoming interface e1/2 mac-address 0123.4567.89ab
packet-type mac
```

The following example shows how to configure a Cisco CMTS running DOCSIS 1.1 software so that it monitors incoming MAC-layer packets of type DSA for the CM identified by SID 173 and forwards copies of the packets to the LAN analyzer on the Ethernet interface in slot 1, port 2:

```
Router(config-if)# cable monitor incoming interface e1/2 sid 173 packet-type mac type dsa
```

---

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>cable intercept</b>	Allows the CMTS to forward all traffic to and from a particular CM to a data collection server located at particular User Datagram Protocol (UDP) port.
<b>show interface cable monitor</b>	Displays monitor flow information on the upstream port.

# cable multicast auth enable default-action

To enable cable multicast authorization profile and set the maximum sessions limit, use the **cable multicast auth enable default-action** command in global configuration mode. To disable a cable multicast authorization profile, use the **no** form of this command.

```
cable multicast auth enable default-action {permit | deny} max-sessions [limit]
```

```
no cable multicast auth enable
```

## Syntax Description

<i>permit</i>	Specifies packets to forward.
<i>deny</i>	Specifies packets to reject.
<i>limit</i>	Specifies the maximum number of dynamic multicast sessions allowed per CM. No default value. Max value allowed is 65535.

## Command Default

Cable multicast authorization is disabled.

## Command Modes

Global configuration (config)

## Command History

Release	Modification
12.2(33)SCB	This command was introduced.

## Usage Guidelines

This command is used to enable cable multicast authorization profile feature and defines the default value. However, it does not define the actual authorization files.

## Examples

The following example shows how to enable the default multicast authorization profile:

```
Router(config)# cable multicast auth enable default-action deny max-sessions 10
```

## Related Commands

Command	Description
<b>cable multicast authorization profile-name</b>	Defines the cable multicast authorization profile.
<b>show cable multicast authorization</b>	Displays the list of defined multicast authorization profiles and all CMs associated with corresponding profiles.

# cable multicast auth profile-name

To define cable multicast authorization profile, use the **cable multicast auth profile-name** command in global configuration mode. To disable a cable multicast authorization profile, use the **no** form of this command.

**cable multicast auth profile-name** *name*

**no cable multicast auth profile-name** *name*

## Syntax Description

<i>name</i>	Specifies the name of the authorization profile to be used.
-------------	---

## Command Default

Cable multicast authorization is disabled.

## Command Modes

Global configuration (config)

## Command History

Release	Modification
12.2(33)SCB	This command was introduced.

## Usage Guidelines

This command defines the cable multicast authorization profile to be used.

## Examples

The following example shows how to use the selected multicast authorization profile:

```
Router(config)# cable multicast auth profile-name GOLD
```

## Related Commands

Command	Description
<b>cable multicast authorization enable default-action</b>	This command enables the cable multicast authorization features. If the multicast authorization feature is disabled, all defined authorization profiles are ineffective.
<b>match rule</b>	This command configures the match rule, rule priority and related action in the selected cable multicast authorization profile

# cable multicast group-encryption

To configure a group encryption profile for a multicast group, use the **cable multicast group-encryption** command in global configuration mode. To disable a group encryption profile, use the **no** form of this command.

**cable multicast group-encryption** *number* **algorithm 56bit-des**

**no cable multicast group-encryption** *number* **algorithm 56bit-des**

## Syntax Description

<b><i>number</i></b>	Specifies the number of a specific cable multicast QoS group encryption profile. The valid range is 1–255.
<b>algorithm 56bit-des</b>	Specifies that the data encryption standard (DES) is 56 bits.

## Command Default

Cable multicast group encryption is disabled.

## Command Modes

Global configuration (config)

## Command History

Release	Modification
12.2(33)SCA	This command was introduced.

## Usage Guidelines

To apply encryption rules to a cable multicast QoS group, you must first enable and identify an encryption group.

## Examples

The following example enables encryption, identifies encryption group 12, and applies the encryption rule to QoS group 2:

```
Router(config)# cable multicast group-encryption 12 algorithm 56bit-des
Router(config)# cable multicast qos group 2 priority 7 global
Router(config-mqos)# group-encryption 12
```

## Related Commands

Command	Description
<b>cable multicast qos group</b>	Specifies and configures a cable multicast QoS group.
<b>show interface bundle multicast-sessions</b>	Displays multicast session information for a specific virtual cable bundle.
<b>show interface cable multicast-sessions</b>	Displays multicast session information for a specific cable interface.

# cable multicast group-qos

To configure a QoS profile for a QoS group, use the **cable multicast group-qos** command in global configuration mode. To disable a QoS profile, use the **no** form of this command.

```
cable multicast group-qos number scn service-class-name control {single | aggregate}
[limit max-sessions]
```

```
no cable multicast group-qos number scn service-class-name control {single | aggregate}
[limit max-sessions]
```

## Syntax Description

<i>number</i>	Specifies the QoS profile number for the cable multicast QoS group. The valid range is 1–255. If a multicast group does not match the group QoS classifiers, a default group-QoS option is applied to the multicast flow.
<b>scn</b> <i>service-class-name</i>	Specifies a service class name for the QoS profile.
<b>control</b>	Specifies the type of control to the service flow.
<b>single</b>	Specifies that a separate service flow is created for each session.
<b>aggregate</b>	Specifies that service flows are grouped for sessions in the same multicast QoS group.
<b>limit</b> <i>max-sessions</i>	(Optional) Specifies the Internet Group Management Protocol (IGMP) session limit for aggregate service flows. The valid range is 1–255.

## Command Default

The QoS profile for a QoS group is not enabled.

## Command Modes

Global configuration (config)

## Command History

Release	Modification
12.2(33)SCA	This command was introduced.

## Usage Guidelines

If a QoS profile number is not specified, a default QoS profile is applied. The default group QoS configuration creates a default multicast service flow for each cable interface that is used when a multicast session does not match any classifiers of a GC on the interface.

## Examples

The following example configures QoS profile 5 with a service name of name1 and a control of single to indicate that a separate service flow is created for each session. QoS profile 5 is then assigned to QoS group 2.

```
Router(config)# cable multicast group-qos 5 scn name1 control single
Router(config)# cable multicast qos group 2 priority 7 global
Router(config-mqos)# cable multicast group-qos 5
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>cable multicast qos group</b>	Specifies and configures a cable multicast QoS group.
<b>show interface bundle multicast-sessions</b>	Displays multicast session information for a specific virtual cable bundle.
<b>show interface cable multicast-sessions</b>	Displays multicast session information for a specific cable interface.

# cable multicast qos group

To specify and configure a cable multicast QoS group and enter multicast QoS configuration mode, use the **cable multicast qos group** command in global configuration mode. To disable a cable multicast QoS group, use the **no** form of this command.

**cable multicast qos group** *id* **priority** *value* [**global**]

**no cable multicast qos group** *id* **priority** *value* [**global**]

## Syntax Description

<b>id</b>	Specifies the number of the cable multicast QoS group. The valid range is 1–255.
<b>priority value</b>	Specifies the priority of the cable multicast QoS group. The valid range is 1–255.
<b>global</b>	(Optional) Specifies that the multicast QoS group configuration is applied to all cable interfaces.

## Command Default

A cable multicast QoS group is not identified.

## Command Modes

Global configuration (config)

## Command History

Release	Modification
12.2(33)SCA	This command was introduced.

## Usage Guidelines

You must configure a group QoS profile (**cable multicast group-qos**) and a group encryption profile (**cable multicast group-encryption**) before you configure a cable multicast QoS group.

## Examples

The following example specifies multicast QoS group 2 with a priority of 6 and global application. Application ID, group encryption, group QoS, session range, ToS, and VRF options are configured for QoS group 2.

```
Router(config)# cable multicast qos group 2 priority 6 global
Router(config-mqos)# application-id 44
Router(config-mqos)# group-encryption 4
Router(config-mqos)# group-qos 3
Router(config-mqos)# session-range 224.10.10.01 255.255.255.254
Router(config-mqos)# tos 1 6 15
Router(config-mqos)# vrf name1
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>application-id</b>	Specifies an application type to allow admission control to be applied to a group configuration.
<b>cable multicast group-encryption</b>	Configures a group encryption profile for a multicast group.
<b>cable multicast group-qos</b>	Configures a group QoS profile for a multicast QoS group.
<b>session-range</b>	Identifies the multicast QoS group session range.
<b>show interface bundle multicast-sessions</b>	Displays multicast session information for a specific virtual cable bundle.
<b>show interface cable multicast-sessions</b>	Displays multicast session information for a specific cable interface.
<b>tos</b>	Sets the type of service (ToS) low byte, high byte, and mask values within a multicast QoS group.
<b>vrf</b>	Specifies the name for a virtual routing and forwarding (VRF) instance.

