

ATM OC-3 Network Module for the Cisco 3600 Series Routers

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Feature Summary

This document describes how to configure, verify, and troubleshoot a Cisco 3600 series router after the ATM OC-3 Network Module has been installed. The ATM OC-3 Network Module allows your router to concentrate data, voice, and video traffic onto an Asynchronous Transfer Mode (ATM) uplink. The following models are available:

Table 1 Models of ATM OC-3 Network Modules

Network Module	Description
NM-1A-OC3MM	Single port ATM OC-3 multinode network module.
NM-1A-OC3SMI	Single port ATM OC-3 single-mode, intermediate reach network module.
NM-1A-OC3SML	Single port ATM OC-3 single-mode, long reach network module.

Note Installing more than one ATM OC-3 in your Cisco 3600 series router may result in significantly degraded performance.

Benefits

The ATM OC-3 Network Module is an ATM network module designed for Optical Carrier level 3 (OC3) high-bandwidth data and voice or data integration applications over Synchronous Optical Network (SONET) and Synchronous Digital Hierarchy (SDH) at speeds of 155.520 Mbps (STM-1). The ATM OC-3 network module can combine router packets with constant bit rate (CBR) data onto an ATM uplink. This network module provides the following features at the ATM Adaptation Layer (AAL) and ATM layers:

- Either OC3 Single Mode (SM) Intermediate Reach, OC3 Single Mode (SM) Long Reach, or OC3 Multi Mode (MM)
- Supports ATM Addaptation Layer 5 (AAL5)
- Supports 4 bits of virtual path identifier (VPI) and 10 bits of virtual channel identifier (VCI)
- Supports up to 1024 virtual clients
- Supports these service classes: available bit rate (ABR), constant bit rate (CBR), unspecified bit rate (UBR), UBR+, variable bit rate for both real time (VBR-rt), and non real time (VBR-nrt)
- ABR permanant virtual circuits (PVCs) and switched virtual circuits (SVCs)
- ATM PVC management
- Multi Queue Segmentation and Reassembly
- Multiple Protocol over ATM - MPoA
- ATM Traffic Management
- Bandwidth Management
- Cisco point-to-point protocol (PPP) over ATM
- Internet Engineering Task Force (IETF) PPP
- LAN emulation (LANE) support
- Operation, Administration, and Maintenance (OAM) cell support
- Early Packet Discard
- Uses standard Cisco ATM IOS CLI commands
- ATM Bandwidth Management
- On-line Insertion and Removal (OIR), enabled only in hardware
- Supports a maximum of 1024 connections, simultaneously
- F4 OAM cell support
- F5 OAM cell support
- Supports three permanant virtual path (PVP) connections

The Segmentation and Reassembly (SAR) converts packets to and from cells that are using the AAL5 adaptation layer. The SAR also provides comprehensive bit rate management providing UBR, VBR, CBR and full end-to-end ABR service.

The OC3 port provides three different fiber interfaces: multimode, single-mode intermediate reach, and single-mode long reach capabilities. The uplink port accepts transmission timing from the primary reference clock on the backplane or from the ATM network.

Restrictions

The ATM OC-3 network module can be configured with the following restrictions:

- If you configure an ABR VC, either in a vc-class or in vcmode, the MCR value you enter is ignored, and an MCR of 0 is used, even though this is not apparent from the configuration. Additionally, ABR PCR values are configurable in a range from 0 to line rate. The MCR is honored, however. Currently, the ATM OC-3 rounds the configured value down to one of the following values:
 - 64 Kbit/sec
 - 384 K
 - 768 K
 - 1,534 K
 - 2 M
 - 4 M
 - 10 M
 - 16 M
 - 25.6 M
 - 44 M
 - 75 M
 - 100 M
 - 125 M
 - 149 M
- When you configure a UBR+ VC, the Cisco CLI requires that you specify a PCR. Due to a hardware limitation, any value you enter is ignored by the ATM OC-3 and a value of 155 Mbits per second is used.
- The ATM OC-3 does not allow configuring interfaces and sub-interfaces by using the **traffic-shape** parameter. That is because the ATM OC-3 supports traffic shaping through native ATM means by making a traffic class for UBR, UBR+, ABR, VBR-rt, VBR-ntr, and CBR.

If you are still having trouble, enable ATM debug mode using the **debug atm errors** command.

Note Using debug commands may generate enormous amounts of data, which may cause significant degradation in performance.

Supported Platforms

These modular access routers support the ATM OC-3:

- Cisco 3620 route
- Cisco 3640 router

Supported MIBs and RFCs

RFC and ATM Forum Support

- RFC 1483, encapsulation for bridged and routed traffic
- RFC 1577, classical IP and ARP over ATM
- RFC 2022, Multicast over UNI 3.0/3.1 based ATM Networks - UNI 3.0
- RFC 2383, *ST2+ over ATM Protocol Specification - UNI 3.1*
- ATM Forum UNI 3.0, 3.1, and 4.0, signaling
- RFC 1695, Definitions of Managed Objects for ATM Management Version 8.0 using SMIv2

MIBs Supported

- ATM Forum MIB
- AToM MIB
- CISCO-AAL5-MIB
- CISCO-ATM-IF-PHYS-MIB
- CISCO-BUS-MIB
- CISCO-LECS-MIB
- CISCO-LES-MIB
- Chassis MIB
- ILMI MIB
- Interface MIB
- LAN-EMULATION-CLIENT-MIB
- SONET MIB

List of Terms and Acronyms

ABR—Available Bit Rate service, provides a feedback path in VCs using RM cells to indicate buffer congestion and automatically decrease/increase data rate on a VC.

ATM —Asynchronous Transfer Mode (NOT Automatic Teller Machine)

CBR—Constant Bit Rate interfaces usually run at T1 or E1 speed and are used mostly to connect PBXs or video equipment

OC3—optical carrier level 3, the optical interface designed with synchronous transport signal (STS-3) rate in SONET.

PVC—permanent virtual circuit made between two data terminal equipment (DTE) lines established by configuration.

SAR—Segmentation and Reassembly, a circuit device that converts packets into cells and visa-versa.

SVC—switched virtual circuit established across a network on as-need basis.

SONET—synchronous optical network

STM-1—Synchronous Transfer Mode level 1

UBR—Unspecified Bit Rate service category for ATM traffic. This is intended for non-real time burst applications which do not require a guarantee of traffic characteristics such as bandwidth, cell delay and cell delay

VBR—variationvariable bit rate

VC—Virtual Circuit

VCI—Virtual Channel Identifier

VPI—Virtual Path Identifier

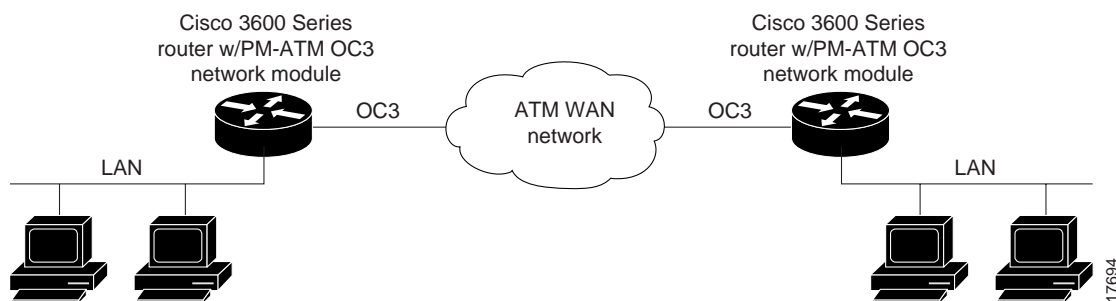
rt-VBR—Real time Variable Bit Rate traffic service category for ATM traffic.

nrt-VBR—Non-real time Variable Bit Rate traffic service category for ATM traffic.

Sample Network Topology

Figure 1 shows a sample network topology for the ATM OC-3 network module installed in a Cisco 3600 series router. When a Cisco 3600 series router is deployed in an ATM wide area network (WAN) with a ATM OC-3 network module installed, high speed connectivity will be supported for multiple types of traffic over ATM. For a sample configuration, see the “Configuration Examples” on page 10:

Figure 1 Example of ATM OCS Network Modules used in an ATM WAN Network



Configuration Tasks

Perform the following tasks to configure the ATM OC-3:

- Configuring the Cisco 3600 for the ATM OC-3 on page 6

Configuring the Cisco 3600 for the ATM OC-3

The ATM OC-3 network module supports most of the standard ATM Cisco command line interface (CLI) configuration and troubleshooting commands. See Table 2 for specific supported ATM related CLI commands. Configuring your Cisco 3600 to fully support ATM network capabilities is beyond the scope of this short document.

Configuring

Step	Command	Purpose
1	Router# configure t Router (config)#	After installing your ATM OC-3 network module, enter the global configuration mode by typing the configure terminal command so you can configure ATM permanent virtual circuit (PVCs) or switched virtual circuit (SVCs) for your Cisco 3620 or 3640 router.
2	Router (config)# ip routing Router (config)#	If you have not configured any routing for the Cisco 3600 Series Router, do it next.
3	Router (config)# interface atm slot/port Router (config-if)#	Specify the ATM controller that you want to configure.
4	Router (config-if)# no shutdown Router (config-if)#	Enter the no shutdown command to pass an enable command to the ATM interface, which then begins segmentation and reassembly (SAR) operations. This command also causes the ATM interface to configure itself based on the previous configuration commands sent.
5	Router (config-if)# ip address ip-addr mask Router (config-if)#	Enter an IP address that the ATM interface will use for routing.
6	Router (config-if)# pvc [vc-id] vpi/vci encaps [ilmi/qsaa] Router (config-if-atm-vc)#	Specify the PVC with a VC identification number, a VPI, a VCI, and a type of encapsulation. All other choices are optional. VCI values 0 to 31 are reserved by ITU-T and ATM Forum. Entering this command places you in config-if-vc ATM vc configuration mode.
7	Router (config-if-atm-vc)# protocol ip ip-addr broadcast Router (config-if-atm-vc)# exit Router (config-if)#	Enter the protocol ip ip-addr [no]broadcast command (a good replacement for the “map-group/map-list” combination, and more appropriate for this interface.
8	Router (config-map-list)# ^Z Router#	Close the interface dropping out of configuration mode.

For a more detailed PVC configuration example, see “Configuration Examples” on page 10.

Verifying PVC Configuration

To verify the correct PVC configuration:

- Enter the **show running-config** command to view the status for all controllers, or enter the **show interface atm slot/port** command to view the status for a particular controller. Make sure that the line protocol is up (see first line), Frame State should be RUNNING, Layer Status should be NO ERROR, and that the interface is the one you configured. Using the **show atm vc** command should show the status as up: Use **debug atm events** to help identify ATM related events as they

are generated. Use **debug atm errors** to indicate what interfaces are having trouble. Use **show ip route** to identify an entry for the ATM interface you configured. Use **show ip route** to show that an entry for the ATM slot/port you configured it:

```
Router# show interface atm 2/0
ATM2/0 is up, line protocol is up
Hardware is RS8234 ATMOC3
Internet address is 200.200.200.1/24
MTU 4470 bytes, sub MTU 4470, BW 155000 Kbit, DLY 80 usec,
    reliability 20/255, txload 1/255, rxload 1/255
Encapsulation ATM, loopback not set
Keepalive not supported
Encapsulation(s):AAL5
1024 maximum active VCs, 1 current VCCs
VC idle disconnect time:300 seconds
Last input never, output 1d21h, output hang never
Last clearing of "show interface" counters never
Queueing strategy:fifo
Output queue 0/40, 0 drops; input queue 0/75, 0 drops
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
    0 packets input, 0 bytes, 0 no buffer
    Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
    6 packets output, 2562 bytes, 0 underruns
    0 output errors, 0 collisions, 1 interface resets
    0 output buffer failures, 0 output buffers swapped out

---- cut ----
```

Troubleshoot PVC Configuration

If the connection does not come up, or you note problems with your configuration, check the following:

- The LEDs on the card should light according to entries in Table 2. If there are errors, see Configuration Note for ATM OC-3 at http://www.cisco.com/univercd/cc/td/doc/product/access/acs_mod/cis2600/update.htm#xtocid237119 for more information.

Table 2 ATM OC-3 Network Module LED Meaning

LED	Color	Meaning
EN (Enable)	Green	Module has passed its self-tests and is available to the router.
RCLK	Green	Receive clock has been detected.
FERF	Yellow	Far End Receive Failure.
OOF	Yellow	Out Of Frame.
AIS	Yellow	Alarm Indication Signal.

- Use the **show interface atm slot/port** command to see if the line protocol is up. The output looks similar to the following example:

```
Router# show interface atm3/0
ATM3/0 is up, line protocol is up
Hardware is RS8234 ATMOC3
Internet address is 1.12.100.1/24
MTU 4470 bytes, sub MTU 4470, BW 155000 Kbit, DLY 80 usec,
  reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ATM, loopback set
Keepalive not supported
Encapsulation(s): AAL5
1024 maximum active VCs, 1 current VCCs
VC idle disconnect time: 300 seconds
Last input 00:09:14, output 00:09:14, output hang never
Last clearing of "show interface" counters never
Queueing strategy: fifo
Output queue 0/40, 0 drops; input queue 0/75, 0 drops
30 second input rate 0 bits/sec, 0 packets/sec
30 second output rate 0 bits/sec, 0 packets/sec
  1404 packets input, 44928 bytes, 0 no buffer
  Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
  0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
  1404 packets output, 44928 bytes, 0 underruns
  1 output errors, 0 collisions, 2 interface resets
  0 output buffer failures, 0 output buffers swapped out
```

- Use the **show controller atm slot/port** command to verify that the Framers State displays a running state, and the Layer Status field shows no errors for the interface. The following example shows fragments of output where transmission (TX) has taken place as well as reception (RX) of cells with a byte count:

```
Router# show controller atm3/0

---- cut ----

PM5346 info:
Framer Chip Type      PM5346
Framer Chip ID        0x30
Framer State          RUNNING
Layer Status          NO ERRORS
Loopback Mode         NONE
Clock Source          LINE
SONET Mode            STS3C
Line Coding            B3ZS
Line Type             LONG MM

---- cut ----

TX cells              56
TX bytes              2968
Last output time      00:01:00
RX cells              271
RX bytes              14363
```

- Use the **show atm vc** command to see if the VC you configured is in the UP state. The output looks similar to the following example:

```
Router# show atm vc
```

Interface	VCD / Name	VPI	VCI	Type	Encaps	SC	Peak Kbps	Avg/Min Kbps	Burst Cells	Sts
1/0	1	0	5	PVC	SNAP	UBR	155000			UP
1/0	8	0	30	PVC	SNAP	UBR	155000			UP
1/0	31	1	1	PVC	SAAL	UBR	155000			UP
1/0	Ron	1	55	PVC	SNAP	UBR	155000			UP
1/0	3	1	111	PVC	SNAP	UBR	155000			UP
1/0	9	2	3	PVC	F4-OAM	UBR	155000			UP
1/0	10	2	4	PVC	F4-OAM	UBR	155000			UP
1/0	4	5	55	PVC	SNAP	CBR	10000			UP
1/0	5	6	66	PVC	SNAP	CBR	20000			UP
1/0	7	7	77	PVC	SNAP	UBR	155000			UP
2/0	1	0	5	PVC	SAAL	UBR	155000			UP
2/0	2	0	16	PVC	ILMI	UBR	155000			UP
3/0	1	15	100	PVC	SNAP	UBR	155000			UP

- Use the **show ip route** command to show an entry for ATM interface. The output looks similar to the following example:

```
Router# show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, * - candidate default
       U - per-user static route, o - ODR, P - periodic downloaded static route
       T - traffic engineered route

Gateway of last resort is 172.18.70.1 to network 0.0.0.0

    1.0.0.0/24 is subnetted, 1 subnets
C       1.12.100.0 is directly connected, ATM3/0
    172.18.0.0/24 is subnetted, 1 subnets
C       172.18.70.0 is directly connected, Ethernet0/0
C     192.22.1.0/24 is directly connected, ATM2/0.1
S*    0.0.0.0/0 [1/0] via 172.18.70.1
S     171.0.0.0/8 [1/0] via 172.18.70.1
S     172.0.0.0/8 [1/0] via 172.18.70.1
S     161.0.0.0/8 [1/0] via 172.18.70.1
```

Configuration Examples

Two examples are suggested for your ATM interface.

Configuring PVCs

The following example configures an ATM interface with a permanent virtual circuit (PVC) connection.

Step 1 Enter global configuration mode using the **configure terminal** command:

```
Router# configure terminal  
Enter configuration commands, one per line. End with CNTL/Z.
```

Step 2 If you have not configured the router before or want to change the current configuration, configure the global parameters, passwords, network management, and routing protocols first. In this example, IP routing and Internetwork Packet Exchange (IPX) routing are enabled:

```
Router(config)# ip routing  
Router(config)# ipx routing
```

For more information about global configuration mode commands, enter a ? at the prompt.

Step 3 Select the ATM interface to configure by entering the interface command, followed by the interface type and the slot and port number:

```
Router(config)# interface atm 1/0  
Router(config-if)#
```

The prompt changes again to show that you are in interface configuration mode.

Step 4 Enable the ATM interface by changing the shutdown state to up:

```
Router(config-if)# no shutdown  
Router(config-if)# exit
```

Step 5 Configure routing protocols on the interface. You enabled the interfaces as part of the global configuration in Step 2. In this example, IP and IPX are configured on the atm 1/0 interface you entered in step 3:

```
Router(config-if)# ip address 192.22.74.3 255.255.255.0  
Router(config-if)# ipx network B005  
Router(config-if)#
```

Step 6 Configure the entire path from source to destination for a PVC manually as well as any switches in the path. The command that creates a PVC has the format **pvc vc-id vpi vci encaps [peak-rate sustained-rate burst-size]**, as follows:

```
Router(config-if)# pvc 1 32  
Router(config-if-atm-vc)#
```

Note Virtual channel identifier (VCI) values 0 to 31 are reserved by ITU-T and ATM Forum¹.

1. International Telecommunication Union Telecommunication (ITU-T) and ATM forum standards specification.

Step 7 Assign the appropriate map list to the interface:

```
Router(config-if-atm-vc)# protocol ip 192.22.74.2 broadcast
Router(config-if-atm-vc)#
```

Use the protocol command to map protocol addresses to the PVC. Doing this eliminates the need for map group lists for virtual circuits (VCs).

Step 8 To configure another interface, repeat Steps 3 through 7 of this procedure.

Step 9 When you finish configuring interfaces, exit configuration mode and return to the enable prompt by pressing **Ctrl-Z**. To see the current operating configuration, including any changes you just made, enter the **show running-config** command:

```
Router# show running-config
Router#
```

Step 10 To see the configuration currently stored in non-volatile random access memory (NVRAM), enter the show startup-config command at the enable prompt:

```
Router# show startup-config
Router#
```

Step 11 Changes to your configuration are evident when you compare the results of the **show running-config** and the **show startup-config** commands before you write your new configuration to NVRAM. To write your changes to NVRAM, making the changes permanent, enter the **copy running-config startup-config** command at the enable prompt:

```
Router# copy running-config startup-config
Building configuration. . .
[OK]
Router#
```

Configuring SVCs

To configure an ATM interface with a switched virtual circuit (SVC) connection:

Step 1 Enter global configuration mode using the **configure terminal** command:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
```

Step 2 If you have not configured the router before or want to change the configuration, configure global parameters, passwords, network management, and routing protocols first. In this example, IP routing, and Internetwork Packet Exchange (IPX) routing are enabled:

```
Router(config)# ip routing
Router(config)# ipx routing
```

For more information about global configuration mode commands, enter a question mark ? at the prompt.

Step 3 Select the ATM interface to configure by entering the interface command, followed by the interface type and the slot/port number:

```
Router(config)# interface atm 1/0
Router(config-if)#
```

The prompt changes again to show that you are in interface configuration mode.

- Step 4** Enable the interface by changing the shutdown state to up:

```
Router(config-if)# no shutdown
Router(config-if)# ^z
Router#
```

- Step 5** Configure routing protocols on the interface. You enabled the interfaces as part of the global configuration in step 2. In this example, IP and IPX are configured on the atm 1/0 interface you entered in step 3:

```
Router(config-if)# ip address 192.22.74.3 255.255.255.0
Router(config-if)# ipx network B005
Router(config-if)#
```

- Step 6** Configure the signalling PVC which the signalling software needs to dynamically set up SVCs with the switch. The signalling virtual channel uses VPI 0 and VCI 5:

```
Router(config-if)# pvc 1/5 qsaal
Router(config-if-atm-vc)# exit
Router#
```

- Step 7** Configure an ILMI PVC.

```
Router(config-if)# pvc 1/16 ilmi
Router(config-if-atm-vc)# exit
Router(config-if)
```

This is required for ILMI administration.

- Step 8** Configure the ATM network service access point, the end station ID (ESI) address:

```
Router(config-vc)# atm esi-address 345678901234.12
Router(config-vc)
```

- Step 9** Map the protocol addresses to ATM NSAP addresses, as shown in the following example:

```
Router(config-if-atm-vc)# protocol ip 192.22.1.2
AB.CDEF.01.234567.890A.BCDE.F012.3456.7890.1234.12 br
Router(config-if-atm-vc)# protocol ip 192.22.1.3
CD.EFAB.01.234567.890A.BCDE.F012.3456.7890.1234.12 br
Router(config-if-atm-vc)# exit
Router(config-if)#
```

- Step 10** Configure the entire path from source to destination for a SVC, manually as well as any switches in the path. The command that creates a SVC has the format **svc [vc-id] nsap 47.0091.81.000000.0040.0B0A.2501.ABC1.3333.3333.05**, as follows:

```
Router(config-if)# svc 1 32.0081.21.000000.0030.0B0A.2501ABC1.2323.2323.02
Router(config-if-atm-vc)#
```

- Step 11** To configure another interface, repeat Steps 3 through 10 of this procedure.

- Step 12** When you finish configuring interfaces, exit configuration mode and return to the enable prompt by pressing **Ctrl-Z**. To see the current operating configuration, including any changes you just made, enter the **show atm vc** command:

```
Router# show atm vc
```

VCD /							Peak	Avg/Min	Burst		
Interface	Name	VPI	VCI	Type	Encaps	SC	Kbps	Kbps	Cells	Sts	
2/0	5	0	5	SVC	SAAL	UBR	155000			UP	
2/0	6	0	16	SVC	ILMI	UBR	155000			UP	
2/0.2	1	1	100	SVC	SNAP	UBR+	50000	0		UP	
2/0.3	2	1	101	SVC	SNAP	ABR	10000	0		UP	
2/0.4	3	1	102	SVC	SNAP	CBR	16000			UP	

```
Router#
```

- Step 13** To see the configuration currently stored in NVRAM, enter the **show startup-config** command at the enable prompt:
- Step 14** Changes to your configuration are evident when you compare the results of the **show running-config** and the **show startup-config** commands before you write your new configuration to NVRAM. To write your changes to NVRAM, making the changes permanent, enter the **copy running-config startup-config** command at the enable prompt:

Checking the Configuration

After you have finished configuring the new ATM interface, perform the following tests to verify that the new interface is operating correctly:

- Display the router hardware configuration with the **show version** command. Check that the list includes the new interface.
- Display all network modules and their interfaces with the **show controllers** command.
- Specify an interface with the **show interfaces [type slot/port]** command and verify that the first line of the display shows the interface with the correct slot and port number, and that the interface and line protocol are in the correct state (up or down).
- Display the protocols configured for the entire router and for individual interfaces with the **show protocols** command. If necessary, return to configuration mode to add or remove protocol routing on the router or its interfaces.
- Display the running configuration with the **show running-config** command; display the configuration stored in NVRAM by using the **show startup-config** command.
- Use the **ping** command to send an echo request to a specified IP address. Each returned signal is displayed as an exclamation point (!) on the console; each signal that is not returned before the timeout is displayed as a period (.). A series of exclamation points (!!!!) indicates a good connection; a series of periods (.....) or the message "timed out" or "failed" indicate that the connection failed.

If an interface is down and you configured it as up, or if the displays indicate that the hardware is not functioning properly, make sure that the new interface is properly connected and configured. If you still have problems, refer to the next section, "Cisco Connection Online."

Command Reference

This section documents new and modified commands. All other commands used with this feature are documented in the Cisco IOS Release 12.0(3) Command References.

Table 3 Support for ATM related CLI commands

ATM Commands	Support Provided	Description
abr	Supported.	Enter Available Bit Rate (pcr)(mcr).
abr rate	Supported.	Enter Available Bit Rate (pcr)(mcr)
abr rate-factors	Not supported for this release.	Set abr rat-factors.
atm max-vc	Not supported for this release.	Maximum value is 1024.
atm aal aal3/4	Not supported for this release.	Only aal5 is supported.
atm address-registration	Supported.	Address Registration with ILMI.
atm arp-server	Supported.	Configure IP ARP Server or set TTL values in ARP Table.
atm classic-ip-extensions	Supported.	Specify the type of Classic IP extensions (to support simple redundant ARP server or none).
atm clock	Supported.	ATM TX clock source (network or internal).
atm esi-address	Supported.	7-octet ATM ESI (End Station ID) used with ILMI.
atm exception-queue	Not supported for this release.	Number of atm events, such as CRC errors, which can be queued.
atm idle-timeout	Supported.	Set idle time before disconnecting an SVC.
atm ilmi-keepalive	Supported.	Enable ILMI keepalive.
atm multicast	Not supported for this release.	No support is provided for AAL3/4 and SMDS.
atm mid-per-vc	Not supported for this release.	Message identifiers per VC. Used in AAL3/4 encapsulation.
atm multipoint-interval	Supported.	Set minimum interval between multipoint party additions.
atm multipoint-signalling	Supported.	Multipoint signalling.
atm nsap-address	Supported.	20-octet ATM NSAP address.
atm pvc	Supported.	Create a PVC. Configure a PVC. aal34smds encapsulation, midlow, midhigh are not supported.
atm rate-queue	Not supported for this release.	ATM Rate Queue is not supported as the hardware does not use rate queues for traffic shaping.
atm rawq-size	Not supported for this release.	Raw queue is used for OAM and ILMI cells.
atm rxbuff	Not supported for this release.	Configure number of reassembly buffers.
atm sig-traffic-shaping	Not supported for this release.	Traffic shaping must match signaled traffic.
smds-address	Not supported for this release.	E.164 ATM SMDS address.
atm txbuff	Not supported for this release.	Configure number of segmentation buffers for AIP.

Table 3 Support for ATM related CLI commands

ATM Commands	Support Provided	Description
atm vc-per-vp	not supported for this release	Configure size of VCI table. 16 VPIs and a max of 1024 connections are allowed.
atm vp-filter	Not supported for this release.	Specify AIP's filter register value to designate which VPIs are used for AAL3/4.
atm sonet	Supported.	Select STS-3C or STM-1 (for Oc3 uplink only).
atm uni-version	Supported.	Used when ILMI is not enabled or unsuccessfully configured.
atmsig close	Supported.	Disconnect the SVC associated with the given VCD number. If the VCD number is -1, then close all SVCs.
broadcast	Supported.	Provide for a pseudo-broadcast.
class	Supported.	ATM vc-class name to use on this VC.
class-vc	Supported.	ATM vc-class name to use on this VC.
debug atm	Supported.	Display debug output for ATM traffic.
encapsulation	Supported.	Specify ATM Encapsulation for VC.
inarp	Supported.	Send OAM cells on this PVC.
idle-timeout	Supported.	Establish timeout after value is set.
ilmi manage	Supported.	Enable/disable ILMI management.
map-list	Supported.	Specify the map list to which the subsequent map-list configuration commands apply.
map-group	Supported.	To associate an ATM interface with a map-list.
oam-pvc	Supported.	Send oam cells on this pvc.
oam-svc	Supported.	Display the SVC.
oam retry	Supported.	Configure OAM retry parameter.
protocol	Supported.	Map an upper layer protocol to this connection.
pvc <name> <vpi/vci>	Supported.	To specify a PVC.
show atm interface	Supported.	Displas interface-specific information.
show atm traffic	Supported.	ATM packet/OAM statistics.
show atm vc	Supported.	Display all VC related statistics.
show atm map	Supported.	Display data about all configured ATM static maps.
show controller atm	Supported.	Displays all controller related information.
show atm pvc	Supported.	Show ATM PVC information.
show atm svc	Supported.	Show ATM SVC information.
svc <name> nsap	Supported.	To specify a SVC.
ubr	Supported.	Enter unspecified peak cell rate (pcr) in Kbps.
ubr+	Supported.	Enter peak cell rate(pcr) minimum cell rate(mcr) in Kbps.
vbr-nrt	Supported.	Enter variable bit rate (pcr) (scr) (bcs).
vc-class	Supported.	Display the VC class.

atm oversubscribe

To manage bandwidth for service categories other than constant bit rate (CBR), enable the **atm oversubscribe** command on a per-ATM-interface basis. To disable bandwidth management, use the no form of the command.

atm oversubscribe
[no] atm oversubscribe

Syntax Description

There are no optional keywords for this command.

Default

The default is to allow as much bandwidth as possible with no upper limits. The no form of the **atm oversubscribe** command enables bandwidth management on any ATM interface you specify.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 12.0(3)T for the Cisco 3600 series routers.

When you type the enabling command (the no version), a check determines if the ATM link is already oversubscribed. If so, the command is rejected. Otherwise, the total bandwidth available on the link is recorded and all future connection setup requests are monitored to ensure that the link is not oversubscribed.

The bandwidth allocated for each service category is displayed in the output of the **show atm interface atm** command.

The ATM bandwidth manager keeps track of bandwidth used by VCs on a per-interface basis. Because many services require guaranteed bandwidth (for VBR-RT, ABR, CBR, for instance), bandwidth management is required. The purpose of the bandwidth manager is to reserve resources for connections that require guaranteed services. Bandwidth management for CBR is turned on automatically for all interfaces supporting CBR. Bandwidth management for other service categories must be turned on by the user. All service categories outside CBR is monitored only if specifically requested.

Note Since UBR does not provide any guarantees, bandwidth specified for aUBR connection is not used in any calculations.

In all cases, bandwidth check for a PVC is done when the PVC is configured. Bandwidth check for a SVC is done when a signaling call is placed or received.

When you specify the **atm pvp** command, the system checks if the specified bandwidth is available on the interface. If the bandwidth available is greater than or equal to the peak rate specified for the PVP, the command is accepted, otherwise the command is rejected.

Within the VC mode the steps taken to check for bandwidth available are to ascertain if the bandwidth is already used by the VC to fulfill the request. If the VC being configured is a PVC and belongs to a PVP, the bandwidth available on the PVP is used for the check; otherwise the bandwidth available on the interface is used for the check.

When configuring services within a VC class, the steps taken are to check if the new bandwidth requirement can be fulfilled for all VCs using the class (on a per-interface basis), by comparing with the bandwidth available on the corresponding interface.

Bandwidth checking for an SVC occurs before a SETUP message is sent for an outbound call. If the bandwidth check fails, the SETUP message is not sent. If the bandwidth check passes, the traffic class from which the service category is inherited, is updated with the requirements for the new SVC.

When a SVC setup is requested for remotely initiated calls, a bandwidth check occurs as soon as the SETUP message is received. This bandwidth check has two components:

- 1 Match the bandwidth requested by the remote end with the bandwidth configured locally
- 2 Check if bandwidth configured locally can be satisfied currently

If the bandwidth check fails, a RELEASE message is sent out and the call is rejected. If the bandwidth check passes, resources are reserved for the VC and the call is accepted.

Example

The following example displays the available bandwidth after you enter VC mode. Notice that the bandwidth is specified in Kbits per second.

```
Router# show atm interface atm 2/0
Interface ATM2/0:
AAL enabled: AAL5 , Maximum VCs:1024, Current VCCs:5

Maximum Transmit Channels:64
Max. Datagram Size:4496
PLIM Type:SONET - 155Mbps, TX clocking:LINE
Cell-payload scrambling:OFF
sts-stream scrambling:ON
877 input, 120843834 output, 0 IN fast, 20 OUT fast
ABR parameters, rif:16 rdf:16, 0 out drop
Bandwidth distribution :CBR :16000 Avail bw = 139000
Config. is ACTIVE

Router#
```

Notice that the bandwidth is specified as (139000) Kbits/second.

What to Do Next

For additional software configuration information, see the following publications:

- *Dial Solutions Configuration Guide (Cisco IOS Release 12.0)*
- *Cisco 3600 Series Hardware Installation Guide*
- *Cisco 3620 Router Installation and Configuration Guide*
- *Cisco 3640 Router Installation and Configuration Guide*
- *Cisco AS5200 Universal Access Server Software Configuration Guide*
- *Update to WAN Interface Cards Hardware Installation Guide*
- *Cisco 3600 Series Configuration Notes*

For additional configuration information, click on the Cisco Release 12.0 Wide Area Networking Configuration and Command References:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/12cgcr/wan_r/index.htm