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cable acfe enable

To enable Fairness Across DOCSIS Interfaces feature on the integrated-cable (IC), modular-cable (MC), or wideband-cable (WB) interfaces, use the **cable acfe enable** command in global configuration mode. To disable Fairness Across DOCSIS Interfaces feature, use the **no** form of this command.

cable acfe enable

no cable acfe enable

Syntax Description This command has no arguments or keywords.

Command Default Fairness Across DOCSIS Interfaces feature is disabled.

Command Modes Global configuration (config)

Command History	Release	Modification
	12.2(33)SCF	This command was introduced.
	IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines Configure the Fairness Across DOCSIS Interfaces feature on the MC, IC, or WB interfaces. It is recommended that you clear the CIR reservation above the legacy “reservable” bandwidth before disabling Fairness Across DOCSIS Interfaces feature. This is to prevent any CIR over-subscription after disabling Fairness Across DOCSIS Interfaces feature.

Examples The following example shows how to enable Fairness Across DOCSIS Interfaces feature in cable interfaces.

```
Router(config)# cable acfe enable
```

Related Commands	Command	Description
	cable acfe period	Configures the interval for running the EIR rebalancing process.
	show cable acfe summary	Displays Fairness Across DOCSIS Interfaces feature status and statistics.

Command	Description
debug cable acfe (for uBR series router)	Displays the debug information related to algorithm or interaction with the system.
debug cable dp acfe (for cBR series router)	Displays the debug information related to algorithm or interaction with the system.

cable acfe max-bonus-bandwidth

To configure the maximum usable bonus bandwidth for a bonding group (BG), use the **cable acfe max-bonus-bandwidth** command in interface configuration mode. To revert to the default values, use the **no** form of this command.

cable acfe max-bonus-bandwidth *bonus-bandwidth*

no cable acfe max-bonus-bandwidth

Syntax Description

<i>bonus-bandwidth</i>	Maximum usable bonus bandwidth for a BG. There is no valid range, and the bonus bandwidth can use the entire bandwidth of an interface.
------------------------	---

Command Default

The bonus bandwidth can use the entire bandwidth of an interface.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.2(33)SCF	This command was introduced.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

The **cable acfe max-bonus-bandwidth** command configures the maximum usable bonus bandwidth. After disabling Fairness Across DOCSIS Interfaces feature, this configuration is retained. However, it will not be used.

Examples

The following example shows how to configure the maximum usable bonus bandwidth for a BG:

```
Router(config-if)# cable acfe max-bonus-bandwidth 1000000
```

Related Commands

Command	Description
cable acfe enable	Enables Fairness Across DOCSIS Interfaces feature on the CMTS routers.
debug cable dp acfe	Displays the debug information related to algorithm or interaction with the system.

cable acfe max-bonus-bandwidth

cable acfe max-eir-ratio

To configure the maximum EIR ratio between the BE bandwidth among adjacent bonding groups (BGs), use the **cable acfe max-eir-ratio** command in global configuration mode. To return to the default values, use the **no** form of this command.

cable acfe max-eir-ratio *eir-ratio*

no cable acfe max-eir-ratio

Syntax Description

<i>eir-ratio</i>	EIR rebalance ratio between two adjacent BGs. The valid range is from 1 to 100 with a default value of 10.
------------------	--

Command Default

The default value for EIR rebalance ratio is 10.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(33)SCF	This command was introduced.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

The **cable acfe max-eir-ratio** command configures the maximum EIR ratio between the BE bandwidth among adjacent BGs.

The failure to maintain the maximum EIR ratio may reduce the guaranteed bandwidth rate for the BE traffic to zero. This may lead to rejection of unicast CIR flows.

Examples

The following example shows how to configure the EIR rebalance ratio between two adjacent BGs:

```
Router(config)# cable acfe max-eir-ratio 20
```

Related Commands

Command	Description
cable acfe enable	Enables Fairness Across DOCSIS Interfaces feature on the CMTS router.

Command	Description
debug cable acfe (for uBR series router)	Displays the debug information related to algorithm or interaction with the system.
debug cable dp acfe (for cBR series router)	Displays the debug information related to algorithm or interaction with the system.

cable admission-control

To configure the CPU and memory thresholds for a Cisco CMTS router supporting broadband processing engines (BPEs), use the **cable admission-control** command in global configuration mode. This command sets the CPU averaging method and memory thresholds. To remove thresholds from a Cisco CMTS router, use the **no** form of this command.

```
cable admission-control {cpu-5sec|cpu-avg} {[io-mem]| [proc-mem]| [total-memory]} minor num1 major
num2 critical num3
```

```
no cable admission-control {cpu-5sec|cpu-avg} {[io-mem]| [proc-mem]| [total-memory]} minor num1
major num2 critical num3
```

Syntax Description

cpu-5sec	Sets Admission Control thresholds on the Cisco CMTS based on a five-second average for the CPU. This setting must be combined with the additional minor , major , and critical threshold percentage values.
cpu-avg	Sets Admission Control thresholds on the Cisco CMTS based on a one-minute average for the CPU. This setting must be combined with the additional minor , major , and critical threshold percentage values.
io-mem	Sets Admission Control thresholds for input/output (IO) memory on the Cisco CMTS route processors and BPE processors.
proc-mem	Sets Admission Control thresholds according to CPU processor memory on the Cisco CMTS.
total-memory	Sets Admission Control thresholds on the Cisco CMTS according to total-memory allocation.
minor <i>num1</i>	Sets the minor threshold level for the CPU or memory resource to be configured. Num1 expresses a percentage and must be an integer between 1 and 100.
major <i>num2</i>	Sets the major threshold level for the CPU or memory resource to be configured. Num2 expresses a percentage and must be an integer between 1 and 100.
critical <i>num3</i>	Sets the critical threshold level for the CPU or memory resource to be configured. Num3 expresses a percentage and must be an integer between 1 and 100.

Command Default Admission control is disabled with no CPU or memory resource threshold settings on the Cisco CMTS router.

Command Modes Global configuration (config)

Release	Modification
12.3(13a)BC	This command was introduced on the Cisco uBR10012 router and the Cisco uBR7246VXR router, with supporting broadband processing engines (BPEs) or cable interface line cards on the respective routers.
12.2(33)SCA	This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines The threshold counters are set to zero when the resource is reconfigured.

An important concept for system resources that are set with this command (CPU and memory) is the concept of *dampening*. Without dampening, and when admission control is configured for the first time, the system resource check is unsuccessful if the current value exceeds the critical threshold. When this happens, the system resource check subsequently succeeds only if the current value drops below the major threshold.



Note When the **minor** threshold value set with *Num1* or a **major** threshold value set with *Num2* is crossed, the Cisco CMTS router sends an alarm (SNMP trap, when supported). When the **critical** threshold value set with *Num3* is crossed, the Cisco CMTS router drops the call request.

This dampening approach helps prevent significant fluctuations in the outcome of resource checks. For example, if the critical threshold were 80 percent and the current values fluctuated between 79 and 81 percent, this scenario would lead to an alternate success then failure event without dampening. The first check would succeed, the second check would fail, and so forth.

For additional Admission Control feature information, refer to the *Admission Control for the Cisco Cable Modem Termination System* document on Cisco.com.

Examples The following example configures the Cisco CMTS router with a Quality of Service (QoS) policy that includes admission control dampening. This example illustrates the following conditions:

- When the **cpu-avg** exceeds 60%, a minor alarm (SNMP trap, when supported) is sent.
- When the **cpu-avg** exceeds 70%, a major alarm (SNMP trap, when supported) is sent.

- When the **cpu-avg** exceeds 80%, the incoming call request is rejected, and additional calls are not accepted until after the **cpu-avg** returns to below 60% (the minor alarm level).

```
Router(config)# cable admission-control cpu-avg minor 60 major 70 critical 80
```

Related Commands

Command	Description
cable admission-control event	Configures and enables admission control event types on the Cisco CMTS router.
cable admission-control ds-bandwidth	Configures admission control downstream bandwidth thresholds on the Cisco CMTS router.
cable admission-control us-bandwidth	Configures admission control upstream bandwidth thresholds on the Cisco CMTS router.
clear cable admission control counters	Clears all admission control resource counters on the Cisco CMTS router.
debug cable admission-control	Enables automatic admission control troubleshooting processes on the Cisco CMTS router.
show cable admission-control	Displays the current admission control configuration and status on the Cisco CMTS router, or on a specified interface.

cable admission-control ds-bandwidth

To set the minor, major, and exclusive thresholds for downstream voice or data bandwidth for all interfaces on a Cisco CMTS router, use the **cable admission-control ds-bandwidth** command in global configuration mode or interface configuration mode. To remove this setting from a Cisco CMTS router or from a specified interface, use the **no** form of this command.

cable admission-control ds-bandwidth *traffic-type* **minor** *minor-threshold* **major** *major-threshold* **exclusive** *exclusive-percentage* **non-exclusive** *non-exclusive-percentage*

no cable admission-control ds-bandwidth *traffic-type* **minor** *minor-threshold* **major** *major-threshold* **exclusive** *exclusive-percentage* **non-exclusive** *non-exclusive-percentage*

Syntax Description

ds-bandwidth	Sets downstream throughput thresholds.
<i>traffic-type</i>	Either of the following keywords sets the traffic type for which Admission Control applies. Both settings can be applied to the Cisco CMTS. <ul style="list-style-type: none"> • voice—Applies thresholds to downstream voice traffic. • data—Applies thresholds to downstream data traffic.
minor <i>minor-threshold</i>	Sets the minor alarm threshold. The minor-threshold value is a percentage value from 1 to 100.
major <i>major-threshold</i>	Sets the major alarm threshold. The major-threshold value is a percentage value from 1 to 100.
exclusive <i>exclusive-percentage</i>	Specifies the percentage of throughput reserved exclusively for this class (voice or data). The <i>exclusive-percentage</i> value is an integer between 1 and 100. No other class can use this throughput.
non-exclusive <i>non-exclusive-percentage</i>	Specifies the percentage of throughput, over and above the exclusive share, that can be used by this class. The <i>non-exclusive-percentage</i> value is an integer between 1 and 100. Because this throughput is non-exclusive, it can be used by other classes as specified.

Command Default

Admission control is disabled on the Cisco CMTS router.

Command Modes

Global configuration (config)
Interface configuration (config-if)

Command History

Release	Modification
12.3(13a)BC	This command was introduced on the Cisco uBR10012 and the Cisco uBR7246VXR router.
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)SCC	This command was modified to run on modular cable and integrated cable interfaces.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Downstream bandwidth settings support all interfaces on the Cisco CMTS router through global configuration. Downstream bandwidth settings can be further refined per-interface or per-upstream, the latter of which provides optimal downstream Admission Control granularity on the Cisco CMTS router. When interface-level downstream configuration is used in combination with global configuration, then the interface configuration supersedes global configuration.

**Note**

The **critical** keyword is not present for the upstream throughput resource management with the Cisco Service Flow Admission Control feature.

**Note**

The **minor** threshold level cannot be greater than the **major** threshold level.

Examples

The following example configures downstream bandwidth in the global configuration mode, with 30% of downstream bandwidth reserved exclusively for voice traffic. Minor and major alarms for voice traffic are also set to be generated at 15% and 25% respectively.

```
Router(config)# cable admission-control ds-bandwidth voice minor 15 major 25 exclusive 30
```

Related Commands

Command	Description
cable admission-control	Configures the CPU and memory thresholds for the Cisco CMTS router and supporting broadband processing engines (BPEs).

Command	Description
cable admission-control event	Configures and enables admission control event types on the Cisco CMTS router.
cable admission-control max-reserved-bandwidth	Defines the maximum reserved bandwidth per bonding group for all service flows that are allowed by the Cisco CMTS.
cable admission-control us-bandwidth	Configures admission control upstream bandwidth thresholds on the Cisco CMTS router.
clear cable admission control counters	Clears all admission control resource counters on the Cisco CMTS router.
debug cable admission-control	Enables automatic admission control troubleshooting processes on the Cisco CMTS router.
show cable admission-control	Displays the current admission control configuration and status on the Cisco CMTS router or on a specified interface.

cable admission-control event

To configure admission control event types on a Cisco CMTS router, and to enable admission control for all previously configured resources on a Cisco CMTS router, use the **cable admission-control event** command in global configuration mode. To disable admission control event types on a Cisco CMTS router, use the **no** form of this command.

cable admission-control event {**cm-registration**| **dynamic-service**}

no cable admission-control event *event_type*

Syntax Description

cm-registration	Performs admission control checks when a cable modem registers with the Cisco CMTS router headend. This setting can be combined with the dynamic-service setting, in which cable modems are allowed to register but remain subject to a Quality of Service (QoS) policy on the Cisco CMTS.
dynamic-service	Performs admission control checks each time a voice call is made, and rejects voice calls if they would impede QoS policies on the Cisco CMTS router. This setting can be combined with the cm-registration setting.

Command Default

Admission control event types are not defined on the Cisco CMTS router.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.3(13a)BC	This command was introduced for the Cisco uBR10012 router and the Cisco uBR7246VXR router.
12.2(33)SCA	This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

At least one event type must be configured to enable admission control on the Cisco CMTS router.

For additional Admission Control feature information, refer to the *Admission Control for the Cisco Cable Modem Termination System* document on Cisco.com.

Examples

The following example configures each available option for the **cable admission-control event** command on the Cisco CMTS router.

```
Router(config)# cable admission-control event cm-registration
Router(config)# cable admission-control dynamic-service
```

Related Commands

Command	Description
cable admission-control	Configures the CPU and memory thresholds for a Cisco CMTS router and supporting broadband processing engines (BPEs).
cable admission-control ds-bandwidth	Configures admission control downstream bandwidth thresholds on a Cisco CMTS router.
cable admission-control us-bandwidth	Configures admission control upstream bandwidth thresholds on a Cisco CMTS router.
clear cable admission control counters	Clears all admission control resource counters on a Cisco CMTS router.
debug cable admission-control	Enables automatic admission control troubleshooting processes on a Cisco CMTS router.
show cable admission-control	Displays the current admission control configuration and status on a Cisco CMTS router, or on a specified interface.

cable admission-control max-reserved-bandwidth

To define the maximum reserved bandwidth per bonding group for all service flows that are allowed by the Cisco CMTS, use the **cable admission-control max-reserved-bandwidth** command in the interface configuration mode. To reset or disable the maximum reserved bandwidth value, use the **no** form of this command.

cable admission-control max-reserved-bandwidth *bw-in-kbps*

no cable admission-control max-reserved-bandwidth

Syntax Description

<i>bw-in-kbps</i>	Maximum admission control reserved bandwidth. The value is in kbps and is based on the RF bandwidth percent defined for the bonding group. Valid range is from 0 to 14762.
-------------------	--

Command Default

The max-reserved-bandwidth value is 80 percent of the aggregate bandwidth of the RF channels configured in the US or DS bonding group.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(33)SCC	This command was introduced.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

This command allows the user to define the maximum reserved bandwidth per bonding group. The default maximum reserved bandwidth value is 80 percent. However the user can choose to configure a higher (up to 96 percent) or lower reserved bandwidth so that there is bandwidth allocated for zero committed information rate (CIR) best effort traffic.

Examples

The following example shows a sample definition of the maximum reserved bandwidth value.

```
Router> enable
Router# configure terminal
Router(config)# interface c5/0/1
Router(config-if)# cable admission-control max-reserved-bandwidth 6344
```

Related Commands

Command	Description
cable admission-control	Configures the CPU and memory thresholds for the Cisco CMTS router and supporting broadband processing engines (BPEs).
cable admission-control event	Configures and enables admission control event types on the Cisco CMTS router.
cable admission-control ds-bandwidth	Configures admission control downstream bandwidth thresholds on the Cisco CMTS router.
cable admission-control us-bandwidth	Configures admission control upstream bandwidth thresholds on the Cisco CMTS router.
debug cable admission-control	Enables automatic admission control troubleshooting processes on the Cisco CMTS router.
show cable admission-control	Displays the current admission control configuration and status on the Cisco CMTS router or on a specified interface.

cable admission-control preempt priority-voice

To change the default PacketCable emergency 911 call preemption functions on a Cisco CMTS router to support throughput and bandwidth requirements for emergency 911 calls above all other buckets on the Cisco CMTS router, use the **cable admission-control preempt priority-voice** command in global configuration mode. To disable preemption and return the bucket that supports PacketCable emergency 911 calls to its default configuration, use the **no** form of this command.

cable admission-control preempt priority-voice

no cable admission-control preempt priority-voice

Syntax Description

This command has no arguments or keywords.

Command Default

Emergency 911 call preemption and service flow admission control is enabled on the Cisco CMTS router.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.3(21)BC	This command was introduced for the Cisco uBR10012 router and the Cisco uBR7246VXR router.
12.2(33)SCA	This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

By default, PacketCable Emergency 911 calls are given priority on the Cisco CMTS. This priority may be preempted or removed from the Cisco CMTS router with non-standard configuration of the Service Flow Admission Control feature.

For additional information for Service Flow Admission Control beginning in Cisco IOS Release 12.3(21)BC, refer to the *Service Flow Admission Control for the Cisco Cable Modem Termination System* document on Cisco.com.

Examples

The following example disables and then restores emergency 911 call preemption on the Cisco CMTS router.

```
Router(config)# no cable admission-control preempt priority-voice
Router(config)# cable admission-control preempt priority-voice
```

cable admission-control us-bandwidth

To configure upstream bandwidth thresholds for admission control on a Cisco CMTS router, use the **cable upstream admission-control us-bandwidth** command in global configuration or interface configuration mode. To disable or to remove this configuration from a Cisco CMTS router or the specified port, use the **no** form of this command.

cable admission-control us-bandwidth [*sched scheduling-type*] **service** *service-class-name*] **minor** *minor-threshold* **major** *major-threshold* **exclusive** *exclusive-percentage* **non-exclusive** *non-exclusive-percentage*

no cable admission-control us bandwidth [*sched scheduling-type*] **service** *service-class-name*] **minor** *minor-threshold* **major** *major-threshold* **exclusive** *exclusive-percentage* **non-exclusive** *non-exclusive-percentage*

Syntax Description

<i>n</i>	Upstream on the router interface.
us-bandwidth	Configures the upstream throughput thresholds.
sched <i>scheduling-type</i>	(Optional) Specifies the scheduling type for a traffic class, where <i>scheduling-type</i> is one of the following values: <ul style="list-style-type: none"> • BE—Selects best effort traffic. • NRTPS—Selects non-real-time polling service. • RTPS—Selects real time polling service. • UGS-AD—Selects UGS-AD service. • UGS—Selects UGS service.
service <i>service-class-name</i>	(Optional) Displays a string representing a previously defined service class. Instead of specifying a class by a scheduling type, this keyword can be used to specify a class using the <i>service-class-name</i> .
minor <i>minor-threshold</i>	Sets the minor alarm threshold in a percentage value between 1 and 100.
major <i>major-threshold</i>	Sets the major alarm threshold in a percentage value between 1 and 100.
exclusive <i>exclusive-percentage</i>	Represents the critical threshold for the upstream throughput resource in a percentage value between 1 and 100. Specifies the percentage of throughput reserved exclusively for this class.

non-exclusive <i>non-exclusive-percentage</i>	Specifies the percentage of throughput, over and above the exclusive share, that can be used by this class. The <i>non-exclusive-percentage</i> value is an integer between 1 and 100. Because this throughput is non-exclusive, it can be used by other classes as specified.
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Command Default

Admission control is disabled by default on a Cisco CMTS router.

Command Modes

Global configuration (config)

Interface configuration (config-if)

Command History

Release	Modification
12.3(13a)BC	This command was introduced on the Cisco uBR10012 and the Cisco uBR7246VXR routers.
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)SCC	This command was modified to run on modular cable and integrated cable interfaces.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Upstream bandwidth settings support all interfaces on a Cisco CMTS router through global configuration.

Upstream bandwidth settings can be further refined on a per-interface or per-upstream basis using interface configuration mode. Per-upstream settings provide the optimal upstream admission control granularity on the Cisco CMTS router.

When interface or per-upstream configuration is used in combination with global configuration, then interface or per-upstream configuration supersedes global configuration. Per-upstream configuration also supersedes per-interface configuration.

**Note**

The **critical** keyword is not present for the upstream throughput resource management with Cisco Admission Control.

**Note**

The **minor** threshold level cannot be greater than the **major** threshold level.

Examples

For additional Admission Control feature information and examples, refer to the *Admission Control for the Cisco Cable Modem Termination System* document on Cisco.com.

Related Commands

Command	Description
cable admission-control	Configures the CPU and memory thresholds for the Cisco CMTS router and supporting broadband processing engines (BPEs).
cable admission-control event	Configures and enables admission control event types on the Cisco CMTS router.
cable admission-control ds-bandwidth	Configures admission control downstream bandwidth thresholds on the Cisco CMTS router.
cable admission-control max-reserved-bandwidth	Defines the maximum reserved bandwidth per bonding group for all service flows that are allowed by the Cisco CMTS.
clear cable admission control counters	Clears all admission control resource counters on the Cisco CMTS router.
debug cable admission-control	Enables automatic admission control troubleshooting processes on the Cisco CMTS router.
show cable admission-control	Displays the current admission control configuration and status on the Cisco CMTS router or on a specified interface.

cable application-type include

To associate an application type with a specific and prioritized bucket on a Cisco CMTS router, use the **cable application-type include** command in global configuration mode. To remove the application type settings, use the **no** form of this command.

```
cable application-type bucket-number include {Best-effort| multicast application-id| packetcable {normal| priority}}| pcmm {app-id gate-app-id| priority gate-priority}}| sched-type type| service-class service-class-name}
```

```
no cable application-type bucket-number include {Best-effort| multicast application-id| packetcable {normal| priority}}| pcmm {app-id gate-app-id| priority gate-priority}}| sched-type type| service-class service-class-name}
```

Syntax Description

<i>bucket-number</i>	Bucket number to which an application type is associated. Range is from 1 to 8, with 1 as the first in the sequence.
Best-effort	Applies best effort committed information rate (CIR) to the specified bucket.
multicast <i>application-id</i>	Specifies the application identification for the multicast service flow. The valid range is 1 to 65535.
packetcable { normal priority }	Specifies PacketCable service flows for the designated bucket, with the following priorities: <ul style="list-style-type: none"> • normal—Selects PacketCable calls with normal priority. • priority—Selects PacketCable calls with high priority.
pcmm { app-id <i>gate-app-id</i> priority <i>gate-priority</i> }	Specifies PacketCable Multimedia (PCMM) service flows for the designated bucket, with the following options: <ul style="list-style-type: none"> • app-id <i>gate-app-id</i>—Selects the gate application identifier from 0 to 65535. For each bucket, up to ten application type rules may be defined. • priority <i>gate-priority</i>—Selects the priority level from 0 to 7.

sched-type <i>type</i>	Specifies upstream scheduling types, with one of the following additional keywords used for the DOCSIS scheduling type: <ul style="list-style-type: none"> • be—Best effort. • nrtps—Non-real-time polling service. • rtps—Real-time polling service. • ugs—Unsolicited Grant Service. • ugs-ad—Unsolicited grant service-activity detection (UGS-AD) service.
service-class <i>service-class-name</i>	Specifies the name of the service class being assigned to the designated bucket, where <i>service-class-name</i> is an alphanumeric string.

Command Default

Service flow admission control is enabled without the application types.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.3(21)BC	This command was introduced for the Cisco uBR10012 router and the Cisco uBR7246VXR router.
12.2(33)SCA	This command was introduced in Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added. The multicast keyword was added to this command.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

The details of this command vary according to the bucket number and application type being mapped to a service flow on the Cisco CMTS router. This command overrides default service flow admission control settings on the Cisco CMTS.

Best Effort

The best effort CIR service flow rule may be applicable to both upstream and downstream. However, in the case of upstream service flows, in most cases, the same service flow may map both the rules.

For best effort, there is also the **sched-type** keyword option that applies to upstream service flows. This best effort scheduling type rule is applicable only for upstream service flows.

Service Classes

DOCSIS 1.1 introduced the concept of service classes. A service class is identified by a service class name. A service class name is a string the CMTS router associates with a QoS parameter set. One of the objectives of using a service class is to allow the high-level protocols to create the service flows with the desired QoS parameter set. Using a service class is a convenient way to bind the application with the service flows. The rules provide a mechanism to implement such binding.

Note the following factors when using the **service-class** keyword:

- Service classes are separately configured using the **cable match** command to provide the QoS for multicast traffic. This step maps a bucket using a rule to allocate bandwidth for multicast traffic.
- A named service class may be classified into any application type.
- Up to ten service class names may be configured per application type. Attempting to configure more than ten service classes results in an error message.

For additional information, see the *Service Flow Admission Control* feature documentation on Cisco.com.

Examples

The following example maps high-priority PacketCable service flows into application bucket 5:

```
Router(config)# cable application-type 5 include packetcable priority
```

The following example maps normal PacketCable service flows into application bucket 1:

```
Router(config)# cable application-type 1 include packetcable normal
```

The following example maps the specified bucket number with PCMM service flow with a priority of 7, then maps an application identifier of 152 for the same bucket number:

```
Router(config)# cable application-type 2 include pcmm priority 7
```

```
Router(config)# cable application-type 2 include pcmm app-id 152
```

The following example maps both UGS and UGS-AD into bucket number 1:

```
Router(config)# cable application-type 1 include sched-type ugs
```

```
Router(config)# cable application-type 1 include sched-type ugs-ad
```

The following example maps the best effort CIR flows to bucket 3:

```
Router(config)# cable application-type 3 include Best-effort
```

The following example maps the service class name with a value of service-name1 into application bucket 3:

```
Router(config)# cable application-type 3 include service-class service-name1
```

The following example maps the multicast application type with a value of 18 into application bucket 3:

```
Router(config)# cable application-type 3 include multicast 18
```

Related Commands

Command	Description
cable admission-control ds-bandwidth	Sets the minor, major, and exclusive thresholds for downstream voice or data bandwidth for all interfaces on the Cisco CMTS router.

Command	Description
cable admission-control preempt priority-voice	Changes the default PacketCable emergency 911 call preemption functions on the Cisco CMTS router to support throughput and bandwidth requirements for emergency 911 calls above all other buckets on the Cisco CMTS router.
cable admission-control us-bandwidth	Configures upstream bandwidth thresholds for admission control on the Cisco CMTS router.
cable application-type name	Assigns an alphanumeric name for the specified bucket.
cable upstream admission-control	Configures per-upstream bandwidth thresholds and exclusive or non-exclusive resources on the Cisco CMTS router.
debug cable admission-control flow-categorization	Displays service flow categorization results, enabled when a service flow is classified.
show application-buckets	Displays rules for any or all buckets supporting service flow admission control on the Cisco CMTS router.
show interface cable admission-control reservation	Displays service flows, categorizations, and bandwidth consumption on the Cisco CMTS router, for the specified interface, and the specified service flow direction.

cable application-type name

To assign an alphanumeric name for the specified bucket, use the **cable application-type name** command in global configuration mode. To remove this configuration, use the **no** form of this command.

cable application-type *bucket-number* **name** *bucket-name*

no cable application-type *bucket-number* **name** *bucket-name*

Syntax Description

<i>bucket-number</i>	Bucket number to which the name is applied. The priority sequence of the buckets, according to their original numeration of 1 to 8, still applies, whether the default bucket numbers or customized alphanumeric names are used.
<i>bucket-name</i>	Alphanumeric bucket name.

Command Default

Service flow admission control and the default configuration of this command is enabled.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.3(21)BC	This command was introduced for the Cisco uBR10012 router and the Cisco uBR7246VXR router.
12.2(33)SCA	This command was introduced in Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

This bucket name appears in supporting **show** and **debug** commands along with the default bucket number. For additional information, see the *Service Flow Admission Control* feature documentation on Cisco.com.

Examples

The following example illustrates the use of descriptive names for the associated buckets:

```
Router(config)# cable application-type 2 name video
Router(config)# cable application-type 3 name gaming
```

Related Commands

Command	Description
cable admission-control ds-bandwidth	Sets minor, major and exclusive thresholds for downstream voice or data bandwidth for each or all interfaces on the Cisco CMTS
cable admission-control preempt priority-voice	Changes the default PacketCable Emergency 911 call preemption functions on the Cisco CMTS, supporting throughput and bandwidth requirements for Emergency 911 calls above all other buckets on the Cisco CMTS.
cable admission-control us-bandwidth	Configures global or interface-level upstream bandwidth thresholds and exclusive or non-exclusive resources on the Cisco CMTS.
cable application-type include	Associates an application type with a specific and prioritized bucket on the Cisco CMTS.
cable upstream admission-control	Configures per-upstream bandwidth thresholds and exclusive or non-exclusive resources on the Cisco CMTS.
debug cable admission-control flow-categorization	Displays service flow categorization results, enabled when a service flow is classified.
show application-buckets	Displays rules for any or all buckets supporting Service Flow Admission Control on the Cisco CMTS.
show interface cable admission-control reservation	Displays service flows, categorizations, and bandwidth consumption on the Cisco CMTS, for the specified interface, and the specified service flow direction.

cable arp

To activate cable Address Resolution Protocol (ARP), use the **cable arp** command in cable interface or subinterface configuration mode. To block ARP requests for cable modems (CMs), use the **no** form of this command.

cable arp

no cable arp

Syntax Description This command has no arguments or keywords.

Command Default ARP is enabled.

Command Modes Interface configuration (config-if)
Subinterface configuration (config-subif)

Release	Modification
12.1T	This command was introduced.
12.0(6)SC	This command was supported.
12.1(2) EC1	This command was supported.
12.1(3a)EC	Subinterface support was added.
12.2(8)BC1	Interaction with the clear arp-cache command was changed. Previously, the clear arp-cache command sent an ARP request to a CM before clearing its ARP entry. Now, the clear arp-cache command clears the ARP entry without communicating with the CM. The CM (or its CPE devices) must send one or more IP packets to the CMTS before IP communications can be restored (assuming the CM or CPE devices are authorized to connect to the network).
12.2(33)SCA	This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers. This command is integrated into bundle interface configuration mode.

Usage Guidelines ARP is an Internet protocol used to map IP addresses to MAC addresses on computers and other equipment installed in a network. You must activate ARP requests so that the Cisco CMTS router can perform IP address resolution on the downstream path.

Occasionally, you might want to use the **no cable arp** and **clear arp-cache** commands to block out new ARP requests and clear the existing ARP table. In this situation, the Cisco CMTS router will retain the ARP addresses of currently online CMs (CMs with a known IP address) and will continue to send ARP requests for those CMs when those ARP entries time out or are cleared, so that those CMs can continue to remain online. ARP requests for CMs that are currently offline and for any other unknown IP addresses, however, will remain blocked until ARP requests are reenabled on the downstream using the **cable arp** command.



Note Using the **no cable arp** and **no cable proxy-arp** commands shifts all responsibility for the management of the IP addresses used by CMs and CPE devices to the DHCP server and provisioning system.



Tip You can expect to see a temporary spike in CPU usage after initially giving the **no cable arp** command, because of the need to verify CPE IP addresses. CPU usage drops after the router has verified and learned all of the CPE IP addresses that are currently online. (This same situation occurs after initially enabling the **cable source-verify dhcp** command, because the router must send a DHCP LEASEQUERY request for every unknown CPE IP address.)



Note Starting from IOX-XE 3.15 OS, this command is integrated into bundle interface configuration mode for cBR Series Converged Broadband Routers.

Examples

The following example shows how to activate cable ARP requests for port 0 on the cable interface line card installed in slot 6 of a Cisco CMTS router:

```
router(config)# interface cable 6/0
```

```
router(config-if)# cable arp
```

The following example shows how to activate cable ARP requests for port 0 on the cable interface line card installed in slot 6, subinterface 1, of a Cisco CMTS router:

```
router(config)# interface cable 6/0.1
```

```
router(config-subif)# cable arp
```

The following example shows how to activate cable ARP requests on the bundle interface line card on Cisco cBR Series Converged Broadband Routers:

```
router(config)# interface bundle 1
```

```
router(config-if)# cable arp
```

Related Commands

Command	Description
clear arp-cache	Clears the ARP table on the router.
cable proxy-arp	Activates cable proxy ARP on the cable interface.

cable arp filter

To control the number of Address Resolution Protocol (ARP) packets that are allowable for each Service ID (SID) on a cable interface, use the **cable arp filter** command in cable interface configuration mode. To stop the filtering of ARP broadcasts for CMs, use the **no** form of this command.

cable arp filter {reply-accept| request-send} *number window-size*

no cable arp filter {reply-accept| request-send}

default cable arp filter {reply-accept| request-send}

Syntax Description

reply-accept	Configures the cable interface to accept only the specified <i>number</i> of ARP reply packets every <i>window-size</i> seconds for each active Service ID (SID) on that interface. The cable interface drops ARP reply packets for a SID that would exceed this number.
request-send	Configures the cable interface to send only the specified <i>number</i> of ARP request packets every <i>window-size</i> seconds for each active SID on that interface. The cable interface drops ARP requests for a SID that would exceed this number.
<i>number</i>	Number of ARP reply packets that is allowed for each SID within the window time period. The allowable range is 0 to 20 packets, with a default of 4 packets. If <i>number</i> is 0, the cable interface drops all ARP reply packets.
<i>window-size</i>	Size of the window time period, in seconds, in which to monitor ARP requests. The valid range is 1 to 5 seconds, with a default of 2 seconds.

Command Default

ARP packets are not filtered, which means the Cisco CMTS router accepts all ARP reply packets and sends all ARP request packets.

Command Modes

Cable interface configuration (config-if)

Command History

Release	Modification
12.2(15)BC2	This command was introduced for the Cisco uBR7246VXR and Cisco uBR10012 universal broadband routers.

Release	Modification
12.3(9a)BC	The values of <i>number</i> and <i>window-size</i> are optional for the the respective reply-accept and request-send settings. In this release and for earlier supporting releases, when ARP filtering is enabled, the default values for <i>number</i> and <i>window-size</i> are 4 and 2 respectively.
12.3(17a)BC	In this release and for later releases, when ARP filtering is enabled, the default values for <i>number</i> and <i>window-size</i> are 3 and 2 respectively.
12.2(33)SCA	This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers. This command is integrated into bundle interface configuration mode.

Usage Guidelines

Viruses, worms, and theft-of-service attacks can generate a large volume of ARP requests on a cable interface. In some situations, the volume of ARP traffic can become so large that it throttles all other traffic.

To control the number of ARP replies and ARP requests that are allowed for each SID on a cable interface, use the **cable arp filter** command. This command configures the interface so that it accepts only a certain number of ARP reply or request packets per a specified time period. If a SID generates more ARP packets than what is allowed, the cable interface drops the excessive traffic.

By default, no ARP filtering is done. ARP filtering is enabled on individual cable interfaces, and you can choose to filter ARP packets only on the specific cable interfaces that require it. You can further choose to filter only ARP request packets, only ARP reply packets, or both. You can configure different threshold values on each interface, allowing you to customize the feature for each interface's traffic patterns.

If using bundled cable interfaces, the Cable ARP Filtering feature is configured separately on the master and slave interfaces. This allows you to configure the feature only on the particular interfaces that require it.



Note

Cisco IOS Release 12.3(9a)BC introduces enhanced command option syntax for the **cable arp filter** command, where *number* and *window-size* values are optional for **reply-accept** and **request-send** settings.



Note

Disabling the cable ARP filtering feature, using the **no cable arp filter** command, does not reset the ARP packet counters. The ARP packet counters do not increment when cable ARP filtering is disabled, but the counters retain their current values until the interface counters are specifically cleared, using the **clear counters** command.

The Linksys Wireless-B Broadband Router BEFW11S4 version 4 with 1.44.2 firmware incorrectly sends its own ARP reply packet for every ARP request packet it receives, instead of replying only to the ARP requests that are specifically for itself. Customers with these routers should upgrade the firmware to the latest revision to fix this bug. To upgrade the firmware, go to the download section on the Linksys web site.

**Note**

Starting from IOX-XE 3.15 OS, this command is integrated into bundle interface configuration mode for cBR Series Converged Broadband Routers.

Examples

The following example shows how to filter cable ARP reply packets, so that the cable interface accepts a maximum of 15 ARP replies every three seconds per SID:

```
Router(config)# interface cable 5/1/0
Router(config-if)# cable arp filter reply-accept 15 3
```

The following example shows how to filter cable ARP request packets, so that the cable interface sends a maximum of 10 requests per second per SID:

```
Router(config)# interface cable 6/0
Router(config-if)# cable arp filter request-send 10 1
```

The following example shows how to enable the filtering of cable ARP request and reply packets on a cable interface, using the default values of 4 packets per CPE per every 2 seconds:

```
Router(config)# interface cable 3/0
Router(config-if)# default cable arp filter reply-accept
Router(config-if)# default cable arp filter request-send
Router(config-if)# end
```

```
Router# show running-config | include filter
cable arp filter reply-accept 4 2
cable arp filter request-send 4 2
```

The following example shows how to disable the filtering of cable ARP request and reply packets on a cable interface:

```
Router(config)# interface cable 1/0
Router(config-if)# no cable arp filter reply-accept
Router(config-if)# no cable arp filter request-send
```

The following example shows how to filter cable ARP reply packets, so that the bundle interface accepts a maximum of 15 ARP replies every three seconds per SID on Cisco cBR Series Converged Broadband Routers:

```
Router(config)# interface bundle 1
Router(config-if)# cable arp filter reply-accept 15 3
```

The following example shows how to filter cable ARP request packets, so that the bundle interface sends a maximum of 10 requests per second per SID on Cisco cBR Series Converged Broadband Routers:

```
Router(config)# interface bundle 1
Router(config-if)# cable arp filter request-send 10 1
```

Related Commands

Command	Description
cable arp	Activates cable ARP.
cable proxy-arp	Activates cable proxy ARP on the cable interface.
clear arp-cache	Refreshes dynamically created entries from the ARP cache.
clear counters	Clears the packet counters on all interfaces or on a specific interface.
debug cable arp filter	Displays debugging messages about the filtering of ARP broadcasts.
show cable arp-filter	Displays the total number of ARP replies and requests that have been sent and received, including the number of requests that have been filtered.

cable attribute-mask

To configure an attribute for a modular cable interface, use the **cable attribute-mask** command in interface configuration mode. To disable this configuration, use the **no** form of this command.

cable attribute-mask *mask*

no cable attribute-mask *mask*

Syntax Description

<i>mask</i>	Specifies the mask value for the interface.
-------------	---

Command Default

If this command is not used, the default attribute will be used for the modular cable interface. The default attribute for a modular cable interface is zero.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.2(33)SCB	This command was introduced.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

The attribute mask comprises 32 attributes and each attribute represents a single bit in the mask. You can configure a provisioned attribute mask for each channel and provisioned bonding group to assign values to the operator-defined binary attributes, or to override the default values of the specification-defined attributes. The operator may configure, in the CM configuration file, a required attribute mask and a forbidden attribute mask for a service flow. Additionally, in a CM-initiated dynamic service request, the CM can include a required attribute mask and a forbidden attribute mask for a service flow.

Examples

The following example shows how to configure an attribute for a modular cable interface:

```
Router# configure terminal
Router(config)# interface modular-cable 1/0/0:0
Router(config-if)# cable attribute-mask 2000ff00
```

The following example shows how to configure an attribute for a Integrated cable interface:

```
Router# configure terminal
Router(config)# interface Integrated-Cable 9/0/3:0
Router(config-if)# cable attribute-mask 2000ff00
```

Related Commands

Command	Description
interface modular-cable	Specifies a modular cable interface.
cable downstream attribute-mask	Specifies an attribute mask value for a wideband cable interface.
interface wideband-cable	Specifies a wideband cable interface.

cable bgsync

To set the data intervals for the background synchronization of SNMP MIB data on the Cisco CMTS, use the **cable bgsync** command in global configuration mode. To disable background synchronization, use the **no** form of this command.

cable bgsync {**itime** *i-interval*| **ptime** *p-interval*}

no cable bgsync

Syntax Description

itime	Indicates the data interval time between two interval synchronizations.
ptime	Indicates the incremental data interval time between two synchronizations.
<i>i-interval</i>	Length of the data interval in seconds. The valid range is from 5 to 31536000. The default value is 86400.
<i>p-interval</i>	Length of the incremental data interval in seconds. The valid range is from 5 to 86400. The default value is 5.

Command Default

This command is enabled by default.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(33)SCG	This command was introduced.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Note

To use the **cable bgsync** command, you must configure the **service internal** command in global configuration mode. Use the **cable bgsync** command carefully as it can impact the CPU utilization.

For more information about MIB objects that are synchronized during background synchronization, see the [Cisco CMTS Universal Broadband Router Series MIB Specifications Guide 12.2SC](#).

Examples

The following example shows how to set the data intervals for background synchronization on the Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# service internal
Router(config)# cable bgsync itime 3600
Router(config)# cable bgsync ptime 6
Router(config)#
```

Related Commands

Command	Description
cable bgsync active	Activates background synchronization process on the Cisco CMTS.
clear bgsync counters	Clears the background synchronization counters on the Cisco CMTS.
show cable bgsync	Displays the information on the background synchronization process on the Cisco CMTS.

cable bgsync active

To activate the background synchronization process on the Cisco CMTS, use the **cable bgsync active** command in global configuration mode. To deactivate the background synchronization process, use the **no** form of this command.

cable bgsync active

no cable bgsync active

Syntax Description This command has no arguments or keywords.

Command Default This command is enabled by default.

Command Modes Global configuration (config)

Command History	Release	Modification
	12.2(33)SCG	This command was introduced.
	IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines Use the **cable bgsync active** command to activate the background synchronization process. SNMP objects use interprocess communication (IPC) to access data between the line card and the route processor (RP). When SNMP queries are sent to a Cisco CMTS with large number of modems configured, IPC takes a long time to retrieve the information from the line card and pass it on to the RP. This resulted in an increase in the SNMP response time.

The background synchronization process slowly synchronizes the data between the line card and the RP. Therefore, when SNMP queries are sent to the Cisco CMTS, the Cisco CMTS returns the SNMP data from the RP. IPC requests are not sent to retrieve the data, thereby improving the SNMP performance.

The background synchronization process is enabled by default on the Cisco uBR10012, and Cisco 7200 Series routers.

For more information about the MIB objects that are synchronized during background synchronization, see the [Cisco CMTS Universal Broadband Router Series MIB Specifications Guide 12.2SC](#).

Examples The following example shows how to deactivate the background synchronization process on the Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# no cable bgsync active
Router(config)#
```

Related Commands

Command	Description
cable bgsync	Sets the data intervals for background synchronization on the Cisco CMTS.
show cable bgsync	Displays the information on the background synchronization process, on the Cisco CMTS.
clear bgsync counters	Clears the background synchronization counters on the Cisco CMTS.

cable bonding-group-id



Note Effective with Cisco IOS Release 12.2(33)SCE, the **cable bonding-group-id** command is replaced by the **cable bonding-group-secondary** command. See the **cable bonding-group-secondary** command for more information.

To specify a Bonding Group ID and indicate whether the bonding group is a primary or secondary bonded channel, use the **cable bonding-group-id** command in wideband-cable interface configuration mode. To remove a bonding group configuration and revert to the default bonding group (a primary bonding group), use the **no** form of this command.

cable bonding-group-id *id_num* [**secondary**]

no cable bonding-group-id *id_num* [**secondary**]

Syntax Description

<i>id_num</i>	A unique Bonding Group ID. Valid values are 1 to 255. The bonding group ID must be unique for each wideband channel on the CMTS.
secondary	Specifies that the bonding group is a secondary bonding group. If the secondary keyword is not used, the bonding group is a primary bonding group.

Command Default

If the **cable bonding-group-id** command is not issued, Cisco IOS software assigns a default ID to the bonding group and configures the wideband-channel cable interface as a primary bonding group.

Command Modes

Interface configuration mode for a wideband-cable interface (config-if)

Command History

Release	Modification
12.3(21)BC	This command was introduced for the Cisco uBR10012 router.
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)SCE	This command was replaced with the cable bonding-group-secondary command.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

The **cable bonding-group-id** command is not needed for the wideband channels that will be received by the Scientific Atlanta DPC2505 or EPC2505 wideband cable modems.

The **cable bonding-group-id** command is used only for wideband channels that will be received by the Linksys WCM300-NA, WCM300-EURO, or WCM300-JP wideband cable modems.

Linksys WCM300 Cable Modem

For wideband channels that will be received by the Linksys WCM300-NA, WCM300-EURO, and WCM300-JP cable modems, the **cable bonding-group-id** command assigns a Bonding Group ID to a wideband-channel cable interface and configures the bonding group as a primary bonding group if the **secondary** keyword is not specified, or as a secondary bonding group if the **secondary** keyword is specified.

- A primary bonding group is a primary bonded channel.
- A secondary bonding group is a secondary bonded channel.

The primary bonded channel is the wideband channel on which the Linksys WCM300 modem receives all of its unicast traffic and some of its multicast traffic. The cable modem may identify the primary bonded channel and any secondary bonded channels to the CMTS at cable modem registration time. The DOCSIS configuration file may define the primary bonded channel for the CMTS to assign to the cable modem.

In addition to joining one primary bonded channel, the Linksys WCM300 may join up to two secondary bonded channels simultaneously in order to receive additional data streams. The DOCSIS configuration file may define the secondary bonded channels for the modem to pass to the CMTS. Secondary bonded channels are intended to receive multicast traffic such as broadcast video that is not available on the primary bonded channel.

For information on the TLV encodings that can be used in the DOCSIS configuration file to identify primary and secondary bonded channels, see the *Cisco Cable Wideband Solution Design and Implementation Guide, Release 1.0*.

**Note**

If a wideband channel is specified as a primary or secondary bonded channel in the DOCSIS configuration file, it *must be identically defined* as a primary or secondary bonded channel in the CMTS active, running configuration file.

- If a wideband channel is configured with the **cable bonding-group-id** command or by default to be a primary bonded channel, the Linksys WCM300 modem will not register using it as one of its secondary bonded channels.
- If a wideband channel is configured with the **cable bonding-group-id** command to be a secondary bonded channel, the Linksys WCM300 modem will not register using it as its primary bonded channel.

**Note**

When a wideband channel is defined on a Wideband SPA, Cisco IOS software configures the wideband channel as a primary bonding group (primary bonded channel) and assigns a default ID to the bonding group. If a wideband channel is to be used as a secondary bonded channel, use the **cable bonding-group-id** command with the **secondary** keyword to specify that the channel is a secondary bonded channel.

If you specify a non-unique Bonding Group ID for the *id_num* argument, **cable bonding-group-id** displays an error message and does not modify the ID.

Examples

The following examples show how to use the **cable bonding-group-id** command for a variety of purposes. The following **cable bonding-group-id** command specifies that wideband channel 10 on the Wideband SPA in slot/subslot/bay 1/0/1 will be a secondary bonding group (secondary bonded channel) having the bonding group ID 20.

```
Router# configure terminal
```

```
Router(config)# interface wideband-cable 1/0/1:10  
Router(config-if)# cable bonding-group-id 20 secondary
```

The following example shows how to change a bonding group with an ID of 20 from a secondary to a primary bonding group by omitting the **secondary** keyword:

```
Router(config-if)# cable bonding-group-id 20
```

The **no** form of the **cable bonding-group-id** removes the configured bonding group and reverts the configuration to the default bonding group. For a secondary bonding group with the ID of 20, the following **no** forms of the command are equivalent:

```
Router(config-if)# no cable bonding-group-id 20  
OR
```

```
Router(config-if)# no cable bonding-group-id 20 secondary
```

When either of the preceding commands are issued, the wideband-channel cable interface is configured to use a default bonding group, which has a default bonding group ID assigned by Cisco IOS software and is a primary bonding group.

Related Commands

Command	Description
interface	Enters interface configuration mode.

cable bonding-group-secondary

To specify a bonding group as a secondary bonded channel, use the **cable bonding-group-secondary** command in wideband-cable interface configuration mode. To remove the bonding group configuration and revert to the default bonding group (a primary bonding group), use the **no** form of this command.

cable bonding-group-secondary

no cable bonding-group-secondary

Command Default

If the **cable bonding-group-secondary** command is not issued, Cisco IOS software configures the wideband-channel cable interface as the primary bonding group.

Command Modes

Interface configuration mode (config-if) for a wideband-cable interface

Command History

Release	Modification
12.2(33)SCE	This command was introduced for the Cisco uBR-MC3GX60V cable interface line card.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Starting with Cisco IOS Release 12.2(33)SCE, the **cable bonding-group-secondary** command replaces the **cable bonding-group-id** command. If you upgrade from an earlier Cisco IOS Release to Cisco IOS Release 12.2(33)SCE and later, the **cable bonding-group-id** command will no longer change the bonding-group ID.

The **cable bonding-group-secondary** command is used only for wideband channels that are received by the Linksys WCM300-NA, WCM300-EURO, or WCM300-JP wideband cable modems.

Linksys WCM300 Cable Modem

For wideband channels that are received by the Linksys WCM300-NA, WCM300-EURO, and WCM300-JP cable modems, the **show controllers Modular-Cable slot/subslot/controller wideband** command displays the bonding group ID of a wideband-channel cable interface and the **cable bonding-group-secondary** command configures the bonding group as a secondary bonding group.

The primary bonded channel is the wideband channel on which the Linksys WCM300 modem receives all of its unicast traffic and some of its multicast traffic. The cable modem identifies the primary bonded channel and any secondary bonded channels to the CMTS at cable modem registration time. The DOCSIS configuration file defines the primary bonded channel for the CMTS to assign to the cable modem.

In addition to joining one primary bonded channel, the Linksys WCM300 joins up to two secondary bonded channels simultaneously in order to receive additional data streams. The DOCSIS configuration file defines the secondary bonded channels for the modem to pass to the CMTS. Secondary bonded channels are intended to receive multicast traffic such as broadcast video that is not available on the primary bonded channel.

For information on the TLV encodings that can be used in the DOCSIS configuration file to identify primary and secondary bonded channels, see *Cisco Cable Wideband Solution Design and Implementation Guide, Release 1.0*.



Note If a wideband channel is specified as a primary or secondary bonded channel in the DOCSIS configuration file, it must be identically defined as a primary or secondary bonded channel in the CMTS active, running configuration file.

The following points list the restrictions for configuring the wideband channel with the **cable bonding-group-secondary** command:

- If a wideband channel is not configured with the **cable bonding-group-secondary** command, the Linksys WCM300 modem may not use it as a secondary bonding group.
- If a wideband channel is configured with the **cable bonding-group-secondary** command to be a secondary bonded channel, the Linksys WCM300 modem may not use it as a primary bonded group.



Note When a wideband channel is defined, the Cisco IOS software configures the wideband channel as a primary bonding group (primary bonded channel) and assigns a default ID to the bonding group. If a wideband channel is to be used as a secondary bonded channel, use the **cable bonding-group-secondary** command to specify that the channel is a secondary bonded channel.

Examples

The following example shows how to use the **cable bonding-group-secondary** command:

```
Router# configure terminal
Router(config)# interface wideband-cable 1/0/1:10
Router(config-if)# cable bonding-group-secondary
```

Related Commands

Command	Description
interface	Enters interface configuration mode.

cable channel-group

To configure the channel group, use the **cable channel-group** command in global configuration mode. To disable the channel group, use the **no** form of the command.

cable channel-group *group-id*

no cable channel-group *group-id*

Syntax Description

group-id Channel group ID. The range is from 1 to 1000.

Command Default

Channel group is not configured.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(33)CX	This command was introduced.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Examples

The following example shows how to configure a channel group:

```
Router# configure terminal
Router(config)# cable channel-group 1
Router(config-ch-group)# upstream Cable 7/1/0 channel 0-3
Router(config-ch-group)# downstream Modular-Cable 7/1/0 rf-channel 0-15
Router(config-ch-group)# cmc 0010.2024.7035
```

Related Commands

Command	Description
show cable channel-group	Displays the channel group information.
upstream cable channel	Configures the upstream cable channel for a channel group.
downstream modular-cable rf-channel (channel group)	Configures the downstream modular cable RF channel for a channel group.
cmc	Configures the Cisco Coaxial Media Converter (CMC).

cable clock clear-counters

To reset the counters that are displayed with the **show controllers clock-reference** command, use the **cable clock clear-counters** command in privileged EXEC mode.

cable clock clear-counters

Syntax Description This command has no keywords or arguments.

Command Default None

Command Modes Privileged EXEC (#)

Command History	Release	Modification
	12.1(1a)T1	This command was introduced.
	12.1(2)EC1	This command was supported on the EC train for the Cisco uBR7246VXR router.
	12.2(2)XF	This command was supported for the TCC+ card on Cisco uBR10012 routers.
	12.2(4)BC1	Support for this command was added to the Release 12.2 BC train for the Cisco uBR7246VXR and Cisco uBR10012 routers.
	12.3(23)BC	This command is supported only for standalone (freerun) mode.
	IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines This command resets any counters that were displayed from the last time the **show controllers clock-reference** command was used.



Note This command is not supported on the SC train.

This command supports the Cisco CMTS clock feature set, which provides a synchronized clock for improved Voice-over-IP (VoIP) operations. The clock feature set requires one of the following configurations:

- A Cisco uBR10012 router with one or two TCC+ cards that are connected to an external national clock source.

**Note**

Beginning in Cisco IOS Release 12.3(23)BC, TCC+ is replaced with the DOCSIS Timing and Control Card (DTCC) and does not require to be connected to an external national clock source.

- A Cisco uBR7246 VXR router using a Cisco uBR-MC16S, Cisco uBR-MC16E, Cisco uBR-MC28C, or Cisco uBR-MC28C-BNC cable interface line card. The router must also be equipped with a Cisco cable clock card and be running Cisco IOS Release 12.1(1a)T1, Cisco IOS Release 12.1(2)EC1, or a later release. The Cisco cable clock card should be connected to an external national clock source.

Only these cable interface cards support the external clock card reference from a clock card to distribute that signal to CMs or set-top boxes (STBs) attached to the specific network segments. You can use other cable interface cards, such as the Cisco uBR-MC16C, with the clock card, but these other cable interfaces will not synchronize their downstream SYNC messages with the external clock source.

Each CM or STB must also support VoIP applications and the clock feature set. For example, the Cisco uBR924, running Cisco IOS Release 12.0(7)T or later releases, supports the clock card feature automatically.

**Note**

The **show controllers clock-reference** command might display compare errors on the Cisco uBR10012 router because there could be a slight delay at system startup before the clock cards synchronize with each other. These initial compare errors can be ignored and cleared with the **cable clock clear-counters** command.

Examples

The following example shows how to reset all counters that are displayed for the clock card:

```
Router# cable clock clear-counters
```

Related Commands

Command	Description
show controllers clock-reference	Displays the cable clock card's hardware information.

cable clock dti

To configure the DOCSIS Timing Interface (DTI) clock reference mode, use the **cable clock dti** command in global configuration mode. To terminate the DTI clock reference mode and restart the standalone mode, use the **no** form of the command.

cable clock dti

no cable clock dti

Syntax Description This command has no keywords or arguments.

Command Default Standalone mode

Command Modes Global configuration (config)

Command History

Release	Modification
12.3(23)BC	This command was introduced for the Cisco uBR10012 router.
12.2(33)SCB	This command was integrated into Cisco IOS Release 12.2(33)SCB. Support for the Cisco uBR7225VXR router was added.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Use this command to configure DTI clocking mode.

This command may be stored in NVRAM as part of the DOCSIS Timing and Control Card (DTCC) configuration on the Cisco uBR10012 and Cisco uBR7225VXR routers.



Note

When the **cable clock dti** command or its **no** form is used to configure the DTI clock reference mode, the DTCC card on the Cisco uBR10012 router restarts and the cable modems may re-initialize or re-register.

Examples

```
Router# configure terminal
Router(config)# cable clock dti
```

Related Commands

Command	Description
show cable clock dti	Displays DTI information.

cable clock dti clear-counters

To reset the counters that are displayed with the **show cable clock dti counters** command in DOCSIS Timing Interface (DTI) mode, use the **cable clock dti clear-counters** command in privileged EXEC mode.

cable clock dti clear-counters *slot/subslot*

Syntax Description

<i>slot/subslot</i>	Specifies the slot and subslot location of the DTCC ports. Valid values are 1/1 or 2/1.
---------------------	---

Command Default

No default behavior or values

Command Modes

Privileged EXEC

Command History

Release	Modification
12.3(23)BC	This command was introduced on the Cisco uBR10012 router .
12.2(33)SCB	This command was integrated into Cisco IOS Release 12.2(33)SCB. Support for the Cisco uBR7225VXR router was added.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

This command resets any counters that were displayed from the last time the **show cable clock dti client** command was used in DTI mode.

This command supports the Cisco CMTS clock feature set, which provides a synchronized clock for improved Voice-over-IP (VoIP) operations.

Examples

The following example shows how to reset all counters that are displayed for the clock card:

```
Router# cable clock dti clear-counters
```

Related Commands

Command	Description
show cable clock dti counters	Displays the cable clock card's hardware information.

cable clock force

To select the external timing source when the clock card is in holdover mode, use the **cable clock force** command in global configuration mode. To disable the selection and return to the default, use the **no** form of this command.

cable clock force {primary|secondary}

no cable clock force

Syntax Description

primary	Forces the primary source to act as the clock reference.
secondary	Forces the secondary source to act as the clock reference.

Command Default

The clock card automatically uses the primary external source, if available. If the primary source fails, the clock card enters holdover mode and, after a few seconds, switches to the secondary external source. The clock card switches back to the primary source when it becomes available.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.1(1a)T1	This command was introduced.
12.1(2)EC1	This command was integrated into Cisco IOS Release 12.1(2)EC1.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

This command overrides the default behavior of the clock card when the clock card is in holdover mode. If the clock card is not in holdover mode, this command is ignored. You cannot force the reference to a port if the clock card is in free-running mode.



Note

This command is not applicable on the SC train.

**Note**

The clock card enters holdover mode if the forced reference is lost, even if the other external reference is available.

To support the clock feature set in VoIP configurations, a Cisco uBR7246 VXR chassis, equipped with a clock card; and a Cisco uBR-MC16S, a Cisco uBR-MC16E, or a Cisco uBR-MC28C cable interface line card must be used running Cisco IOS Release 12.1(1a)T1 or later releases. Only these cable interface line cards support the external clock card reference from a clock card to distribute that signal to CMs or set-top boxes (STBs) attached to the specific network segments. You can use other cable interface cards, such as the Cisco uBR-MC16C, with the clock card, but these other cable interfaces will not synchronize their downstream SYNC messages with the external clock source.

Each CM or STB must also support VoIP applications and the clock feature set. For example, the Cisco uBR924, running Cisco IOS Release 12.0(7)T or later releases, supports the clock card feature automatically.

Examples

The following example shows how to force the timing reference for the cable clock card to come from the secondary external source, when the clock card is in holdover mode:

```
Router(config)# cable clock force secondary
```

Related Commands

Command	Description
show cable clock	Displays status information for the cable clock card.
show controllers clock-reference	Displays hardware information, register values, and current counters for the cable clock card.

cable clock source-midplane

To make the midplane time-division multiplexing (TDM) clock the primary timing reference for the clock card, use the **cable clock source-midplane** command in global configuration mode. To disable the selection and return to the default, use the **no** form of this command.

cable clock source-midplane

no cable clock source-midplane

Syntax Description This command has no keywords or arguments.

Command Default The clock card does not get its timing reference from the midplane TDM clock.

Command Modes Global configuration (config)

Command History	Release	Modification
	12.1(1a)T1	This command was introduced.
	12.1(2)EC1	This command was integrated into Cisco IOS Release 12.1(2)EC1.
	12.3BC	This command was integrated into Cisco OS Release 12.3BC.
	IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines Because the clock card automatically provides the timing reference to the midplane TDM clock, the midplane cannot in turn act as the reference for the clock card. This means that the **cable clock source-midplane** command does not take effect unless a port adapter is configured as the primary clock reference source for the midplane.



Note This command is not applicable on the SC train.

To support the clock feature set in VoIP configurations, a Cisco uBR7246 VXR chassis, equipped with a clock card; and a Cisco uBR-MC16S, a Cisco uBR-MC16E, or a Cisco uBR-MC28C cable interface line card must be used running Cisco IOS Release 12.1(1a)T1 or higher releases. Only these cable interface line cards support the external clock card reference from a clock card to distribute that signal to CMs or set-top boxes (STBs) attached to the specific network segments. You can use other cable interface cards, such as the Cisco uBR-MC16C, with the clock card, but these other cable interfaces will not synchronize their downstream SYNC messages with the external clock source.

Each CM or STB must also support VoIP applications and the clock feature set. The Cisco uBR924, running Cisco IOS Release 12.0(7)T or later releases, supports the clock card feature automatically.

Examples

The following example shows how to set the primary clock reference to the midplane TDM clock:

```
Router(config)# cable clock source-midplane
```

Related Commands

Command	Description
show cable clock	Displays status information for the cable clock card.

cable clock upgrade

To upgrade the Field-Programmable Gate Array (FPGA) image manually on the DOCSIS Timing & Control Card (DTCC), use the **cable clock upgrade** command in privileged EXEC mode.

cable clock upgrade *slot/subslot*

Syntax Description

<i>slot</i>	Chassis slot number of the DTCC card. The valid slot is 1.
<i>subslot</i>	Secondary slot number of the DTCC card. Valid subslots are 1 or 2.

Command Default

No default behaviors or values

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SCC	This command was introduced.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

In Cisco IOS Release 12.2(33) SCC and later, you can manually upgrade the FPGA image only if a single DTCC card is installed on the Cisco uBR 10012 router. If the manual upgrade fails or is interrupted, the DTCC card may become unusable. Do not reset or unplug the DTCC card during the manual upgrade. We recommend that you take precaution against extended downtime if the FPGA upgrade fails unexpectedly by having a standby DTCC card installed on the Cisco uBR10012 router.



Note

You will have to enter **y (yes)** when the system prompts you to continue the manual upgrade.

Examples

The following example shows how to start the manual FPGA upgrade process on the DTCC card:

```
Router# cable clock upgrade 1/1
```

Related Commands

Command	Description
cable clock dti	Configures the DOCSIS Timing Interface (DTI) clock reference mode.

cable cm-status

To configure the values of the “Event Holdoff Timer” and “Number of Reports per Event” parameters for the cable modem (CM) status events, use the **cable cm-status** command in global configuration mode. To revert to the default values, use the **no** form of this command.

```
cable cm-status {all| event} [holdoff {timer| default}| reports {reportvalue| default}]
```

```
no cable cm-status
```

Syntax Description

all	Specifies all CM status events.
<i>event</i>	Type of CM status event.
holdoff	(Optional) Sets the CM status event holdoff timer. The holdoff units are defined in milliseconds. The timer value increments by 20 milliseconds. <ul style="list-style-type: none"> <i>timer</i>—Holdoff timer value. The valid range is from 1 to 65535 milliseconds. The default value is 50 milliseconds. default—Specifies the default value of 50 milliseconds.
reports	(Optional) Sets the value for the number of reports per event. <ul style="list-style-type: none"> <i>reportvalue</i>—Report value. The valid range is from 0 to 255. The default value is 2. default—Specifies the default value of 2.

Command Default

Default values are used for the “Event Holdoff Timer” and “Number of Reports per Event” parameters.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(33)SCB	This command was introduced.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

The **cable cm-status** command updates the event table for the MAC Domain Descriptor (MDD) belonging to a primary channel. The help text of the command provides a mapping of an event type to the corresponding integer.

The ten CM status events are:

- 1 Secondary channel MDD time-out
- 2 QAM/FEC lock failure
- 3 Sequence out-of-range
- 4 MDD recovery
- 5 QAM/FEC lock recovery
- 6 T4 time-out
- 7 T3 re-tries exceeded
- 8 Successful ranging after T3 re-tries exceeded
- 9 CM operating on battery backup
- 10 CM returned to A/C power

**Note**

The CM-STATUS message event 'sequence out of range' is enabled and supported on the Cisco Wideband SPA from Cisco IOS Release 12.2(33)SCE5 onwards. When the Cisco CMTS receives the 'sequence out of range' event, it toggles the sequence-change-count (SCC) bit for each of the indicated downstream service identifiers (DSIDs).

Examples

The following example shows how to configure an event holdoff timer of 100 milliseconds and four reports per event for all CM-STATUS events:

```
Router# configure terminal
Router(config)# cable cm-status all holdoff 100 reports 4
```

The following example shows how to configure the CM status event "MDD recovery" with an event holdoff timer of 150 milliseconds and three reports for the event:

```
Router# configure terminal
Router(config)# cable cm-status 4 holdoff 150 reports 3
```

Related Commands

Command	Description
cable cm-status enable	Enables a CM status event or a group of CM status events on a primary cable interface.

cable cm-status enable

To enable a CM status event or a group of CM status events on a primary cable interface, use the **cable cm-status enable** command in interface configuration mode. To disable a particular event on a primary cable interface, use the **no** form of this command.

cable cm-status enable *range*

no cable cm-status

Syntax Description

<i>range</i>	<p>Specifies the CM status events you want to enable on a primary cable interface. The valid range is 1 to 10. You can enable a single event by specifying the event number or a group of events by specifying a range (for example, 1-9).</p> <p>The following events are enabled by default on a cable or modular cable interface on the Cisco uBR10012 and Cisco uBR7200 series routers:</p> <ul style="list-style-type: none"> • Secondary channel MDD time-out • QAM/FEC lock failure • Sequence out of range • MDD recovery • QAM/FEC lock recovery <p>Note The default events are not displayed in the output of the show running-config interface cable command.</p>
--------------	---

Command Default

The downstream related events such as secondary channel MDD time-out, QAM/FEC lock failure, Sequence out of range, MDD recovery, and QAM/FEC lock recovery are enabled.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.2(33)SCB	This command was introduced.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

This command applies to all non-primary RF channels on a CMTS.

The ten CM status events per interface on the Cisco uBR10012 and Cisco uBR7200 series routers are:

- 1—Secondary channel MDD time-out
- 2—QAM/FEC lock failure
- 3—Sequence out of range
- 4—MDD recovery
- 5— QAM/FEC lock recovery
- 6—T4 time-out
- 7— T3 re-tries exceeded
- 8— Successful ranging after T3 re-tries exceeded
- 9— CM operating on battery backup
- 10— CM returned to A/C power

The six CM status events per interface on the Cisco cBR series routers are:

- 3—Sequence out of range
- 6—T4 time-out
- 7—T3 re-tries exceeded
- 8— Successful ranging after T3 re-tries exceeded
- 9—CM operating on battery backup
- 10— CM returned to A/C power

**Note**

If the **no** form of the command is executed on the interface for specific events, then the **show running-config interface** command lists the events only that are enabled. If no events are enabled then, the **show running interface cable** command displays **no cable cm-stauts enable** with the events.

Examples

The following example shows how to enable all CM status events on a primary cable interface:

```
Router# configure terminal
Router(config)# interface cable 8/0/0
Router(config-if)# cable cm-status enable 1-10
```

The following example shows the **no cable cm-status enable** command being configured and the corresponding example shows **show running-config interface** command output:

```
Router(config)# interface cable 8/0/0
Router(config-if)# cable cm-status enable 1-10
Router(config-if)# no cable cm-status enable 1-2 4-5
Router(config-if) exit
Router# show running-config interface cable 8/0/0
```

```

Building configuration...
Current configuration : 1557 bytes
!
interface Cable8/0/0
 shutdown
 cable cm-status enable 3 6-10
 no cable packet-cache
 cable default-phy-burst 0
 cable map-advance dynamic 300 500
 cable bundle 1
 cable downstream channel-id 145

```

The following example shows the **show running-config interface cable** command output when no events are enabled on the CMTS:

```

Router# show running-config interface cable 8/0/0
Building configuration...
Current configuration : 1558 bytes
!
interface Cable8/0/0
 shutdown
 no cable cm-status enable 1-10
 no cable packet-cache
 cable default-phy-burst 0
 cable map-advance dynamic 300 500
 cable bundle 1
 cable downstream channel-id 145
 cable downstream annex B
 cable downstream modulation 256qam
 cable downstream interleave-depth 32
 cable downstream frequency 555000000
 cable downstream rf-shutdown
 cable upstream max-ports 4
 no cable upstream 0 connector
 cable upstream 0 frequency 40000000
 cable upstream 0 channel-width 3200000 3200000
 cable upstream 0 power-level 26
 cable upstream 0 docsis-mode tdma-atdma
 cable upstream 0 minislots-size 4
--More--

```

Related Commands

Command	Description
show cable modem	Displays information for the registered and unregistered CMTSs.

cable cmc

To configure the downstream RF power or Forward Optical Receiver Module (FRx) for the Cisco Coaxial Media Converter (CMC), use the **cable cmc** command in global configuration mode. To disable the configuration, use the **no** form of the command.

```
cable cmc mac-address {ds-rf-power power [tilt tilt-value ] | frx {att att-value | eq eq-value}}
```

```
no cable cmc mac-address { ds-rf-power | frx {att | eq}}
```

Syntax Description

<i>mac-address</i>	MAC address of the Cisco CMC.
ds-rf-power	Specifies the RF power for downstream channels on the Cisco CMC.
<i>power</i>	RF power in dBmV. The valid range is from 35 to 62. RF power is specified in the format <i>xy.z</i> , where <i>z</i> is 0.
tilt <i>tilt-value</i>	(Optional) Sets the tilt equalization value for downstream channel RF power on the Cisco CMC. The default value is 9 dB. <i>tilt-value</i> —Tilt equalization can be set to one of the following values: <ul style="list-style-type: none"> • -15dB—Sets the tilt equalization value to -15 dB. • -12dB—Sets the tilt equalization value to -12 dB. • -9dB—Sets the tilt equalization value to -9 dB. • -6dB—Sets the tilt equalization value to -6 dB. • -3dB—Sets the tilt equalization value to -3 dB. • 0dB—Sets the tilt equalization value to 0 dB.
frx	Configures FRx on the Cisco CMC.
att <i>att-value</i>	Specifies the attenuation value in dB. <ul style="list-style-type: none"> • <i>att-value</i>—Attenuation value. The valid range is from 0 to 10.
eq <i>eq-value</i>	Sets the equalization value in dB. <ul style="list-style-type: none"> • <i>eq-value</i>—Equalization value. The valid range is from 3 to 15.

Command Default Downstream RF power and FRx are not configured on the Cisco CMC.

Command Modes Global configuration (config)

Command History	Release	Modification
	Cisco IOS Release 12.2(33)CX	This command was introduced.
	IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines The **cable cmc** command configures the resource sharing between the Cisco CMCs in a channel group based on the MAC address.

The valid downstream RF power value is based on the number of active downstream RF channels on the Cisco CMC. If the configured downstream RF power value for a specific number of downstream RF channels is out of the valid range, the downstream RF power is adjusted according to the number of active downstream RF channels on the Cisco CMC and a warning message is displayed.

We recommend that you use the following downstream RF power values based on the number of active downstream RF channels:

Table 1: Recommended Downstream RF Power Values

Number of Downstream RF Channels	Recommended RF Power Values
1	50 dBmV to 6 2dBmV
2	46 dBmV to 58 dBmV
3	44 dBmV to 56 dBmV
4	42 dBmV to 54 dBmV
5	41 dBmV to 53 dBmV
6	40 dBmV to 52 dBmV
7	39 dBmV to 51 dBmV
8	39 dBmV to 51 dBmV
9	38 dBmV to 50 dBmV
10	38 dBmV to 50 dBmV

Number of Downstream RF Channels	Recommended RF Power Values
11	37 dBmV to 49 dBmV
12	37 dBmV to 49 dBmV
13	36 dBmV to 48 dBmV
14	36 dBmV to 48 dBmV
15	35 dBmV to 47 dBmV
16	35 dBmV to 47 dBmV

Examples

The following example shows how to configure RF power for downstream channel on the Cisco CMC with a tilt equalization value of 0 dB:

```
Router# configure terminal
Router(config)# cable cmc 0001.0002.0003 ds-rf-power 35 tilt 0dB
```

The following example shows how to configure FRx for the Cisco CMC with an attenuation value of 6 dB:

```
Router# configure terminal
Router(config)# cable cmc 0001.0002.0003 frx att 6
```

The following example shows how to configure FRx for the Cisco CMC with an equalization value of 3 dB:

```
Router# configure terminal
Router(config)# cable cmc 0001.0002.0003 frx eq 3
```

Related Commands

Command	Description
clear cable cmc	Clears the information on the Cisco CMC.
show cable cmc	Displays the Cisco CMC information.

cable cmc image_upgrade

To upgrade the Cisco CMC image , use the **cable cmc image_upgrade** command in privileged EXEC mode. To disable the upgrade, use the **no** form of the command.

cable cmc *mac-address* **image_upgrade**

no cable cmc *mac-address* **image_upgrade**

Syntax Description

<i>mac-address</i>	MAC address of the Cisco CMC.
--------------------	-------------------------------

Command Default

None

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
Cisco IOS Release 12.2(33)CX	This command was introduced.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Before upgrading the Cisco CMC image through the Cisco CMTS, you must specify the TFTP or FTP server address and the full file path in the DHCP server.

Examples

The following example shows how to upgrade the Cisco CMC image:

```
Router> enable
Router# cable cmc 0001.0002.0003 image_upgrade
```

cable cmcpe-list valid-time

To set the length of time that a CMTS router will consider the current list of CM and CPE devices to be valid, use the **cable cmcpe-list valid-time** command in global configuration mode. To reset the time period to its default value of 3 minutes, use the **no** form of this command.

cable cmcpe-list valid-time *time*

no cable cmcpe-list valid-time

Syntax Description

<i>time</i>	Specifies the time period, in seconds, that the Cisco CMTS router should consider the current CM/CPE list to be valid. In Cisco IOS Release 12.2(15)BC1 and earlier releases, the valid range is 0 to 3600 seconds, with a default value of 180 seconds (3 minutes). In Cisco IOS Release 12.2(15)BC2 and later releases, the valid range is 0 to 86400 seconds, with a default value of 900 seconds (15 minutes).
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Command Default

180 seconds (3 minutes)—Cisco IOS Release 12.2(15)BC1 and earlier releases

900 seconds (15 minutes)—Cisco IOS Release 12.2(15)BC2 and later releases

Command Modes

Global configuration (config)

Command History

Release	Modification
12.0(15)SC1, 12.1(8)EC1,	This command was introduced for the Cisco uBR7100 series and Cisco uBR7200 series routers.
12.2(4)BC1	This command was supported on the 12.2 BC train for the Cisco uBR10012 router.
12.2(15)BC2	The maximum range for time was expanded from 3600 to 86400 seconds, and the default was changed from 180 to 900 seconds.
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.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

The Cisco CMTS router maintains an internal list of cable modems and CPE devices that were connected on its cable interfaces in the last 24 hours. This list does not capture cable modems and CPE devices that were connected before the last 24 hours.

The CMTS router uses this list to provide the data for various **show** commands and to respond to SNMP requests that query the entries in the `cdxCmCpeTable` table in the CISCO-DOCS-EXT-MIB MIB.

By default, the Cisco CMTS router uses the current list if it is less than 3 minutes old. If the current list is older than 3 minutes, the Cisco CMTS router considers it invalid and rebuilds a new list. This prevents the CMTS router from having to build a new list for every query, which could impact system performance.

You can use the **cable cmcpe-list valid-time** command to change the length of time that the CMTS router considers the current CM and CPE device list to be valid. This allows you to find the optimum time value that provides the most current information without affecting the number of CPU cycles that are available for network processing.

A smaller time period ensures that the CM and CPE device list is more current but it requires more processing time to maintain the list. A longer time period reduces the load on the processor but the CM/CPE list might not be current.

If CPU usage dramatically increases when performing SNMP queries of the `cdxCmCpeTable` table, use this command to increase the valid list time so that the Cisco CMTS router does not have to rebuild the CM/CPE list more often than needed to respond to the queries.

**Note**

To find the current valid list time, use the **show running-config** command and look for the **cable cmcpe-list valid-time** command in the output. If the command does not appear, the valid list time is set for its default value.

Examples

The following example shows how to set the valid list time to 60 seconds (1 minute):

```
Router(config)# cable cmcpe-list valid-time 60
```

The following example shows how to find the current valid list time setting:

```
Router# show running-config | include cmcpe-list
```

```
cable cmcpe-list valid-time 60
```

Related Commands

Command	Description
show cable modem	Displays information for the registered and unregistered CMs.

cable cmts-id

To configure the CMTS ID for the Cisco CMTS, use the **cable cmts-id** command in global configuration mode. To set the CMTS ID to its default value, use the **no** form of this command.

cable cmts-id *cmts-id*

no cable cmts-id *cmts-id*

Syntax Description

<i>cmts-id</i>	CMTS ID for the Cisco CMTS. The range is from 0 to 16383. The default is 8191.
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Command Default

CMTS ID is 8191.

Command Modes

Global configuration (config)

Command History

Release	Modification
IOS-XE 3.15.0S	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

This configuration allows you to define the value for the CMTS ID portion of Gate IDs. The CMTS ID value is the 13 least significant bits (0-12) of the Gate ID.

Examples

The following example shows how to configure the CMTS ID:

```
Router(config)# cable cmts-id 9000
```

Related Commands

Command	Description
show cable cmts-id	Displays the configured CMTS ID.

cable config-file

To create a configuration filename for a Cisco CMTS router internal CM configuration file, use the **cable config-file** command in global configuration mode. To delete the configuration filename, use the **no** form of this command.

cable config-file *filename*

no cable config-file *filename*

Syntax Description

<i>filename</i>	Specifies the configuration filename to create and edit.
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Command Default

None.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.1(2)EC1	This command was introduced.
12.2(4)BC1	This command was integrated into Cisco IOS Release 12.2(4)BC1.
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.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

A DOCSIS CMTS router automatically downloads a DOCSIS configuration file to a CM during its initial registration procedure. The DOCSIS configuration file configures the CM for its network operations and includes information such as the maximum number of CPE devices that are supported, the quality of service (QoS) options provided for the CM, and whether the CM should upgrade to a new software image.

The DOCSIS specification defines the format of the DOCSIS configuration files, which can be created by any number of tools. In addition to the other tools that Cisco provides for this purpose, the **cable config-file** command can be used to create the DOCSIS configuration files needed for your network. These configuration files are stored in the Flash memory on the Cisco CMTS router and can be automatically downloaded to the CM as needed.

The **cable config-file** command creates the DOCSIS configuration file if it does not already exist and then enters config-file configuration mode. You can then give one of the following subcommands to create the configuration file:

- **access-denied**
- **channel-id**
- **cpe max**
- **download**
- **frequency**
- **option**
- **privacy**
- **service-class**
- **snmp manager**
- **timestamp**

**Note**

When a DOCSIS shared secret is configured on the downstream interface (see the **cable shared-secret** command), the **cable config-file** command automatically inserts the appropriate MD5 Message Integrity Check (MIC) value at the end of the dynamically generated DOCSIS configuration file. You do not need to specify the DOCSIS shared secret string with the **cable config-file** command.

After using the **cable config-file** subcommands, enter the **exit** command to leave config-file mode and to save the configuration file in the Flash memory. After a configuration file is created, it also appears in the running-configuration file. To delete a configuration file and remove it from Flash memory, use the **no cable config-file** command

To allow CMs to download the configuration files, you must also enable the router's onboard TFTP server, using the **tftp-server** configuration command. Unless you are running on a small lab network, you should also remove the default limit of 10 TFTP sessions by using the **service udp-small-serves max-servers no limit** command.

In addition, the following commands are also recommended:

- **cable time-server** - Enables the Cisco CMTS router to function as a time-of-day (ToD) server.
- **ip dhcp pool** - Configures the Cisco CMTS router as a DHCP server. Otherwise, you need an external DHCP server.
- **ip dhcp ping packets 0** - Improves the scalability of the Cisco CMTS router DHCP server.

**Note**

For complete information on DOCSIS configuration files, see Appendix C in the DOCSIS 1.1 Radio Frequency (RF) Interface Specification, available on the DOCSIS Cable Labs official web site at <http://www.cablemodem.com>

Examples

The following example shows two DOCSIS configuration files being configured. The first configuration file allows each CM to have up to four CPE devices and configures the QoS parameters for its traffic. The second configuration file denies network access to the CM and its CPE devices.

```
Router# configure terminal
Router(config)# cable config-file test.cm
Router(config-file)# cpe max 4
Router(config-file)# service-class 1 priority 2
Router(config-file)# service-class 1 max-upstream 128
Router(config-file)# service-class 1 max-downstream 1000
Router(config-file)# timestamp
Router(config-file)# exit
Router(config)# cable config-file denied.cm
Router(config-file)# access-denied
Router(config-file)# exit
Router(config)#
```

The following is a portion of a typical Cisco IOS configuration file that shows the above two DOCSIS configuration files, as well as a typical DHCP server configuration:

```
Router# show running-config
...
service udp-small-servers max-servers no-limit
!
cable time-server
!
cable config-file test.cm
  cpe max 4
  service-class 1 priority 2
  service-class 1 max-upstream 128
  service-class 1 max-downstream 1000
  timestamp
cable config-file disable.cm
  access-denied
!
ip dhcp pool modems-c3
  network 10.30.128.0 255.255.240.0
  bootfile test.cm
  next-server 10.30.128.1
  default-router 10.30.128.1
  option 7 ip 10.30.128.1
  option 4 ip 10.30.128.1
  option 2 hex 0000.0000
!
...
```

Related Commands

Command	Description
cable config-file	Creates a DOCSIS configuration file and enters configuration file mode.
access-denied	Disables access to the network.
channel-id	Specifies upstream channel ID.
cpe max	Specifies the maximum number of CPE devices allowed access.

Command	Description
debug cable config-file	Displays information about the DOCSIS configuration files that are generated by the internal DOCSIS configuration file editor.
download	Specifies the filename and server IP address for downloading a new software image.
frequency	Specifies the downstream frequency.
option	Specifies options for the configuration file that are not provided for by the other commands.
privacy	Specifies privacy options for baseline privacy images.
service-class	Specifies service class definitions for the configuration file.
snmp manager	Specifies Simple Network Management Protocol (SNMP) options.
timestamp	Enables time-stamp generation.
show running-config	Displays the current run-time configuration, which includes any configuration files that have been defined.
show startup-config	Displays the current saved configuration, which includes any configuration files that have been defined and saved.