

QoS Policy Support on L2VPN ATM PVPs

This feature enables you to configure Quality of Service (QoS) service policies in ATM permanent virtual path (PVP) mode for Layer 2 Virtual Private Networks (L2VPNs).

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Prerequisites for QoS Policy Support on L2VPN ATM PVPs

Before configuring QoS policies on L2VPN ATM PVPs, you should understand the concepts and configuration instructions in the following documents:

- Any Transport over MPLS
- Applying QoS Features Using the MQC

Restrictions for QoS Policy Support on L2VPN ATM PVPs

- Queueing-based policies are not supported in ATM PVP mode and virtual circuit (VC) mode at the same time under the same main interface. However, nonqueueing policies can be mixed. For example, you can configure a nonqueueing policy in PVP mode and configure queueing policies on in VC mode under the same main interface. Similarly, you can configure a queueing policy in PVP mode and configure nonqueueing policies in VC mode in the input or output direction.
- ATM PVP mode does not support sessions.
- When you enable a policy in PVP mode, do not configure ATM rates on the VCs that are part of the PVP. The VCs should be unspecified bit rate (UBR) VCs only.
- If VCs are part of a PVP that has a policy configured, you cannot configure ATM VC traffic shaping.
- You cannot configure a queueing policy on an ATM PVP with UBR.

- You cannot configure queueing-based policies with UBR traffic shaping.

Information About QoS Policy Support on L2VPN ATM PVPs

The MQC Structure

The MQC structure allows you to define a traffic class, create a traffic policy, and attach the traffic policy to an interface.

The MQC structure consists of the following three high-level steps.

SUMMARY STEPS

1. Define a traffic class by using the **class-map**command. A traffic class is used to classify traffic.
2. Create a traffic policy by using the **policy-map** command. (The terms traffic policy and policy map are often synonymous.) A traffic policy (policy map) contains a traffic class and one or more QoS features that will be applied to the traffic class. The QoS features in the traffic policy determine how to treat the classified traffic.
3. Attach the traffic policy (policy map) to the interface by using the **service-policy** command.

DETAILED STEPS

Procedure

Step 1	Define a traffic class by using the **class-map**command. A traffic class is used to classify traffic.
Step 2	Create a traffic policy by using the **policy-map** command. (The terms traffic policy and policy map are often synonymous.) A traffic policy (policy map) contains a traffic class and one or more QoS features that will be applied to the traffic class. The QoS features in the traffic policy determine how to treat the classified traffic.
Step 3	Attach the traffic policy (policy map) to the interface by using the **service-policy** command.

Elements of a Traffic Class

A traffic class contains three major elements: a traffic class name, a series of match commands, and, if more than one match command is used in the traffic class, instructions on how to evaluate these match commands.

The match commands are used for classifying packets. Packets are checked to determine whether they meet the criteria specified in the match commands; if a packet meets the specified criteria, that packet is considered a member of the class. Packets that fail to meet the matching criteria are classified as members of the default traffic class.

Elements of a Traffic Policy

A traffic policy contains three elements: a traffic policy name, a traffic class (specified with the class command), and the command used to enable the QoS feature.

The traffic policy (policy map) applies the enabled QoS feature to the traffic class once you attach the policy map to the interface (by using the service-policy command).



Note A packet can match only one traffic class within a traffic policy. If a packet matches more than one traffic class in the traffic policy, the first traffic class defined in the policy will be used.

How to Configure QoS Policy Support on L2VPN ATM PVPs

Enabling a Service Policy in ATM PVP Mode

You can enable a service policy in ATM PVP mode. You can also enable a service policy on PVP on a multipoint subinterface.



Note The **show policy-map interface** command does not display service policy information for ATM interfaces.

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SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface atm** *slot* / *subslot* / *port* [**.** *subinterface*]
4. **atm pvp** *vpi* **l2transport**
5. **service-policy** [**input** | **output**] *policy-map-name*
6. **xconnect** *peer-router-id vcid* encapsulation mpls
7. **end**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.

	Command or Action	Purpose
Step 3	**interface atm** *slot* / *subslot* / *port* [**.** *subinterface*] **Example:** `Router(config)# interface atm1/0/0`	Defines the interface and enters interface configuration mode.
Step 4	**atm pvp** *vpi* **l2transport** **Example:** `Router(config-if)# atm pvp 1 l2transport`	Specifies that the PVP is dedicated to transporting ATM cells and enters l2transport PVP configuration mode. • The **l2transport**keyword indicates that the PVP is for cell relay. This mode is for Layer 2 transport only; it is not for regular PVPs.
Step 5	**service-policy** [**input** | **output**] *policy-map-name* **Example:** `Router(config-if-atm-l2trans-pvp)# service policy input pol1`	Enables a service policy on the specified PVP.
Step 6	**xconnect** *peer-router-id vcid* encapsulation mpls **Example:** `Router(config-if-atm-l2trans-pvp)# xconnect 10.0.0.1 123 encapsulation mpls`	Binds the attachment circuit to a pseudowire VC. • The syntax for this command is the same as for all other Layer 2 transports.

Step 7	**end**
	Example:
	`Router(config-if-atm-l2trans-pvp)#`
	`end`
		Exits l2transport PVP configuration mode and returns to privileged EXEC mode.

Enabling a Service Policy in ATM PVP Mode using the commands associated with the L2VPN Protocol-Based CLIs feature

You can enable a service policy in ATM PVP mode. You can also enable a service policy on PVP on a multipoint subinterface.

Note The **show policy-map interface** command does not display service policy information for ATM interfaces.

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SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface atm** *slot* / *subslot* / *port* [**.** *subinterface*]

4. **atm pvp** *vpi* **l2transport**
5. **service-policy** [**input** | **output**] *policy-map-name*
6. **end**
7. **interface pseudowire** *number*
8. **encapsulation mpls**
9. **neighbor** *peer-address vcid-value*
10. **exit**
11. **l2vpn xconnect context** *context-name*
12. **member pseudowire** *interface-number*
13. **member gigabitethernet** *interface-number*
14. **end**
15. **end**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**interface atm** *slot* / *subslot* / *port* [**.** *subinterface*] **Example:** `Router(config)# interface atm1/0/0`	Defines the interface and enters interface configuration mode.
Step 4	**atm pvp** *vpi* **l2transport** **Example:** `Router(config-if)# atm pvp 1 l2transport`	Specifies that the PVP is dedicated to transporting ATM cells and enters l2transport PVP configuration mode. • The **l2transport**keyword indicates that the PVP is for cell relay. This mode is for Layer 2 transport only; it is not for regular PVPs.
Step 5	**service-policy** [**input**	**output**] *policy-map-name* **Example:** `Router(config-if-atm-l2trans-pvp)# service policy input pol1`	Enables a service policy on the specified PVP.

	Command or Action	Purpose
Step 6	**end** **Example:** `Router(config-if-atm-l2trans-pvp)# end`	Exits to privileged EXEC mode.
Step 7	**interface pseudowire** *number* **Example:** `Router(config)# interface pseudowire 100`	Specifies the pseudowire interface and enters interface configuration mode.
Step 8	**encapsulation mpls** **Example:** `Router(config-if)# encapsulation mpls`	Specifies that Multiprotocol Label Switching (MPLS) is used as the data encapsulation method.
Step 9	**neighbor** *peer-address vcid-value* **Example:** `Router(config-if)# neighbor 10.0.0.1 123`	Specifies the peer IP address and virtual circuit (VC) ID value of the Layer 2 VPN (L2VPN) pseudowire.
Step 10	**exit** **Example:** `Router(config-if)# exit`	Exits interface configuration mode.
Step 11	**l2vpn xconnect context** *context-name* **Example:** `Router(config)# l2vpn xconnect context con1`	Creates a Layer 2 VPN (L2VPN) cross connect context and enters xconnect configuration mode.
Step 12	**member pseudowire** *interface-number* **Example:** `Router(config-xconnect)# member pseudowire 100`	Specifies a member pseudowire to form a Layer 2 VPN (L2VPN) cross connect.
Step 13	**member gigabitethernet** *interface-number* **Example:** `Router(config-xconnect)# member GigabitEthernet0/0/0.1`	Specifies the location of the Gigabit Ethernet member interface.
Step 14	**end** **Example:** `Router(config-xconnect)# end`	Exits to privileged EXEC mode.

	Command or Action	Purpose

Step 15	**end**
	Example:
	`Router(config-xconnect)#`
	`end`
		Exits xconnecrt configuration mode and returns to privileged EXEC mode.

Enabling Traffic Shaping in ATM PVP Mode

Traffic shaping commands are supported in PVP mode. For egress VP shaping, one configuration command is supported for each ATM service category. The supported service categories are constant bit rate (CBR), UBR, variable bit rate-nonreal time (VBR-NRT), and variable bit rate real-time(VBR-RT).

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface atm** *slot* / *subslot* / *port* [**.** *subinterface*]
4. **atm pvp** *vpi* **l2transport**
5. Do one of the following:
   - **ubr** *pcr*
   -
   - **cbr** *pcr*
   - or
   - **vbr-nrt** *pcr scr mbs*
   - or
   - **vbr-rt** *pcr scr mbs*
6. **xconnect** *peer-router-id vcid* encapsulation mpls

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.

	Command or Action	Purpose
Step 3	**interface atm** *slot* / *subslot* / *port* [**.** *subinterface*] **Example:** `Router(config)# interface atm1/0/0`	Defines the interface and enters interface configuration mode.
Step 4	**atm pvp** *vpi* **l2transport** **Example:** `Router(config-if)# atm pvp 1 l2transport`	Specifies that the PVP is dedicated to transporting ATM cells and enters l2transport PVP configuration mode. • The **l2transport**keyword indicates that the PVP is for cell relay. This mode is for Layer 2 transport only; it is not for regular PVPs.
Step 5	Do one of the following: • **ubr** *pcr* • • **cbr** *pcr* • or • **vbr-nrt** *pcr scr mbs* • or • **vbr-rt** *pcr scr mbs* **Example:** `Router(config-if-atm-l2trans-pvp)# cbr 1000`	Enables traffic shaping in ATM PVP mode. • *pcr* = peak cell rate • *scr* = sustain cell rate • *mbs* = maximum burst size
Step 6	**xconnect** *peer-router-id vcid* encapsulation mpls **Example:** `Router(config-if-atm-l2trans-pvp)# xconnect 10.0.0.1 123 encapsulation mpls`	Binds the attachment circuit to a pseudowire VC. • The syntax for this command is the same as for all other Layer 2 transports.

Enabling Traffic Shaping in ATM PVP Mode using the commands associated with the L2VPN Protocol-Based CLIs feature

Traffic shaping commands are supported in PVP mode. For egress VP shaping, one configuration command is supported for each ATM service category. The supported service categories are constant bit rate (CBR), UBR, variable bit rate-nonreal time (VBR-NRT), and variable bit rate real-time(VBR-RT).

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface atm** *slot* / *subslot* / *port* [**.** *subinterface*]
4. **atm pvp** *vpi* **l2transport**
5. Do one of the following:
   • **ubr** *pcr*

-
- **cbr** *pcr*
- or
- **vbr-nrt** *pcr scr mbs*
- or
- **vbr-rt** *pcr scr mbs*

6. **end**
7. **interface pseudowire** *number*
8. **encapsulation mpls**
9. **neighbor** *peer-address vcid-value*
10. **exit**
11. **l2vpn xconnect context** *context-name*
12. **member pseudowire** *interface-number*
13. **member gigabitethernet** *interface-number*
14. **end**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**interface atm** *slot* / *subslot* / *port* [**.** *subinterface*] **Example:** `Router(config)# interface atm1/0/0`	Defines the interface and enters interface configuration mode.
Step 4	**atm pvp** *vpi* **l2transport** **Example:** `Router(config-if)# atm pvp 1 l2transport`	Specifies that the PVP is dedicated to transporting ATM cells and enters l2transport PVP configuration mode. • The **l2transport**keyword indicates that the PVP is for cell relay. This mode is for Layer 2 transport only; it is not for regular PVPs.
Step 5	Do one of the following: • **ubr** *pcr* •	Enables traffic shaping in ATM PVP mode. • *pcr* = peak cell rate • *scr* = sustain cell rate

	Command or Action	Purpose
	• **cbr** *pcr* • or • **vbr-nrt** *pcr scr mbs* • or • **vbr-rt** *pcr scr mbs* **Example:** `Router(config-if-atm-l2trans-pvp)# cbr 1000`	• *mbs* = maximum burst size
Step 6	**end** **Example:** `Router(config-if-atm-l2trans-pvp)# end`	Exits to privileged EXEC mode.
Step 7	**interface pseudowire** *number* **Example:** `Router(config)# interface pseudowire 100`	Specifies the pseudowire interface and enters interface configuration mode.
Step 8	**encapsulation mpls** **Example:** `Router(config-if)# encapsulation mpls`	Specifies that Multiprotocol Label Switching (MPLS) is used as the data encapsulation method.
Step 9	**neighbor** *peer-address vcid-value* **Example:** `Router(config-if)# neighbor 10.0.0.1 123`	Specifies the peer IP address and virtual circuit (VC) ID value of the Layer 2 VPN (L2VPN) pseudowire.
Step 10	**exit** **Example:** `Router(config-if)# exit`	Exits interface configuration mode.
Step 11	**l2vpn xconnect context** *context-name* **Example:** `Router(config)# l2vpn xconnect context con1`	Creates a Layer 2 VPN (L2VPN) cross connect context and enters xconnect configuration mode.
Step 12	**member pseudowire** *interface-number* **Example:** `Router(config-xconnect)# member pseudowire 100`	Specifies a member pseudowire to form a Layer 2 VPN (L2VPN) cross connect.
Step 13	**member gigabitethernet** *interface-number* **Example:**	Specifies the location of the Gigabit Ethernet member interface.

	Command or Action	Purpose
	`Router(config-xconnect)# member GigabitEthernet0/0/0.1`	
Step 14	**end** **Example:** `Router(config-xconnect)# end`	Exits to privileged EXEC mode.

Enabling Traffic Shaping in ATM PVP Mode Example using the commands associated with the L2VPN Protocol-Based CLIs feature

The following example enables traffic shaping in ATM PMP mode.

```
interface atm 1/0
 atm pvp 100 l2transport
  ubr 1000
  xconnect 10.11.11.11 777 encapsulation mpls
 atm pvp 101 l2transport
  cbr 1000
  xconnect 10.11.11.11 888 encapsulation mpls
 atm pvp 102 l2transport
  vbr-nrt 1200 800 128
  xconnect 10.11.11.11 999 encapsulation mpls
```

Enabling Matching of ATM VCIs

You can match on an ATM VCI or range of VCIs, using the **match atm-vci** command in class-map configuration mode.

Note When you configure the **match atm-vci**command in class-map configuration mode, you can add this class map to a policy map that can be attached only to an ATM VP.

>

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **class-map** *class-map-name* [**match-all** | **match-any**]
4. **match atm-vci** *vc-id* **[- vc-id]**
5. **end**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**class-map** *class-map-name* [**match-all** | **match-any**] **Example:** `Router(config)# class-map class1`	Creates a class map to be used for matching traffic to a specified class, and enters class-map configuration mode.
Step 4	**match atm-vci** *vc-id* **[- vc-id]** **Example:** `Router(config-cmap)# match atm-vci 50`	Enables packet matching on an ATM VCI or range of VCIs. The range is 32 to 65535. **Note** You can use the **match not** command to remove the match criteria.
Step 5	**end** **Example:** `Router(config-cmap)# end`	(Optional) Returns to privileged EXEC mode.

Configuration Examples for QoS Policy Support on L2VPN ATM PVPs

Example Enabling Traffic Shaping in ATM PVP Mode

The following example enables traffic shaping in ATM PMP mode.

```
int atm 1/0/0
   atm pvp 100 l2transport
       ubr 1000
       xconnect 10.11.11.11 777 encapsulation mpls
   atm pvp 101 l2transport
       cbr 1000
       xconnect 10.11.11.11 888 encapsulation mpls
```

```
   atm pvp 102 l2transport
       vbr-nrt 1200 800 128
       xconnect 10.11.11.11 999 encapsulation mpls
```

Example Enabling Traffic Shaping in ATM PVP Mode using the commands associated with the L2VPN Protocol-Based CLIs feature

The following example enables traffic shaping in ATM PMP mode.

```
int atm 1/0/0
   atm pvp 100 l2transport
       ubr 1000
       interface pseudowire 100
       encapsulation mpls
       neighbor 10.0.0.1 123
!
l2vpn xconnect context A
 member pseudowire 100
 member g0/0/0.1
   atm pvp 101 l2transport
       cbr 1000
       interface pseudowire 100
       encapsulation mpls
       neighbor 10.0.0.1 123
!
l2vpn xconnect context A
 member pseudowire 100
 member g0/0/0.1
   atm pvp 102 l2transport
       vbr-nrt 1200 800 128
       interface pseudowire 100
       encapsulation mpls
       neighbor 10.0.0.1 123
!
l2vpn xconnect context A
 member pseudowire 100
 member g0/0/0.1
```

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Commands List, All Releases
Description of commands associated with MPLS and MPLS applications	*Cisco IOS Multiprotocol Label Switching Command Reference*
Modular Quality of Service (QoS) Command-Line Interface (CLI) (MQC)	Applying QoS Features Using the MQC
Any Transport over MPLS	Any Transport over MPLS

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 by this feature, and support for existing MIBs has not been modified by this feature.	To locate and download MIBs for selected platforms, Cisco software 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, and support for existing RFCs has not been modified by this feature.	--

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for QoS Policy Support on L2VPN ATM PVPs

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

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

Table 1: Feature Information for QoS Policy Support on L2VPN ATM PVPs

Feature Name	Releases	Feature Information
QoS Policy Support on L2VPN ATM PVPs	Cisco IOS XE Release 2.3	This feature enables you to configure Quality of Service (QoS) service policies in ATM permanent virtual path (PVP) mode for Layer 2 Virtual Private Networks (L2VPNs). The following commands were introduced or modified: **cbr**, **match atm-vci**, **service-policy**, **ubr**, **vbr-nrt**, **vbr-rt**.
Cell-Based ATM Shaping per PVP	Cisco IOS XE Release 2.3	This feature was introduced for Cisco ASR 1000 Series Aggregation Services Routers.