



ATM CBR and VBR-rt Support

The ATM CBR and VBR-rt Support feature implements support for constant bit rate (CBR) and variable bit rate real-time (VBR-rt) service classes on ATM virtual circuits. This feature introduces CBR and VBR-rt support for ATM traffic management functions on enhanced ATM port adapters and the PA-A3-8T1/8E1 IMA port adapters.

History for ATM CBR and VBR-rt Support Feature

Release	Modification
12.0(31)S	This feature was introduced on the Cisco 7200 series and Cisco 7500 series routers. The Cisco 7301 series routers are not supported in this release.
12.0(31)S4	Support for the PA-A3-8T1 and PA-A3-8E1 IMA port adapters was introduced.

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Information About ATM CBR and VBR-rt Support

To learn an overview of this feature, the supported ATM port adapters, and available existing Cisco IOS documentation related to this feature, see the following sections:

- [CBR and VBR-rt Support, page 2](#)
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CBR and VBR-rt Support

The Traffic Management Specification Version 4.0 standard defines five service classes that describe the user traffic transmitted on a network and the quality of service (QoS) that a network should provide for that traffic. Two of the service classes that are designed to support ATM real-time traffic management applications are constant bit rate (CBR) and variable bit rate real-time (VBR-rt).

The CBR and VBR-rt service classes are used to support ATM traffic management such as traffic shaping and traffic policing. For example, to perform ATM traffic shaping, the network operator uses the appropriate service class to configure the router to transmit ATM cells at a rate that conforms to the QoS that was purchased from an ATM Internet Service Provider (ISP). The service purchased is based on the type of service the user needs, such as voice, video, or data.

The CBR service class is designed for ATM virtual circuits (VCs) needing a static amount of bandwidth that is continuously available for the duration of the active connection. An ATM virtual circuit configured as CBR can send cells at peak cell rate (PCR) at any time and for any duration. It can also send cells at a rate less than the PCR or even emit no cells.

The VBR-rt service class is intended for real-time applications, such as compressed voice over IP (VoIP) and video conferencing. These applications require tightly constrained delays (cell transfer delay [CTD]) and delay variation (cell delay variation [CDV]). The source device transmits typically in bursts and at a rate that varies with time. VBR-rt is characterized by a peak cell rate (PCR), sustained cell rate (SCR), and maximum burst size (MBS).

This feature implements support for CBR and VBR-rt on the Cisco 7200 series and Cisco 7500 series routers in Cisco IOS Release 12.0(31)S and Cisco IOS Release 12.0(31)S4 on the following supported ATM port adapters:

- PA-A3-E3
- PA-A3-T3
- PA-A3-OC3
- PA-A3-8T1 IMA
- PA-A3-8E1 IMA

The PA-A3 port adapters provide advanced features for ATM traffic management. The PA-A3-OC3/T3/E3 ATM port adapters are single-port and single-wide port adapters for the Cisco 7200 series and Cisco 7500 series routers.

The eight-port PA-A3-8T1 and PA-A3-8E1 inverse multiplexing over ATM (IMA) port adapters support inverse multiplexing over ATM. Inverse multiplexing provides a means of access to ATM networks at rates between DS1/E1 and DS3/E3 levels by combining the bandwidth of multiple DS1/E1 links into groups that collectively provide higher intermediate rates. This is especially desirable in networks where DS3/E3 links are scarce.

CBR and VBR-rt Documentation

There is detailed, existing Cisco documentation on CBR, VBR-rt, the ATM PA-A3 port adapters, and the PA-A3-8T1/8E1 IMA port adapters.

Refer to the following documents for more information:

- [Understanding the CBR Service Category for ATM VCs](http://www.cisco.com/en/US/tech/tk39/tk51/technologies_tech_note09186a0080094e6a.shtml) tech note at the following URL:
http://www.cisco.com/en/US/tech/tk39/tk51/technologies_tech_note09186a0080094e6a.shtml
- [Understanding the Variable Bit Rate Real Time \(VBR-rt\) Service Category for ATM VCs](http://www.cisco.com/en/US/tech/tk39/tk51/technologies_tech_note09186a0080094cd0.shtml) tech note at the following URL:
http://www.cisco.com/en/US/tech/tk39/tk51/technologies_tech_note09186a0080094cd0.shtml
- *Cisco 7200 series Design Library: ATM Traffic Management*, “[Configuring Traffic Shaping on the PA-A3 and PA-A6 ATM Port Adapters](#)” chapter, at the following URL:
http://www.cisco.com/en/US/products/hw/modules/ps2033/products_implementation_design_guide_chapter09186a0080199958.html#1046740
- [PA-A3 Enhanced ATM Port Adapter Installation and Configuration](http://www.cisco.com/univercd/cc/td/doc/product/core/cis7505/portadpt/atm_port/pa_a3/index.htm) guide at the following URL:
http://www.cisco.com/univercd/cc/td/doc/product/core/cis7505/portadpt/atm_port/pa_a3/index.htm
- Information on the **cbr** command, *Cisco IOS Wide Area Networking Command Reference, Release 12.3* at the following URL:
http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123cgcr/wan_r/wan_c1g.htm#
- Information on the **vbr-rt** command, *Cisco IOS Voice Command Reference* at the following URL:
http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122tcr/122tvr/vrg_v1.htm#wp1012264
- [Inverse Multiplexing over ATM Port Adapter Installation and Configuration](http://www.cisco.com/en/US/products/hw/modules/ps2033/products_module_installation_guide_book09186a008018a84d.html) guide at the following URL:
http://www.cisco.com/en/US/products/hw/modules/ps2033/products_module_installation_guide_book09186a008018a84d.html

How to Configure ATM CBR and VBR-rt Support

This section contains the following tasks:

- [Configuring CBR](#)
- [Configuring VBR-rt](#)
- [Verifying CBR and VBR-rt Configurations on an ATM VC](#)

Configuring CBR

This section contains the procedure to configure the constant bit rate (CBR) QoS class for an ATM permanent virtual circuit (PVC) and specifies the PVC bandwidth on a Cisco 7200 series or Cisco 7500 series router.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. **pvc** [*name*] *vpi* | *vci* [**l2transport**]
5. **cbr** *rate*
6. **end**

DETAILED STEPS

	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 <i>type number</i> Example: Router(config)# interface atm 1/0	Configures an ATM interface and enters interface configuration mode. For information on the options of the interface command, see the command in the Cisco IOS Interface and Hardware Component Command Reference, Release 12.3 .
Step 4	pvc [<i>name</i>] <i>vpi</i> <i>vci</i> [l2transport] Example: Router(config-if)# pvc 0/100	Creates or assigns a name to an ATM permanent virtual circuit (PVC), specifies the encapsulation type on an ATM PVC, and enters virtual circuit configuration mode. <ul style="list-style-type: none"> • <i>name</i> (optional) is the PVC name. • <i>vpi</i> is the ATM network virtual path identifier (VPI) for this PVC. • <i>vci</i> is the ATM network virtual channel identifier (VCI) for this PVC. • l2transport (optional) is used to specify that the PVC is switched and not terminated. <p>The example creates a PVC with VPI 0 and VCI 100 in interface configuration mode.</p> <p>For more information on the pvc command, see the Cisco IOS Wide-Area Networking Command Reference, Release 12.3.</p>

	Command or Action	Purpose
Step 5	cbx rate Example: Router(config-if-atm-vc)# cbr 16000	Configures the constant bit rate (CBR) QoS class for an ATM permanent virtual circuit (PVC), and specifies the PVC bandwidth. <ul style="list-style-type: none"> <i>rate</i> is the peak cell rate (PCR) in Kbps. You define the required bandwidth in Kbps by specifying a PCR. The example creates a CBR PVC with a peak cell rate of 16,000 Kbps.
Step 6	end Example: Router(config)# end	Enter end four times or Ctrl-Z to exit the various configuration modes and return to privileged EXEC mode.

Configuring VBR-rt

This section contains the procedure to configure the real-time variable bit rate (VBR) for VoATM voice connections for an ATM PVC on a Cisco 7200 series or Cisco 7500 series router.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. **pvc** [*name*] *vpi* | *vci* [**l2transport**]
5. **vbr-rt** *peak-rate average-rate burst*
6. **end**

DETAILED STEPS

	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 <i>type number</i> Example: Router(config)# interface atm 1/0	Configures an ATM interface and enters interface configuration mode. For information on the options of the interface command, see the command in the Cisco IOS Interface and Hardware Component Command Reference, Release 12.3 .

Command or Action	Purpose
<p>Step 4</p> <pre>pvc [<i>name</i>] <i>vpi</i> <i>vci</i> [l2transport]</pre> <p>Example: Router(config-if)# pvc 0/100</p>	<p>Creates or assigns a name to an ATM permanent virtual circuit (PVC), specifies the encapsulation type on an ATM PVC, and enters virtual circuit configuration mode.</p> <ul style="list-style-type: none"> <i>name</i> (optional) is the PVC name. <i>vpi</i> is the ATM network virtual path identifier (VPI) for this PVC. <i>vci</i> is the ATM network virtual channel identifier (VCI) for this PVC. l2transport (optional) is used to specify that the PVC is switched and not terminated. <p>The example creates a PVC with VPI 0 and VCI 100 in interface configuration mode.</p> <p>For more information on the pvc command, see the Cisco IOS Wide-Area Networking Command Reference, Release 12.3.</p>
<p>Step 5</p> <pre>vbr-rt <i>peak-rate</i> <i>average-rate</i> <i>burst</i></pre> <p>Example: PA-A3-OC3 and PA-A3-E3 ATM PA configuration Router(config-if-atm-vc)# vbr-rt 600 300 32</p> <p>Example: PA-A3-T3 ATM PA configuration Router(config-if-atm-vc)# vbr-rt 1000 1000 32</p>	<p>Configures the real-time variable bit rate (VBR) for VoATM voice connections for an ATM PVC in virtual circuit configuration mode.</p> <ul style="list-style-type: none"> <i>peak-rate</i> is the peak cell rate (PCR) in Kbps. <i>average-rate</i> is the average cell rate in Kbps. <i>burst</i> is the burst cell size in number of cells. <p>The PA-A3 OC-3 and PA-A3-E3 port adapter example creates a VBR-rt PVC with a PCR of 600 Kbps, an average cell rate of 300 Kbps, and a burst cell size of 32.</p> <p>The PA-A3-T3 port adapter example creates a VBR-rt PVC with a PCR of 1000 Kbps, an average cell rate of 1000 Kbps, and a burst cell size of 32.</p>
<p>Step 6</p> <pre>end</pre> <p>Example: Router(config-if-atm-vc)# end</p>	<p>Enter end four times or Ctrl-Z to exit the various configuration modes and return to privileged EXEC mode.</p>

Verifying CBR and VBR-rt Configurations on an ATM VC

Perform this optional task to verify that CBR or VBR-rt are configured on an ATM VC.

SUMMARY STEPS

1. **enable**
2. **show atm vc** [*vcd* | **interface** *interface-number*]

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	show atm vc [<i>vcd</i> interface <i>interface-number</i>] Example: Router# show atm vc 2	<p>If CBR is configured, the command displays cbr and the peak cell rate in Kbps.</p> <p>If VBR-rt is configured, the command displays vbr-rt, the peak cell rate in Kbps, the average cell rate, and the burst cell size.</p> <ul style="list-style-type: none"> <i>vcd</i> (optional) specifies which virtual circuit about which to display information. interface <i>interface-number</i> (optional) is the interface number or subinterface number of the PVC or SVC. Displays all PVCs and SVCs on the specified interface or subinterface. <p>The example displays statistics for ATM virtual circuit 2, including information about the configured CBR or VBR-rt.</p>

Configuration Examples for ATM CBR and VBR-rt Support

This section contains the following examples:

- [Configuring CBR: Example, page 7](#)
- [Configuring VBR-rt: Example, page 7](#)
- [Verifying CBR Output: Example, page 8](#)

Configuring CBR: Example

To configure a CBR PVC, use the **cbr** command on an ATM VC, as shown in the following example:

```
Router(config)# interface atm 1/0
Router(config-if)# pvc 0/100
Router(config-if-atm-vc)# cbr 16000
```

Configuring VBR-rt: Example

The following example 1) configures a VBR-rt PVC with a peak cell rate of 10000 Kbps, an average cell rate of 5000 Kbps, and a burst cell size of 32 cells on a PVC; and 2) displays the configuration with a **show run** command. The highlighted arrow, for documentation purposes only, shows the configured VBR-rt:

```
Router(config-subif)# pvc 0/100
Router(config-if-atm-vc)# vbr-rt 10000 5000 32
Router(config-if-atm-vc)# end
```

```

Router#
Router# show run interface atm 2/0.1
Building configuration...

Current configuration : 200 bytes
!
interface ATM2/0.1 point-to-point
ip address 40.0.0.2 255.0.0.0
no ip directed-broadcast
no ip route-cache
no ip mroute-cache
no atm enable-ilmi-trap
pvc 0/100
vbr-rt 10000 5000 32 <===== configured VBR-rt
!
end

```

The following is an example of a VBR-rt configuration on a PA-A3-OC3 ATM port adapter:

```

Router(config)# interface atm 1/0
Router(config-if)# pvc 0/100
Router(config-if-atm-vc)# vbr-rt ?
<64-155000> Peak Cell Rate(PCR) in Kbps
Router(config-if-atm-vc)# vbr-rt 600 ?
<64-600> Average Cell Rate in Kbps
Router(config-if-atm-vc)# vbr-rt 600 300 ?
<1-64000> Burst cell size in number of cells
Router(config-if-atm-vc)# vbr-rt 600 300 32

```

Verifying CBR Output: Example

The following example using the **show run interface** and **show atm vc** commands shows that CBR with a peak cell rate of 4000 Kbps is configured on ATM virtual circuit 2:

```

Router# show run interface atm 2/0.2
Building configuration...

Current configuration :117 bytes
!
interface ATM2/0.2 point-to-point
ip address 10.0.0.2 10.255.255.255
no ip route-cache
pvc 10/40
  cbr 4000
!
end

Router# show atm vc 2
01:13:52:%SYS-5-CONFIG_I:Configured from console by console
Description:N/A
ATM2/0.2:VCD:2, VPI:10, VCI:40
CBR, SusRate:4000 (9434 cps)
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
AAL5-LLC/SNAP, etype:0x0, Flags:0x820, VCmode:0x0, Encapsize:12
OAM frequency:0 second(s)
VC TxRingLimit:157 particles
VC Rx Limit:47 particles
InARP frequency:15 minutes(s)
Transmit priority 1

```

```

InPkts:0, OutPkts:2, InBytes:0, OutBytes:56
InCells:0, OutCells:2
InPRoc:0, OutPRoc:2
InFast:0, OutFast:0, InAS:0, OutAS:0
InPktDrops:0, OutPktDrops:0/0/0 (holdq/outputq/total)
InCellDrops:0, OutCellDrops:0
InByteDrops:0, OutByteDrops:0
CrcErrors:0, SarTimeOuts:0, OverSizedSDUs:0, LengthViolation:0, CPIErrors:0
Out CLP=1 Pkts:0, Cells:0
OAM cells received:0
OAM cells sent:0
Status:UP

```

Additional References

The following sections provide references related to the ATM CBR and VBR-rt Support feature.

Related Documents

Related Topic	Document Title
Information on the cbr command.	Cisco IOS Wide Area Networking Command Reference, Release 12.3.
Information on the vbr-rt command.	Cisco IOS Voice Command Reference.

Standards

Standards	Title
ATM traffic management	Traffic Management Specification Version 4.0

MIBs

MIBs	MIBs Link
No new MIBs are supported or modified by this feature 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

RFCs	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 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/en/US/support/index.html

Command Reference

There are no new or modified commands.

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