



QoS: CBQoS Management—Policy-to-Interface Mapping Support

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The QoS: CBQoS Management—Policy-to-Interface Mapping Support feature lets you use Simple Network Management Protocol (SNMP) to find which service policy is applied to a particular interface, without having to search the entire service policy table in the CISCO-CLASS-BASED-QOS-MIB. This feature introduces the CISCO-CBP-TARGET-MIB, which stores these mappings.

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 QoS: CBQoS Management—Policy-to-Interface Mapping Support](#)” section on page 10.

Finding Support Information for Platforms and Cisco IOS and Catalyst OS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS and Catalyst OS software image support. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on Cisco.com is not required.

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Prerequisites for QoS: CBQoS Management—Policy-to-Interface Mapping Support

- You must enable SNMP on the label switch routers (LSRs) in your network.
- You must configure policy maps and attach them to interfaces in an input or output direction within your network.

Restrictions for QoS: CBQoS Management—Policy-to-Interface Mapping Support

- Service policies applied to PPP sessions are not supported in Cisco IOS Release 12.2(31)SB2.
- The CISCO-CBP-TARGET-MIB is limited to read-only (RO) permission for MIB objects.
- This feature is supported on Cisco 10000 series routers with performance routing engine 2 (PRE2) and 3 (PRE3).

Information About QoS: CBQoS Management—Policy-to-Interface Mapping Support

To use the QoS: CBQoS Management—Policy-to-Interface Mapping Support feature, you should understand the following concepts:

- [Feature Overview of QoS: CBQoS Management—Policy-to-Interface Mapping Support, page 2](#)
- [Benefits of QoS: CBQoS Management—Policy-to-Interface Mapping Support, page 7](#)

Feature Overview of QoS: CBQoS Management—Policy-to-Interface Mapping Support

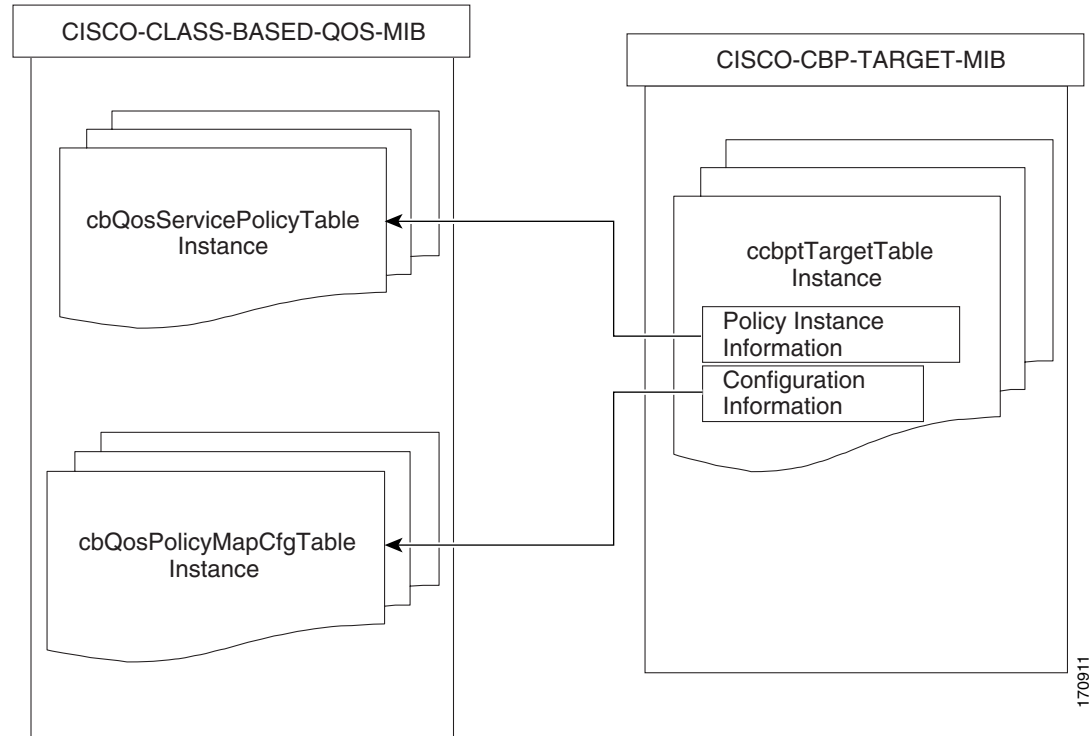
To find the QoS service policies that are applied to a specific interface (more generically referred to as a target), you must search the entire `cbQosServicePolicyTable` within the `CISCO-CLASS-BASED-QOS-MIB`. This process can be very time consuming in large scale configurations, and therefore, is not feasible.

A solution was to create the `CISCO-CBP-TARGET-MIB`, a more generic MIB that allows any type of target to be mapped to the service policies that are applied to it.

The `CISCO-CBP-TARGET-MIB` maps policy targets to their corresponding attached service policies by providing a link to the policy instance (service policy) and the policy-map configuration data by using row pointers to the tables that manage each one. For policy types in the `CISCO-CLASS-BASED-QOS-MIB`, the `CISCO-CBP-TARGET-MIB` maps targets to their `cbQosServicePolicyTable` and `cbQosPolicyMapCfgTable` rows, respectively.

Figure 1 shows the relationship between the CISCO-CBP-TARGET-MIB and the CISCO-CLASS-BASED-QOS-MIB.

Figure 1 Relationship between the CISCO-CBP-TARGET-MIB and the CISCO-CLASS-BASED-QOS-MIB



CISCO-CBP-TARGET-MIB Objects and Descriptions

The CISCO-CBP-TARGET-MIB consists of the ccbptTargetTable, which describes the class-based policy attachments to specific targets.

Table 1 lists the CISCO-CBP-TARGET-MIB objects and their descriptions.

Table 1 CISCO-CBP-TARGET-MIB Objects and Descriptions

Object	Description
ccbptPolicyIdNext	Indicates the next available value of ccbptPolicyId that can be used to create a new conceptual row in the ccbptTargetTable. This is a scalar object that is read-only and, therefore, has a value of 0.
ccbptTargetEntry	Describes a class-based policy attachment to a particular target. Note This is not a pollable object that is present in the MIB.

Table 1 CISCO-CBP-TARGET-MIB Objects and Descriptions (continued)

Object	Description
ccbptTargetType	Indicates the type of target, such as an ifIndex, an ATM virtual circuit (VC), a Frame Relay data-link connection identifier (DLCI), or a control plane. Values are as follows: <ul style="list-style-type: none"> • If the target type equals 1, then the target is an ifIndex. • If the target type equals 2, then the target is an ATM VC. • If the target type equals 3, then the target is a Frame Relay DLCI. • If the target type equals 4, then the target is a control plane.
ccbptTargetId	Gives the target identifier in the format indicated by the target type. This object contains variable length octets that are interpreted according to the value of the target type.
ccbptTargetDir	Indicates the direction, input(2) or output(3), relative to the target.
ccbptPolicySourceType	Shows the type of policy applied to the target and shows the cbQoS MIB relationship.
ccbptPolicyId	Contains the cbQoSPolicyIndex value for this instance of the service policy applied to the target. This object is an arbitrary integer that is used to identify a service policy.
ccbptTargetStatus	Indicates the status of the row. This object is always active(1).
ccbptTargetStorageType	Indicates the storage type for the row. This object is always volatile(2).
ccbptPolicyMap	Points to a row in the cbQoSPolicyMapCfgTable indicating the configuration of the policy map for this target.
ccbptPolicyInstance	Points to a row in the cbQoSServicePolicyTable indicating the instance of the policy map attached to this target.
ccbptPolicyAttachTime	Shows the time that this policy map was attached.
ccbptTargetTableLastChange	Shows the time that an entry was added or removed. This is a scalar object that is not part of the ccbptTargetTable entry.

Decoding Index Values

The CISCO-CBP-TARGET-MIB contains objects that define textual conventions for representing targets that have class-based policy mappings. A target can be any logical interface or entity to which a class-based policy can be applied.

The ccbptTarget is a series of octets that should be interpreted according to the value of ccbptTargetType.

Figure 2 shows a sample index with the type genIf(1) and how to decode index values corresponding to configuration mapping data output.

Figure 2 Sample Index with Mapping Data Output

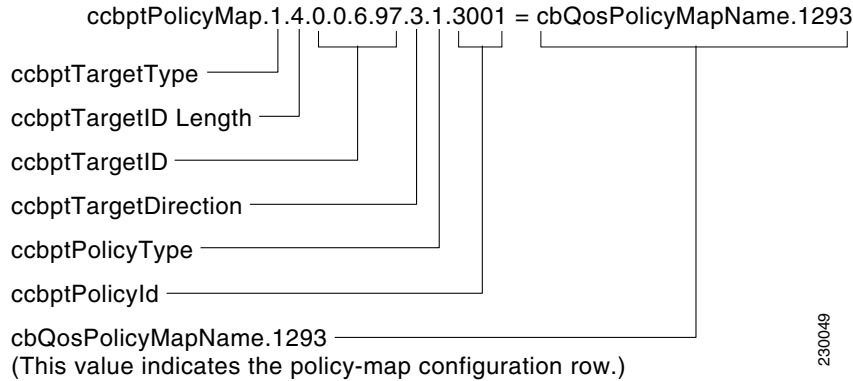


Figure 2 shows the mapping of the index portion of the object identifier (OID) for an instance of the ccbptPolicyMap object. Each portion of the index is defined as follows:

Configuration Policy Mapping Data

 ccbptPolicyMap.1.4.0.0.6.97.3.1.3001 = cbQosPolicyMapName.1293

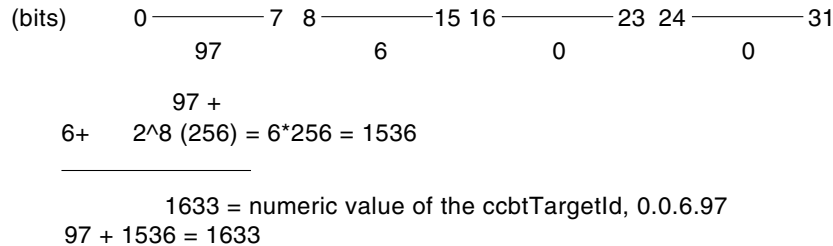
Where from left to right:

- ccbptTargetType—Value of 1 indicates the ccbptTargetType which is genIf(1). The target type indicates that the value contained in the ccbptTargetId is an ifIndex value.
- ccbptTargetId Length—Value of 4 indicates that the length of the ccbptTargetId to follow is 4 bytes. The ccbptTargetId is defined in the MIB as a variable length octet string. Representing this object in the index of a table requires that the object be preceded by the length of an octet string.
- ccbptTargetId—Value of 0.0.6.97 indicates the target ID. The length of the third index is determined by the value in the second byte of the entire index. (In this example, the length of the target ID is 4 bytes.) For supported ccbptTargetId values, see the “Possible Values for ccbptTargetId” section on page 6.

Numerical Value for the ifIndex Example

Figure 3 shows the numerical value of the ifIndex ccbptTargetId, 0.0.6.97.

Figure 3 Numerical Value for an ifIndex

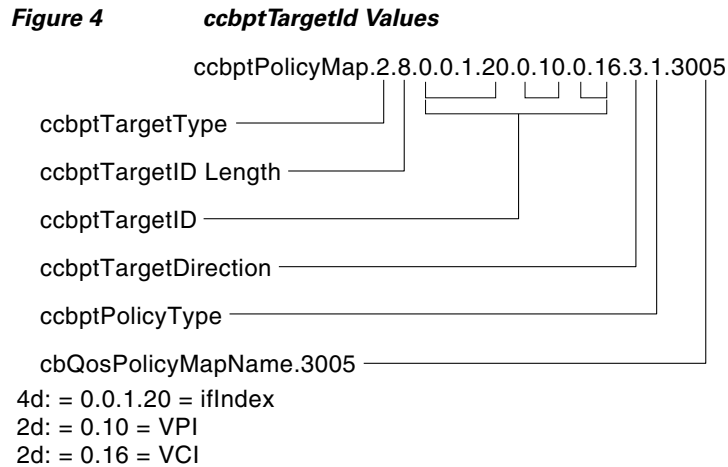


- ccbptTargetDirection—Value of 3 indicates the ccbptTarget output direction.
- ccbptPolicyType—Value of 1 indicates the ccbptPolicyType, which is ciscoCbQos(1).

- `ccbptPolicyId`—Value of 3001 indicates the `ccbptPolicyId`, which is the policy index integer for the policy instance applied to the target. The value of 3001 equals the value of the `cbQosPolicyIndex` for the corresponding entry in the `cbQosServicePolicyTable` in the CISCO-CLASS-BASED-QOS-MIB.
- `cbQosPolicyMapName.1293`—Value indicates the row in the `cbQosPolicyMapTable` describing the configuration of the policy map applied to the output direction of this `ccbptTargetId`.

Possible Values for `ccbptTargetId`

Figure 4 shows the supported `ccbptTargetId` values.



- For `genIf(1)`, OCTET STRING (SIZE(4))—ifIndex (4d). Where the (4d) value is a 4-byte decimal for the length of the `ccbptTargetId` in the example.
- For `atmPvc(2)`, OCTET STRING (SIZE(8))—ATM PVC (4d:2d:2d). Where the ATM PVC has a `ccbptTargetId` length of 8 bytes (4d:2d:2d); for example:
- For `frDlci(3)`, OCTET STRING(SIZE(6))—Frame Relay ifIndex is the first 4 bytes, and DLCI is the last 2 bytes (4d:2d).
- For `controlPlane(4)`, OCTET STRING(SIZE(4))—Control Plane Entity (4d).

Objects in the CISCO-CBP-TARGET-MIB

The notation used in the CISCO-CBP-TARGET-MIB follows the conventions defined in Abstract System Notation One (ASN.1). ASN.1 defines an Open System Interconnection (OSI) language used to describe data types independently from particular computer structures and presentation techniques. Each object in the MIB incorporates a DESCRIPTION field that includes an explanation of the object's meaning and usage, which, together with the other characteristics of the object (SYNTAX, MAX-ACCESS, and INDEX), provides sufficient information for management application development, as well as for documentation and testing.

A network administrator can access the entries (objects) in the CISCO-CBP-TARGET-MIB by means of any SNMP-based network management system (NMS). The network administrator can retrieve information in the CISCO-CBP-TARGET-MIB using standard SNMP **get** and **getnext** operations.

Scalar Objects in the CISCO-CBP-TARGET-MIB

The CISCO-CBP-TARGET-MIB contains the following unsupported scalar object:

- `ccbptPolicyNext`—Indicates the next available value of `ccbptPolicyId` that can be used to create a new conceptual row in the `ccbptTargetTable`. If no available identifier exists, this object has a value of 0. This object is read-only and is unsupported.

The CISCO-CBP-TARGET-MIB contains the following supported scalar object:

- `ccbptTargetTableLastChange`—Shows the value of `sysUpTime` at the time of the last addition or deletion of an entry in the `ccbptTargetTable`. If the number of entries is unchanged since the last reinitialization of the local network management system, the value of this object is 0. This object is read-only and is supported.

Notifications in the CISCO-CBP-TARGET-MIB

There are no notifications in the CISCO-CBP-TARGET-MIB.

Benefits of QoS: CBQoS Management—Policy-to-Interface Mapping Support

Simplifies QoS-to-Service-Policy Mapping

In deployments where service policies are applied to several thousand interfaces, obtaining QoS statistics and configuration information on a per interface or target basis is difficult using the organization of the CISCO-CLASS-BASED-QOS-MIB. You must perform a linear search of the `cbQoSServicePolicyTable` within the MIB to find the corresponding `cbQoSPolicyIndex` and then search for the configuration and statistics for the service policy applied to the interface (target).

The CISCO-CBP-TARGET-MIB offers a direct mapping from the target to the service policy applied to the target and provides the configuration information for that same service policy.

How to Configure QoS: CBQoS Management—Policy-to-Interface Mapping Support

There is no special way to configure this feature. For information on SNMP and QoS configuration tasks and examples, see the [Cisco IOS Network Management Command Reference](#), Release 12.4T, the [Cisco IOS Network Management Command Reference](#), and the [Cisco IOS Quality of Service Solutions Command Reference](#), Release 12.4T, respectively.

Configuration Examples for QoS: CBQoS Management—Policy-to-Interface Mapping Support

This section provides the following configuration example:

- [CISCO-CBP-TARGET-MIB: Example, page 8](#)

CISCO-CBP-TARGET-MIB: Example

In the following example, the configuration permits any SNMP manager to access all objects with read-only permissions using the community string public.

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# snmp-server community public ro
```



Note

There is no explicit way to configure the CISCO-CBP-TARGET-MIB. However, for information on QoS configuration tasks and examples, see the [Cisco IOS Quality of Service Solutions Configuration Guide, Release 12.4](#).

Additional References

The following sections provide references related to the QoS: CBQoS Management—Policy-to-Interface Mapping Support feature.

Related Documents

Related Topic	Document Title
QoS commands: complete command syntax, command modes, command history, defaults, usage guidelines, and examples	Cisco IOS Quality of Service Solutions Command Reference, Release 12.4T Cisco IOS Quality of Service Solutions Command Reference, Release 12.2 SR
QoS configuration tasks	Cisco IOS Quality of Service Solutions Configuration Guide, Release 12.4
SNMP commands: complete command syntax, command modes, command history, defaults, usage guidelines, and examples	Cisco IOS Network Management Command Reference, Release 12.4T Cisco IOS Network Management Command Reference, Release 12.2 SR
SNMP configuration tasks	“ Configuring SNMP Support ” chapter in the Cisco IOS Network Management Configuration Guide, Release 12.4T
Other documentation	For information on using SNMP MIB features, see the appropriate documentation for your network management system.

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
<ul style="list-style-type: none"> CISCO-AAA-SESSION-MIB CISCO-CLASS-BASED-QOS-MIB 	<p>To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:</p> <p>http://www.cisco.com/go/mibs</p>

RFCs

RFC	Title
RFC 1156	<i>Management Information Base for Network Management of TCP/IP-based Internets</i>
RFC 1157	<i>A Simple Network Management Protocol (SNMP)</i>
RFC 1213	<i>Management Information Base for Network Management of TCP/IP-based Internets: MIB-II</i>

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 feature uses no new or modified commands.

Feature Information for QoS: CBQoS Management—Policy-to-Interface Mapping Support

Table 2 lists the release history for this feature.

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

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Note

Table 2 lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release train. Unless noted otherwise, subsequent releases of that Cisco IOS software release train also support that feature.

Table 2 Feature Information for QoS: CBQoS Management—Policy-to-Interface Mapping Support

Feature Name	Releases	Feature Information
QoS: CBQoS Management—Policy-to-Interface Mapping Support	12.2(31)SB2	<p>The QoS: CBQoS Management—Policy-to-Interface Mapping Support feature lets you use SNMP to find which service policy is applied to a particular interface, without having to search the entire service policy table in the CISCO-CLASS-BASED-QOS-MIB. This feature introduces the CISCO-CBP-TARGET-MIB, which stores these mappings.</p> <p>In 12.2(31)SB2, this feature was introduced on the Cisco 10000 Series routers with PRE2 and PRE3.</p>

Glossary

MIB—Management Information Base. A database of network management information that is used and maintained by a network management protocol such as Simple Network Management Protocol (SNMP). The value of a MIB object can be changed or retrieved by using SNMP commands, usually through a network management system. MIB objects are organized in a tree structure that includes public (standard) and private (proprietary) branches.

OID—object identifier. Values are defined in specific MIB modules.

policy map—Any defined rule that determines the use of resources within the network. A QoS policy map identifies the traffic class to which it applies and the instructions for one or more actions to take on that traffic.

QoS—quality of service. A measure of performance for a transmission system that reflects its transmission quality and service availability. Quality of service focuses on achieving appropriate network performance for networked applications; it is superior to best-effort performance.

SNMP—Simple Network Management Protocol. A management protocol used almost exclusively in TCP/IP networks. SNMP provides a means for monitoring and controlling network devices and for managing configurations, statistics collection, performance, and security.

**Note**

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

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