



Default DOCSIS 1.0 ToS Overwrite

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This document describes the Default DOCSIS 1.0 ToS Overwrite feature for the Cisco Cable Modem Termination System (CMTS). This feature eliminates the need to create multiple QoS profiles in order to perform type of service (ToS) overwrite by enabling a default ToS overwrite to be bound to all DOCSIS 1.0 Cable Modem (CM) created profiles.

Finding Feature Information in This Module

Your Cisco IOS software release may not support all of the features documented in this module. To reach links to specific feature documentation in this module and to see a list of the releases in which each feature is supported, use the [“Feature Information for Default DOCSIS 1.0 ToS Overwrite”](#) section on page 11.

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Prerequisites for Default DOCSIS 1.0 ToS Overwrite

No special equipment or software is needed to use the Default DOCSIS 1.0 ToS Overwrite feature.

Restrictions for Default DOCSIS 1.0 ToS Overwrite

- The Default DOCSIS 1.0 ToS Overwrite feature is only applicable to CMs running DOCSIS version 1.0.
- Once the Default DOCSIS 1.0 ToS Overwrite feature is configured, all CMs will need to be reset in order for the effect to take place.
- Once the Default DOCSIS 1.0 ToS Overwrite feature is configured, all CMs will display the default values that were configured. After which, overwrite values can only be changed by editing the QoS profiles.

Information About Default DOCSIS 1.0 ToS Overwrite

To configure the Default DOCSIS 1.0 ToS Overwrite feature, you should understand the following concept:

- [Default DOCSIS 1.0 ToS Overwrite Overview, page 2](#)
- [DOCSIS, page 2](#)
- [Type-of-Service \(ToS\), page 3](#)

Default DOCSIS 1.0 ToS Overwrite Overview

Currently, ToS overwrite requires the creation of static cable QoS profiles, which are assigned ToS fields and are then associated with 1.0 CMs. This implementation works well if only a few different service types are offered.

However, scalability issues arise when large numbers of service types are presented; each requiring a static QoS profile in order to perform ToS overwrite.

The Default DOCSIS 1.0 ToS Overwrite feature eliminates the need to create multiple QoS profiles in order to perform type-of-service (ToS) overwrite by automatically bounding all DOCSIS 1.0 Cable Modem (CM) created profiles to a default ToS overwrite.

DOCSIS

Created by CableLabs, Data Over Cable Service Interface Specification (DOCSIS) defines the interface standards and requirements for all cable modems associated with high-speed data distribution over a cable television system network.

The DOCSIS architecture consists of the following two components:

- Cable Modem (CM)
- Cable Modem Termination System (CMTS)

Each of these components are situated at different locations, often with the CM located on a customer site and the CMTS on the service provider site, and communication between the CM and CMTS is conducted over cable through DOCSIS.

**Note**

Though there are several versions of DOCSIS available, the Default DOCSIS 1.0 ToS Overwrite feature is only applicable to CMs running DOCSIS 1.0.

Type-of-Service (ToS)

Tools such as type-of-service (ToS) bits identification make it possible to isolate network traffic by the type of application being used. ToS capabilities can be further expanded to isolate network traffic down to the specific brands, by the interface used, by the user type and individual user identification, or by the site address.

How to Configure Default DOCSIS 1.0 ToS Overwrite

The tasks in this section enables the use of the Default DOCSIS 1.0 ToS Overwrite feature.

- [Enabling Default DOCSIS 1.0 ToS Overwrite, page 3](#)
- [Editing QoS Profiles, page 5](#)

Enabling Default DOCSIS 1.0 ToS Overwrite

All CMs with a DOCSIS 1.0 configuration file currently have their ToS overwrite default values are set to tos-and: 0xff and tos-or: 0x00. Since there were previously no mechanism in the DOCSIS 1.0 configuration file to specify the ToS overwrite, QoS profiles were created and assigned to the default ToS overwrites.

The following procedures enable the Default DOCSIS 1.0 ToS Overwrite feature, which will allow a default ToS overwrite to be bound to all CM created profiles.

Prerequisites

There are no prerequisites for these procedures.

Restrictions

- The Default DOCSIS 1.0 ToS Overwrite feature is only applicable to CMs running DOCSIS version 1.0.
- Once the Default DOCSIS 1.0 ToS Overwrite feature is configured, all CMs will need to be reset in order for the effect to take place.
- Once the Default DOCSIS 1.0 ToS Overwrite feature is configured, all CMs will display the default values that were configured. After which, overwrite values can only be changed by editing the QoS profiles.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **cable default-tos-qos10 tos-overwrite** *<tos-and>* *<tos-or>*
4. **end**

DETAILED STEPS

| | Command or Action | Purpose |
|--------|--|--|
| Step 1 | enable Example: Router> enable | Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted. |
| Step 2 | configure terminal Example: Router# configure terminal | Enters global configuration mode. |
| Step 3 | cable default-tos-qos10 tos-overwrite <i><tos-and></i> <i><tos-or></i> Example: Router(config)# cable default-tos-qos10 tos-overwrite 0x1F 0xE0 | Configures the ToS overwrite default value for the CM. This default value will be bound to all future CM created profiles. |
| Step 4 | end Example: Router(config-if)# end | Exits interface configuration mode and returns to privileged EXEC mode. |

Examples

The following example shows how to configure the Default DOCSIS 1.0 ToS Overwrite feature with a default value of “1”:

```
Router# cable default-tos-qos10 tos-overwrite 0x1F 0xE0
```

What to Do Next

After configuring the ToS overwrite default value, reset the CM using the **clear cable modem delete** command to allow the new ToS overwrite default value to take effect.

Editing QoS Profiles

Once the Default DOCSIS 1.0 ToS Overwrite feature is configured, additional ToS overwrite values can be changed by editing the QoS profiles.

To configure a QoS profile, enter the **cable qos profile** global configuration command. To either set default values for profile group numbers (other than profile 1 or 2), or to remove the QoS profile if no specific parameters remain, enter the **no** form of this command.

```
cable qos profile { groupnum | ip-precedence | guaranteed-upstream | max-burst | max-upstream |
max-downstream | priority | tos-overwrite | value }
```

```
no cable qos profile { groupnum | ip-precedence | guaranteed-upstream | max-burst | max-upstream |
max-downstream | priority | tos-overwrite | value }
```

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **cable qos profile** { *groupnum* | *ip-precedence* | *guaranteed-upstream* | *max-burst* | *max-upstream* | *max-downstream* | *priority* | *tos-overwrite* | *value* }
4. **end**

DETAILED STEPS

| | Command or Action | Purpose |
|--------|--|---|
| Step 1 | enable Example: Router> enable | Enables privileged EXEC mode. <ul style="list-style-type: none">• Enter your password if prompted. |
| Step 2 | configure terminal Example: Router# configure terminal | Enters global configuration mode. |

| Command or Action | Purpose |
|---|--|
| <p>Step 3</p> <pre>cable qos profile {groupnum ip-precedence / guaranteed-upstream max-burst max-upstream max-downstream priority tos-overwrite value}</pre> <p>Example: Router(config)# cable qos profile 4 guaranteed-upstream 2</p> | <p>Configures the QoS profile.</p> <ul style="list-style-type: none"> • <i>groupnum</i>—QoS profile group number. QoS profiles 1 and 2 are required by the system. QoS profile 1 is used during registration, and QoS profile 2 is the default QoS profile. Both profiles are preconfigured and cannot be removed nor modified. • <i>ip-precedence</i>—Bits in the TOS byte that enable you to configure individual data rate limits on a per modem basis. Valid values are from 0 to 7. • <i>guaranteed-upstream</i>—Guaranteed minimum upstream rate in kilobytes per second. Valid values are from 0 to 100000. Default value is 0 (no reserved rate). • <i>max-burst</i>—Maximum upstream transmit burst size in bytes that the modem can send for any single transmit burst. Valid values are from 0 to 255. Default value is 0 (no limit). • <i>max-upstream</i>—Maximum upstream data rate in kilobytes per second that a modem using this QoS profile will receive. Valid values are from 0 to 255. Default value is 0 (no upstream rate limit). • <i>max-downstream</i>—Maximum downstream data rate in kilobytes per second that a modem using this QoS profile will receive. Valid values are from 0 to 100000. Default value is 0 (no downstream rate limit). • <i>priority</i>—Relative priority number assigned to upstream traffic by this QoS profile. Valid values are from 0 to 7, with 7 being the highest priority. Default value is 0. • <i>tos-overwrite</i>—Overwrite the Type of Service (TOS) field in the IP datagrams received on the upstream before forwarding them downstream (or IP backbone). This parameter sets the hexadecimal mask bits to a hexadecimal value. This helps the CMTS identify datagrams for QoS on the backbone. • <i>value</i>—The value substituted for the TOS value. See <i>tos_overwrite</i>. |
| <p>Step 4</p> <pre>end</pre> <p>Example: Router(config-if)# end</p> | <p>Exits interface configuration mode and returns to privileged EXEC mode.</p> |

Examples

The following example configures QoS profile 4 with guaranteed upstream of 2 kbps, maximum transmission burst of 2, an IP precedence of 7, a maximum downstream rate of 300 kbps, with a priority of 4, cable baseline privacy set, and a *tos-overwrite* mask and value byte (in hex) of 0x7:

```
Router(config)# cable qos profile 4 guaranteed-upstream 2
Router(config)# cable qos profile 4 max-burst 2
Router(config)# cable qos profile 4 ip-precedence 7 max-downstream 300
Router(config)# cable qos profile 4 priority 4
Router(config)# cable qos profile 4 tos-overwrite 0x7 0x4b
```

Additional References

The following sections provide references related to the Default DOCSIS 1.0 ToS Overwrite feature.

Related Documents

| Related Topic | Document Title |
|---------------------------------|---|
| CMTS Commands | <i>Cisco Broadband Cable Command Reference Guide</i> , at the following URL: http://www.cisco.com/univercd/cc/td/doc/product/cable/bbcmref/index.htm |
| Cisco IOS Release 12.3 Commands | <i>Cisco IOS Release 12.3 Configuration Guides and Command References</i> , at the following URL http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123cgcr/index.htm |

Standards

| Standard | Title |
|---|-------|
| No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature. | |

MIBs

| MIB | MIBs Link |
|---|--|
| No new or modified MIBs are supported, and support for existing MIBs has not been modified by this feature. | To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs |

RFCs

| RFC | Title |
|--|--|
| No new or modified RFCs are supported by this feature. | To locate and download Request for Comments (RFCs) and Internet Drafts, see the Internet Engineering Task Force (IETF) web site at the following URL: http://www.ietf.org/index.html |

Technical Assistance

| Description | Link |
|--|---|
| The Cisco Technical Support & Documentation website contains thousands of pages of searchable technical content, including links to products, technologies, solutions, technical tips, tools, and technical documentation. Registered Cisco.com users can log in from this page to access even more content. | http://www.cisco.com/techsupport |

Command Reference

This section documents new and modified commands only.

- [cable default-tos-qos10 tos-overwrite](#)

cable default-tos-qos10 tos-overwrite

To enable a default ToS overwrite to be bound to all DOCSIS 1.0 Cable Modem (CM) created profiles, use the **cable default-tos-qos10 tos-overwrite** command in cable interface configuration mode.

```
cable default-tos-qos10 tos-overwrite <tos-and> <tos-or>
```

Syntax Description

| | |
|--------------------|--|
| <tos-and> <tos-or> | These are the ToS overwrite default values that will be automatically bound to all DOCSIS 1.0 CM created profiles. |
|--------------------|--|

Command Default

All CMs with a DOCSIS 1.0 configuration file initially have their ToS overwrite default values set to tos-and: 0xff and tos-or: 0x00 when coming on line.

Command Modes

Privileged EXEC

Command History

| Release | Modification |
|--------------|---|
| 12.3(17a)BC2 | This command was introduced for the Cisco uBR7100, Cisco uBR7200, and Cisco uBR10000 universal broadband routers. |

Usage Guidelines

The current implementation of ToS overwrite requires that static cable QoS profiles be created, which are assigned ToS fields and are then associated with 1.0 CMs. This implementation works well if only a few different service types are offered. However, scalability issues arise when large numbers of service types are presented; each requiring a static QoS profile in order to perform ToS overwrite.

To eliminate the need to create multiple QoS profiles in order to perform type of service (ToS) overwrite, use the **cable default-tos-qos10 tos-overwrite** command to be bound to all DOCSIS 1.0 Cable Modem (CM) created profiles to a default ToS overwrite.



Note

Once the **cable default-tos-qos10 tos-overwrite** command is used to change the ToS overwrite default, there is no version of the command that will restore the default.

Examples

The following example shows how to configure the Default DOCSIS 1.0 ToS Overwrite feature with a default value of “1”:

```
Router# cable default-tos-qos10 tos-overwrite 0x1F 0xE0
```

Related Commands

There are no related commands.

Feature Information for Default DOCSIS 1.0 ToS Overwrite

[Table 1](#) lists the release history for this feature.

Table 1 Feature Information for Default DOCSIS 1.0 ToS Overwrite

| Feature Name | Releases | Feature Information |
|----------------------------------|--------------|---|
| Default DOCSIS 1.0 ToS Overwrite | 12.3(17a)BC2 | This feature eliminates the need to create multiple QoS profiles in order to perform type of service (ToS) overwrite by enabling a default ToS overwrite to be bound to all DOCSIS 1.0 Cable Modem (CM) created profiles. The cable default-tos-qos10 tos-overwrite command was introduced by this feature. |

Glossary

This section describes terms and acronyms that are used in this manual and not otherwise defined.

CM—Cable Modem. A device which enables high-speed data access and Internet connectivity via a cable TV network.

CMTS—Cable modem termination system. A CMTS is a component that exchanges digital signals with cable modems on a cable network. The CMTS is usually located in the cable provider's local office.

DOCSIS—Data-over-Cable Service Interface Specifications. A suite of specifications maintained by CableLabs that describe the operation of a data network over a hybrid fiber-coaxial (HFC) cable network.

QoS—Quality of Service. A method of guaranteeing bandwidth to specified types of traffic.

ToS—Type-of-Service. A byte in the IPv4 header.

**Note**

See [Internetworking Terms and Acronyms](#) for terms not included in this glossary.

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