



ATM Hierarchical Shaping ATM VC into VP Shaping

Last Updated: December 6, 2011

Traffic shaping is a quality of service (QoS) mechanism that is used to manage the network traffic by shaping the traffic to a specified rate. Traffic shaping enables the network administrator to:

- Control access to the available bandwidth.
- Ensure that the traffic conforms to the policies.
- Regulate the flow of traffic to avoid congestion that can occur when the transmitted traffic exceeds the access speed of its remote target interface.

Traffic shaping uses queues to constrain data bursts, limit peak data rate, and smooth jitters so that traffic will fit within the promised envelope. Traffic shaping limits the throughput by buffering excess traffic instead of dropping packets.

ATM VP/VC hierarchical shaping provides two levels of traffic shaping--per-VC and per-VP--to control or modify the flow of traffic on an interface. The shaping function also ensures that the traffic from one VC does not adversely impact another VC, thus preventing the loss of data. The traffic is shaped first at the VC level and then at the VP level.

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Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the Feature Information Table at the end of this document.



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Restrictions for ATM Hierarchical Shaping

All virtual channels (VCs) within a given virtual path (VP) must belong to the same ATM service category.

Information About ATM Hierarchical Shaping

- [ATM Hierarchical Shaping, page 2](#)

ATM Hierarchical Shaping

If a service (or an application) wants to use an ATM network to transport a particular kind of traffic, it must first inform the network about what kind of traffic is to be transported, and the performance requirements of that traffic. The ATM service categories provide a method to relate traffic characteristics and QoS requirements to network behavior. Hierarchical shaping requires that all VCs belonging to a given VP have the same ATM service category. This hierarchy ensures that packets are shaped first at the VC level and then at the VP level. At the interface level, the priority is based on the ATM service category. The service category is determined by the first PVC that is configured under a VP. The priority is in the following order:

- 1 Constant Bit Rate (CBR)
- 2 Unspecified Bit Rate (UBR)
- 3 Variable Bit Rate Non Real-Time (VBR-nRT)
- 4 Real-time Variable Bit Rate (VBR-RT)

If no service category is specified at the VC level, the default is unshaped UBR. The ATM Hierarchical Shaping feature is supported for the following ATM traffic service categories:

- VBR-nRT
- UBR

For VBR-nRT traffic the output sustainable cell rate (SCR) value that is configured will be taken into account for VC shaping. For UBR traffic, the output peak cell rate (PCR) value that is configured will be taken into account for VC shaping.

The ATM Hierarchical Shaping feature supports over-subscription. Over-subscription occurs when the sum of the configured rate of UBR and VBR PVCs exceeds the line rate.

How to Configure ATM Hierarchical Shaping

- [Configuring ATM Hierarchical Shaping, page 2](#)

Configuring ATM Hierarchical Shaping

Perform this task to configure ATM hierarchical shaping.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface atm** *interface-number* [*. subinterface-number* { **mpls** | **multipoint** | **point-to-point**}]
4. **atm pvp** *vpi* [*peak-rate*]
5. **pvc** *vpi* / *vci*
6. **exit**
7. **range** [*range-name*] **pvc** [*start-vpi* /] *start-vci* [*end-vpi* /] *end-vci*
8. **ubr** *output-pcr*
9. **exit**
10. **atm pvp** *vpi* [*peak-rate*]
11. **pvc** *vpi* / *vci*
12. **vbr-nrt** *output-pcr* *output-scr* [*output-maxburstsize*]
13. **create on-demand**
14. **end**
15. **show atm pvc**
16. **show atm vp**

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	interface atm <i>interface-number</i> [<i>. subinterface-number</i> { mpls multipoint point-to-point }] Example: Router(config)# interface atm 0/3/2.1 multipoint	Configure an ATM interface and enters subinterface configuration mode.

Command or Action	Purpose
<p>Step 4 <code>atm pvp vpi [peak-rate]</code></p> <p>Example:</p> <pre>Router(config-subif)# atm pvp 2</pre>	<p>Creates a permanent virtual path (PVP) used to multiplex (or bundle) one or more VCs.</p>
<p>Step 5 <code>pvc vpi / vci</code></p> <p>Example:</p> <pre>Router(config-subif)# pvc 2/200</pre>	<p>Creates or assigns a name to an ATM PVC and enters ATM virtual circuit configuration mode.</p>
<p>Step 6 <code>exit</code></p> <p>Example:</p> <pre>Router(config-if-atm-vc)# exit</pre>	<p>Exits ATM virtual circuit configuration mode and returns to subinterface configuration mode.</p>
<p>Step 7 <code>range [range-name] pvc [start-vpi /]start-vci [end-vpi /]end-vci</code></p> <p>Example:</p> <pre>Router(config-subif)# range range1 pvc 2/100 2/102</pre>	<p>Defines a range of ATM PVCs.</p>
<p>Step 8 <code>ubr output-pcr</code></p> <p>Example:</p> <pre>Router(config-if-atm-vc)# ubr 4000</pre>	<p>Configures UBR QoS and specifies the output PCR for an ATM PVC, PVC range, switched virtual circuit (SVC), VC class, or VC bundle member.</p>
<p>Step 9 <code>exit</code></p> <p>Example:</p> <pre>Router(config-if-atm-vc)# exit</pre>	<p>Exits ATM virtual circuit configuration mode and returns to subinterface configuration mode.</p>
<p>Step 10 <code>atm pvp vpi [peak-rate]</code></p> <p>Example:</p> <pre>Router(config-subif)# atm pvp 3</pre>	<p>Creates a PVP used to multiplex (or bundle) one or more VCs.</p>

Command or Action	Purpose
<p>Step 11 <code>pvc vpi / vci</code></p> <p>Example:</p> <pre>Router(config-subif)# pvc 3/150</pre>	<p>Creates or assigns a name to an ATM PVC and enters ATM virtual circuit configuration mode.</p>
<p>Step 12 <code>vbr-nrt output-pcr output-scr [output-maxburstsize]</code></p> <p>Example:</p> <pre>Router(config-if-atm-vc)# vbr-nrt 1000 1000</pre>	<p>Configures the VBR-nRT QoS and specifies output PCR, output SCR, and output maximum burst cell size for an ATM PVC, PVC range, SVC, VC class, or VC bundle member.</p>
<p>Step 13 <code>create on-demand</code></p> <p>Example:</p> <pre>Router(config-if-atm-vc)# create on-demand</pre>	<p>Configures ATM PVC autoprovisioning, which enables a PVC or range of PVCs to be created automatically on demand.</p>
<p>Step 14 <code>end</code></p> <p>Example:</p> <pre>Router(config-if-atm-vc)# end</pre>	<p>Exits ATM virtual circuit configuration mode and returns to privileged EXEC mode.</p>
<p>Step 15 <code>show atm pvc</code></p> <p>Example:</p> <pre>Router# show atm pvc</pre>	<p>(Optional) Displays the statistics for all VPs on an interface or for a specific VP.</p>
<p>Step 16 <code>show atm vp</code></p> <p>Example:</p> <pre>Router# show atm vp</pre>	<p>(Optional) Displays all ATM PVCs and traffic information.</p>

Configuration Examples for ATM Hierarchical Shaping

- [Example Configuring ATM Hierarchical Shaping, page 6](#)

Example Configuring ATM Hierarchical Shaping

The following example shows how to configure ATM hierarchical shaping:

```
enable
configure terminal
interface atm 0/3/2.1 multipoint
  atm pvp 2
  pvc 2/200
  exit
  range range1 pvc 2/100 2/102
 ubr 4000
  exit
  atm pvp 3
  pvc 3/100
  vbr-nrt 1000 1000
  create on-demand
end
```

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Commands List, All Releases
ATM commands	<i>Cisco IOS Asynchronous Transfer Mode Command Reference</i>

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 ATM Hierarchical Shaping

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.

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Table 1 Feature Information for ATM Hierarchical Shaping

Feature Name	Releases	Feature Information
ATM Hierarchical Shaping-- ATM VC into VP Shaping	Cisco IOS XE Release 3.3S	ATM VP/VC hierarchical shaping provides two levels of traffic shaping--per-VC and per-VP--to control or modify the flow of traffic on an interface. The shaping function also ensures that traffic from one VC does not adversely impact another VC, thus preventing loss of data. The traffic is shaped first at the VC level and then at the VP level.

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