AAA Per VC QoS Policy Support

The AAA Per VC QoS Policy Support feature provides the ability to modify an existing quality of service (QoS) profile applied to a session while that session remains active using new Cisco attribute-value (AV) pairs that specify service policy output and service policy input.

History for the AAA Per VC QoS Policy Support Feature

Release	Modification
12.4(2)T	This feature was introduced.

Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at http://www.cisco.com/go/fn. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

Contents

- Prerequisites for AAA Per VC QoS Policy Support, page 1
- Restrictions for AAA Per VC QoS Policy Support, page 2
- Information About AAA Per VC QoS Policy Support, page 2
- Configuration Examples for AAA Per VC QoS Policy Support, page 4
- Additional References, page 5
- Command Reference, page 5

Prerequisites for AAA Per VC QoS Policy Support

You should be familiar with defining policy maps for managing subscriber sessions, and with configuring QoS traffic conditioning. See the "Additional References" section for information on these topics.

CISCO SYSTEMS

Corporate Headquarters:
Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

Copyright © 2005 Cisco Systems, Inc. All rights reserved.

Restrictions for AAA Per VC QoS Policy Support

Although there are no specific restrictions for using the AAA Per VC QoS Policy Support feature, defect report CSCef69140 describes a problem whereby in PPPoA sessions, an input service policy cannot be applied at the ATM virtual circuit (VC) level. Instead, an input service policy, and therefore an input policy AV pair, must be applied under interface virtual template mode.

Also, read through the configuration guidelines in the "Interface Policy Map AAA Attributes" section before using the attributes described in this document.

Information About AAA Per VC QoS Policy Support

Familiarize yourself with the following information before using the attributes described in this document:

- RADIUS Push and Pull, page 2
- Interface Policy Map AAA Attributes, page 3

RADIUS Push and Pull

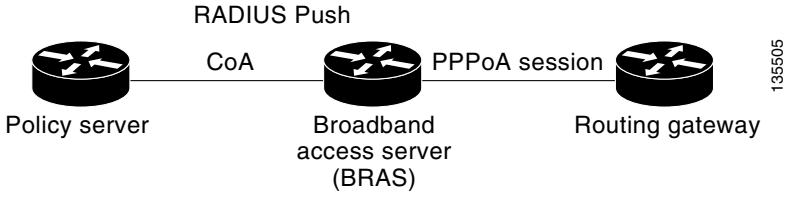
Cisco Systems software offers applications for the DSL aggregation market and service providers that make powerful use of dynamic policy maps. Policy maps govern user services to be deployed in the network and are triggered by a service or by a user—concepts referred to as push and pull. Before the AAA Per VC QoS Policy Support feature introduced in Cisco IOS Release 12.4(2)T, there was no RADIUS push and pull capability for a policy map at the ATM VC level. RADIUS only supported dynamic bandwidth selection and virtual access interface policy maps applied during the establishment of a PPP session. The AAA Per VC QoS Policy Support feature provides support for RADIUS push and pull capability for a policy map at the ATM VC level.

RADIUS pull of policy maps on a VC means that a policy map can be applied on the VC while a PPP over ATM (PPPoA) session is being established. PPPoA sessions are established between a policy server and a routing gateway.

Service policies are applied only when a subscriber first authenticates the VC. Software creates an identifier that is used as the session unique identifier between the router and the RADIUS server using RADIUS Internet Engineering Task Force (IETF) attribute 44. This identifier is sent with an Access Request message and all accounting records for that session.

RADIUS push functionality provides the ability to modify an existing QoS profile applied to a session while that session remains active. A policy server governs the authorization of active sessions with its ability to send a Change of Authorization (CoA) message (see Figure 1). Specific events can trigger the CoA message and allow modification of the QoS configuration. Implementation of RADIUS push eliminates the need to preprovision subscribers, allowing QoS policies to be transparently applied where and when required without the disruption of session reauthentication.

Figure 1 RADIUS Push



These abilities provide a high degree of flexibility, smaller configuration files, and more efficient use of queueing resources. And perhaps more importantly, RADIUS push and pull eliminates the need to statically configure a policy map on every VC or VLAN.

This feature is implemented by Cisco AV pairs that identify QoS policies configured on the router from a RADIUS server by defining service policy output and service policy input. The AV pairs place the appropriate policy map, which is identified by name, directly on the interface. The interface can be either an ATM VC or Ethernet VLAN.

After the initial subscriber authentication, authorization, and accounting (AAA) process, RADIUS returns the appropriate AV name for the policy maps to be applied at the VC and virtual-access interface level. The QoS policy maps define the subscriber user experience for broadband service and can be leveraged to deliver higher value services such as VoIP and video.

Interface Policy Map AAA Attributes

Two new generic Cisco RADIUS VSA attributes are introduced by the AAA Per VC QoS Policy Support feature, as follows:

```
cisco-avpair = "atm:vc-qos-policy-in=in-policy-name"
cisco-avpair = "atm:vc-qos-policy-out=out-policy-name"
```

Use these attributes in the RADIUS server profile to define service policy output and service policy input. The AV pairs place the appropriate policy map, which is identified by name, directly on the interface. The interface can be either an ATM VC or Ethernet VLAN.

The AAA Per VC QoS Policy Support feature also replaces the following generic Cisco RADIUS vendor-specific attribute (VSA) attributes:

```
cisco-avpair = "ip:sub-policy-In=in-policy-name"
cisco-avpair = "ip:sub-policy-Out=out-policy-name"
```

with the following new attributes:

```
cisco-avpair = "ip:sub-qos-policy-in=in-policy-name"
cisco-avpair = "ip:sub-qos-policy-out=out-policy-name"
```

The replaced attributes will be supported for several more software releases, but profiles should be updated with the new attributes as soon as it is feasible to do so.

Remember the following guidelines as you configure these attributes:

- A policy map pulled or pushed from the RADIUS server has a higher precedence than a policy map configured under a permanent virtual circuit (PVC).
- The Cisco IOS **show policy-map interface** EXEC command will display the policy map pushed or pulled from the RADIUS server. This policy map is actually used by the driver, even though the policy map was configured using the **service-policy** command under PVC configuration mode.

- Once a policy map is pushed or pulled on the VC and successfully installed or updated, any configuration or removal of the configuration would affect only the running configuration, and not the driver and actual policy map used by the VC.
- You must enable dynamic bandwidth selection using the **dbs enable** command. Dynamic policies that are pulled and pushed from the RADIUS server must be specifically disabled using the **no dbs enable** command.

Configuration Examples for AAA Per VC QoS Policy Support

This section contains the following examples:

- RADIUS Interface Policy Map Profile: Example, page 4
- Define the Policy Map on the Router: Example, page 4
- Display the Service Policy: Example, page 5

RADIUS Interface Policy Map Profile: Example

Following is an example of a RADIUS profile defining an input service policy named test_vc:

```
radius subscriber 2
 vsa cisco generic 1 string "atm:vc-qos-policy-in=test_vc"
 attribute 1 string "user@cisco.com"
 attribute 44 string "00000002"
!
radius client 192.168.1.4 access-ports 1645 1645 accounting-ports 1646 1646
radius host 192.168.1.3 auth-port 1645 acct-port 1646 key 0 cisco
radius host 192.168.1.4 auth-port 1645 acct-port 1646
radius retransmit 0
radius timeout 15
radius key 0 cisco
radius server 192.168.1.4
 client 192.168.1.3 shared-secret word
```

Define the Policy Map on the Router: Example

The following example shows the Cisco IOS commands that are used to define the service policy on the router:

```
!
interface ATM4/0
 no ip address
 no atm ilmi-keepalive
 pvc 1/101
  dbs enable
  service-policy input test_vc
 !
end
```

Display the Service Policy: Example

The following example shows the report from the **show policy-map interface** command when the policy map named test_vc has been pushed on PVC 1/101:

```
Router# show policy interface atm 4/0

 ATM4/0: VC 1/101 -

  Service-policy input: test_vc

    Class-map: class-default (match-any)
      0 packets, 0 bytes
      5 minute offered rate 0 bps, drop rate 0 bps
      Match: any
```

Additional References

The following sections provide references related to the AAA Per VC QoS Policy Support feature.

Related Documents

Related Topic	Document Title
Service policies and policy maps	• *ISA Configuration Guide* • *ISA Command Reference*
Cisco VSA attributes	• *Cisco IOS Security Configuration Guide*
QoS traffic conditioning	• *Cisco IOS Quality of Service Solutions Configuration Guide* • *Cisco IOS Quality of Service Solutions Command Reference*

Technical Assistance

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

Command Reference

The AAA Per VC QoS Policy Support feature uses no new or modified Cisco IOS commands.

CCVP, the Cisco logo, and Welcome to the Human Network are trademarks of Cisco Systems, Inc.; Changing the Way We Work, Live, Play, and Learn is a service mark of Cisco Systems, Inc.; and Access Registrar, Aironet, Catalyst, CCDA, CCDP, CCIE, CCIP, CCNA, CCNP, CCSP, Cisco, the Cisco Certified Internetwork Expert logo, Cisco IOS, Cisco Press, Cisco Systems, Cisco Systems Capital, the Cisco Systems logo, Cisco Unity, Enterprise/Solver, EtherChannel, EtherFast, EtherSwitch, Fast Step, Follow Me Browsing, FormShare, GigaDrive, HomeLink, Internet Quotient, IOS, iPhone, IP/TV, iQ Expertise, the iQ logo, iQ Net Readiness Scorecard, iQuick Study, LightStream, Linksys, MeetingPlace, MGX, Networkers, Networking Academy, Network Registrar, PIX, ProConnect, ScriptShare, SMARTnet, StackWise, The Fastest Way to Increase Your Internet Quotient, and TransPath are registered trademarks of Cisco Systems, Inc. and/or its affiliates in the United States and certain other countries.

All other trademarks mentioned in this document or Website are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (0711R)

Copyright © 2005 Cisco Systems, Inc. All rights reserved.