



Loopback Mode Detection Through OAM

The Loopback Mode Detection Through OAM feature allows you to enable automatic detection of when a peer ATM interface is in loopback mode. When loopback is detected on an interface where end-to-end F5 Operation, Administration, and Maintenance (OAM) is enabled, the impacted permanent virtual circuit (PVC) is moved to a DOWN state, and traffic is suspended. When the loopback condition in the peer ATM interface is removed, the PVC is moved back to an UP state.

Feature History for the Loopback Mode Detection Through OAM Feature

Release	Modification
12.0(30)S	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 Loopback Mode Detection Through OAM, page 2](#)
- [Restrictions for Loopback Mode Detection Through OAM, page 2](#)
- [Information About Loopback Mode Detection Through OAM, page 2](#)
- [How to Enable Loopback Mode Detection Through OAM, page 2](#)
- [Configuration Examples for Loopback Mode Detection Through OAM, page 6](#)
- [Additional References, page 6](#)
- [Command Reference, page 7](#)



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Prerequisites for Loopback Mode Detection Through OAM

- The tasks in this document assume that you know how to manage ATM PVCs using OAM.

Restrictions for Loopback Mode Detection Through OAM

- The Loopback Mode Detection Through OAM feature applies only to ATM PVCs.
- The Loopback Mode Detection Through OAM feature is supported on only the Cisco 10000 series routers and on the Cisco 7200 series routers.

Information About Loopback Mode Detection Through OAM

To enable loopback mode detection through OAM, you should understand the following concepts:

- [How Loopback Mode Detection Through OAM Works, page 2](#)
- [Benefits of Loopback Mode Detection Through OAM, page 2](#)

How Loopback Mode Detection Through OAM Works

When a PVC traverses an ATM cloud and OAM is enabled, the router sends a loopback cell to the other end and waits for a response to determine whether the circuit is up. If an intervening router within the ATM cloud is in loopback mode, however, the router considers the circuit to be up, when in fact the other end is not reachable.

When enabled, the Loopback Mode Detection Through OAM feature detects when an intervening router is in loopback mode, in which case it sets the OAM state to NOT_VERIFIED. This prevents traffic from being routed on the PVC for as long as any intervening router is detected as being in loopback mode.

Benefits of Loopback Mode Detection Through OAM

Loopback mode detection through OAM prevents traffic from being routed on an ATM PVC when an intermediary router is in loopback mode.

How to Enable Loopback Mode Detection Through OAM

This section contains the following procedures:

- [Enabling Loopback Mode Detection Through OAM, page 2](#)

Enabling Loopback Mode Detection Through OAM

To enable loopback mode detection on an ATM interface, perform the steps in this section.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface atm** *interface-number*
4. **pvc** *vpi/vci*
5. **oam-pvc-manage loop-detection**
6. **show atm pvc** *vpi/vci*

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> Example: Router(config)# interface ATM1/0	Configures an interface type and enters interface configuration mode.
Step 4	pvc <i>vpi/vci</i> Example: Router(config-if)# pvc 4/100	Creates an ATM PVC. <ul style="list-style-type: none"> • The <i>vpi</i> argument specifies the ATM network virtual path identifier (VPI) for this PVC. The absence of the slash (/) and a VPI value causes the VPI value to default to 0. The value range is 0 to 255. • The <i>vci</i> argument specifies the ATM network virtual channel identifier (VCI) for this PVC. This value ranges from 0 to 1 less than the maximum value set for this interface by the atm vc-per-vp command. Typically, lower values from 0 to 31 are reserved for specific traffic (for example, F4 OAM, SVC signaling, ILMI, and so on) and should not be used. The VCI is a 16-bit field in the header of the ATM cell. The VCI value is unique only on a single link, not throughout the ATM network, because it has only local significance. • The arguments <i>vpi</i> and <i>vci</i> cannot both be set to 0; if one is 0, the other cannot be 0.

	Command or Action	Purpose
Step 5	<p>oam-pvc-manage [<i>frequency</i>] loop-detection</p> <p>Example: Router(config-if-atm-vc)# oam-pvc-manage loop-detection</p>	<p>Enables automatic loop detection on the specified interface.</p> <ul style="list-style-type: none"> The <i>frequency</i> argument specifies the time delay between transmissions of OAM loopback cells. The range of values is from 0 to 600 seconds. The default is 10 seconds.
Step 6	<p>show atm pvc <i>vpi/vci</i></p> <p>Example: Router(config-if-atm-vc)# show atm pvc 4/100</p>	<p>(Optional) Displays ATM PVC status.</p> <ul style="list-style-type: none"> When the Loopback Mode Detection Through OAM feature is enabled, the OAM Loopback status field reads “Enabled.” For sample output from the show atm pvc command, refer to the “Examples” section on page 5.

Examples

In the following example, the **show atm pvc** command in privileged EXEC mode is used to verify that loopback detection mode has been enabled the ATM PVC 4/100.

```
Router# show atm pvc 4/100

ATM1/0: VCD: 4, VPI: 4, VCI: 100
UBR, PeakRate: 149760
AAL5-LLC/SNAP, etype:0x0, Flags: 0xC20, VCmode: 0x0
!
OAM frequency: 10 second(s), OAM retry frequency: 1 second(s)
OAM up retry count: 3, OAM down retry count: 5
OAM Loopback status: OAM Received
OAM VC state: Verified
OAM Loop detection: Enabled ! Indicates that loopback mode detection is enabled.
!
ILMI VC state: Not Managed
VC is managed by OAM.
InARP frequency: 15 minutes(s)
Transmit priority 4
InPkts: 0, OutPkts: 0, InBytes: 0, OutBytes: 0
InPRoc: 0, OutPRoc: 0, Broadcasts: 0
InFast: 0, OutFast: 0, InAS: 0, OutAS: 0
InPktDrops: 0, OutPktDrops: 0
CrcErrors: 0, SarTimeOuts: 0, OverSizedSDUs: 0
Out CLP=1 Pkts: 0
OAM cells received: 27
F5 InEndloop: 27, F5 InSegloop: 0, F5 InAIS: 0, F5 InRDI: 0
OAM cells sent: 27
F5 OutEndloop: 27, F5 OutSegloop: 0, F5 OutAIS: 0, F5 OutRDI: 0
OAM cell drops: 3
Status: UP
```

In the following example, the **show atm pvc** command in privileged EXEC mode is used to verify that loopback mode has been detected on the ATM PVC 4/100.

```
Router# show atm pvc 4/100

ATM1/0: VCD: 4, VPI: 4, VCI: 100
UBR, PeakRate: 149760
AAL5-LLC/SNAP, etype:0x0, Flags: 0xC20, VCmode: 0x0
!
OAM frequency: 10 second(s), OAM retry frequency: 1 second(s)
OAM up retry count: 3, OAM down retry count: 5
OAM Loopback status: OAM Sent
OAM VC state: Not Verified
OAM Loop detection: Enabled, Detected ! Indicates that loopback mode has been detected on
this interface.
!
ILMI VC state: Not Managed
VC is managed by OAM.
InARP frequency: 15 minutes(s)
Transmit priority 4
InPkts: 0, OutPkts: 0, InBytes: 0, OutBytes: 0
InPRoc: 0, OutPRoc: 0, Broadcasts: 0
InFast: 0, OutFast: 0, InAS: 0, OutAS: 0
InPktDrops: 0, OutPktDrops: 0
CrcErrors: 0, SarTimeOuts: 0, OverSizedSDUs: 0
Out CLP=1 Pkts: 0
OAM cells received: 20
F5 InEndloop: 20, F5 InSegloop: 0, F5 InAIS: 0, F5 InRDI: 0
OAM cells sent: 20
```

```
F5 OutEndloop: 20, F5 OutSegloop: 0, F5 OutAIS: 0, F5 OutRDI: 0
OAM cell drops: 1
Status: DOWN, State: NOT_VERIFIED
```

Configuration Examples for Loopback Mode Detection Through OAM

This section provides the following configuration example:

- [Enabling Loopback Mode Detection Through OAM: Example, page 6](#)

Enabling Loopback Mode Detection Through OAM: Example

The following example shows how to create an ATM PVC and enable loopback mode detection through OAM:

```
interface ATM1/0
 pvc 4/100
 oam-pvc manage loop-detection
```

Additional References

The following sections provide references related to loopback mode detection through OAM.

Related Documents

Related Topic	Document Title
Configuring ATM, PVCs, and VC management through OAM	“Configuring ATM” chapter in the <i>Cisco IOS Wide-Area Networking Configuration Guide</i> , Release 12.2
OAM and PVC commands: complete command syntax, command mode, command history, defaults, usage guidelines, and examples	<i>Cisco IOS Wide-Area Networking Command Reference</i> , Release 12.3

Standards

Standards	Title
No new or modified standards are supported by this feature.	—

MIBs

MIBs	MIBs Link
No new or modified MIBs are supported 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
Technical Assistance Center (TAC) home page, containing 30,000 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/public/support/tac/home.shtml

Command Reference

This section documents new and modified commands only.

- [oam-pvc](#)
- [show atm pvc](#)

oam-pvc

To enable end-to-end F5 Operation, Administration, and Maintenance (OAM) loopback cell generation and OAM management for an ATM permanent virtual circuit (PVC), virtual circuit (VC) class, or label-controlled ATM (LC-ATM) VC, use the **oam-pvc** command in the appropriate command mode. To disable generation of OAM loopback cells and OAM management, use the **no** form of this command.

ATM VC or VC Class

oam-pvc [**manage**] [*frequency*]

no oam-pvc [**manage**]

LC-ATM VC

oam-pvc manage [*frequency*]

no oam-pvc manage

Loopback Mode Detection

oam-pvc manage [*frequency*] **loop-detection**

no oam-pvc manage loop-detection

Syntax Description		
manage	(Optional for ATM VCs or VC classes; required for LC-ATM VCs) Enables OAM management. The default is disabled.	
<i>frequency</i>	(Optional) Time delay between transmitting OAM loopback cells. For ATM VCs or VC classes and loopback mode detection, the range of values is from 0 to 600 seconds. The default is 10 seconds. For LC-ATM VCs, the range of values is from 0 to 255 seconds. The default is 5 seconds.	
loop-detection	Enables automatic detection of whether the physically connected ATM switch is in loopback mode. The default is disabled.	

Command Default Disabled.

Command Modes Interface-ATM-VC configuration (for an ATM PVC or Loopback Mode Detection)
 VC-class configuration (for a VC class)
 PVC-in-range configuration (for an individual PVC within a PVC range)
 Control-VC configuration (for enabling OAM management on an LC-ATM VC)

Command History

Release	Modification
11.3	This command was introduced.
12.1(5)T	This command was implemented in PVC-in-range configuration mode.
12.3(2)T	This command was implemented for LC-ATM VCs.
12.0(30)S	The loop-detection keyword was added.

Usage Guidelines

If OAM management is enabled, further control of OAM management is configured using the **oam retry** command.

ATM VCS or VC Classes

If the **oam-pvc** command is not explicitly configured on an ATM PVC, the PVC inherits the following default configuration (listed in order of precedence):

- Configuration of the **oam-pvc** command in a VC class assigned to the PVC itself.
- Configuration of the **oam-pvc** command in a VC class assigned to the PVC's ATM subinterface.
- Configuration of the **oam-pvc** command in a VC class assigned to the PVC's ATM main interface.
- Global default: End-to-end F5 OAM loopback cell generation and OAM management are disabled, but if OAM cells are received, they are looped back. The default value for the *frequency* argument is 10 seconds.

Loopback Mode Detection

When a PVC traverses an ATM cloud and OAM is enabled, the router sends a loopback cell to the other end and waits for a response to determine whether the circuit is up. If an intervening router within the ATM cloud is in loopback mode, however, the router considers the circuit to be up, when in fact the other end is not reachable.

When enabled, the Loopback Mode Detection Through OAM feature detects when an intervening router is in loopback mode, in which case it sets the OAM state to NOT_VERIFIED. This prevents traffic from being routed on the PVC FOR AS LONG AS ANY intervening router is detected as being in loopback mode.

Examples

The following example shows how to enable end-to-end F5 OAM loopback cell transmission and OAM management on an ATM PVC with a transmission frequency of 3 seconds:

```
Router(cfg-mpls-atm-cvc)# oam-pvc manage 3
```

The following example shows how to enable end-to-end F5 OAM loopback cell transmission and OAM management on an LC-ATM interface with a transmission frequency of 2 seconds:

```
Router(config)# interface Switch1.10 mpls
Router(config-subif)# ip unnumbered Loopback0
Router(config-subif)# mpls atm control-vc 0 32
Router(cfg-mpls-atm-cvc)# oam-pvc manage 2
```

The following example shows how to create a PVC and enable loopback detection:

```
Router(config)# interface ATM1/0
Router(config-if)# pvc 4/100
Router(config-if-atm-vc)# oam-pvc manage loop-detection
```

Related Commands

Command	Description
ilmi manage	Enables ILMI management on an ATM PVC.
oam retry	Configures parameters related to OAM management for an ATM PVC, SVC, VC class, or LC-ATM VC.
show atm pvc	Displays all ATM PVCs and traffic information.

show atm pvc

To display all ATM permanent virtual connections (PVCs) and traffic information, use the **show atm pvc** command in privileged EXEC mode.

```
show atm pvc [vpi/vci | name | interface atm interface-number [.subinterface-number multipoint]]
                [ppp]
```

Syntax Description

<i>vpi/vci</i>	(Optional) ATM virtual path identifier (VPI) and virtual channel identifier (VCI) numbers. The absence of the slash character (/) and a <i>vpi</i> value causes the <i>vpi</i> value to default to 0.
<i>name</i>	(Optional) Name of the PVC.
interface atm <i>interface-number</i>	(Optional) Displays all PVCs on the specified ATM interface. To determine the appropriate form of the <i>interface-number</i> argument, consult your ATM network module, port adapter, or router documentation.
<i>.subinterface-number</i>	(Optional) Subinterface number in the range from 1 to 4294967293. The dot (.) is required as a separator between <i>interface-number</i> and <i>subinterface-number</i> .
multipoint	(Optional) Multipoint subinterface.
ppp	(Optional) Displays each PVC configured for PPP over ATM.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3T	This command was introduced.
12.1(1)T	This command was modified to display PPPoE status.
12.2(4)T	This command was modified to display only PVCs that are attached to a virtual access interface. Before this modification, all PVCs that were configured with PPPoA or PPPoE were displayed.
12.0(23)S	This command was modified to display OAM cell emulation status for Any Transport over MPLS (AToM).
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
12.3(7)T	This command was modified to display information about multilink PPP over ATM link fragmentation and interleaving for ATM PVCs.
12.0(30)S	This command was modified to display information about OAM loopback detection.

Usage Guidelines

If the *vpi/vci* or *name* argument is not specified, the output of this command is the same as that of the **show atm vc** command, but only the configured PVCs are displayed.

If the *vpi/vci* or *name* argument is specified, the output of this command is the same as that of the **show atm vc vcd** command, with extra information related to PVC management, including connection name, detailed states, and Operation, Administration, and Maintenance (OAM) counters.

If the **interface atm interface-number** option is included in the command, all PVCs under that interface or subinterface are displayed.

Examples

The following is sample output from the **show atm pvc** command. The output is the same as that of the **show atm vc** command, but only the configured PVCs are displayed.

```
Router# show atm pvc
```

Interface	VCD/ Name	VPI	VCI	Type	Encaps	Peak Kbps	Avg/Min Kbps	Burst Cells	Sts
2/0	1	0	5	PVC	SAAL	155000	155000		UP
2/0	2	0	16	PVC	ILMI	155000	155000		UP
2/0.2	101	0	50	PVC	SNAP	155000	155000		UP
2/0.2	102	0	60	PVC	SNAP	155000	155000		DOWN
2/0.2	104	0	80	PVC	SNAP	155000	155000		UP
2/0	hello	0	99	PVC	SNAP	1000			UP

The following is sample output from the **show atm pvc** command with the *vpi/vci* argument specified:

```
Router# show atm pvc 0/41
```

```
ATM2/0: VCD: 3, VPI: 0, VCI: 41
UBR, PeakRate: 155000
AAL5-LLC/SNAP, etype:0x0, Flags: 0xC20, VCmode: 0x0
OAM frequency: 0 second(s), OAM retry frequency: 1 second(s), OAM retry frequency: 1
second(s)
OAM up retry count: 3, OAM down retry count: 5
OAM Loopback status: OAM Disabled
OAM VC state: Not Managed
OAM Loop detection: Disabled
ILMI VC state: Not Managed
InARP frequency: 15 minutes(s)
InPkts: 31759, OutPkts: 26497, InBytes: 2356434, OutBytes: 1589743
InPRoc: 15785, OutPRoc: 26472, Broadcasts: 0
InFast: 20, OutFast: 20, InAS: 15954, OutAS: 6
OAM cells received: 0
F5 InEndloop: 0, F5 InSegloop: 0, F5 InAIS: 0, F5 InRDI: 0
F4 InEndloop: 0, F4 InSegloop: 0, F4 InAIS: 0, F4 InRDI: 0
OAM cells sent: 0
F5 OutEndloop: 0, F5 OutSegloop: 0, F5 OutRDI: 0
F4 OutEndloop: 0, F4 OutSegloop: 0, F4 OutRDI: 0
OAM cell drops: 0
Status: UP
PPPOE enabled.
```

The following sample output from the **show atm pvc** command displays OAM cell emulation statistics, which are marked in this example by exclamation points:

```
Router# show atm pvc 5/500
```

```
ATM4/1/0.200: VCD: 6, VPI: 5, VCI: 500
UBR, PeakRate: 1
AAL5-LLC/SNAP, etype:0x0, Flags: 0x34000C20, VCmode: 0x0
OAM Cell Emulation: enabled, F5 End2end AIS Xmit frequency: 1 second(s) !!!
OAM frequency: 0 second(s), OAM retry frequency: 1 second(s)
OAM up retry count: 3, OAM down retry count: 5
OAM Loopback status: OAM Disabled
OAM VC state: Not ManagedVerified
```

```

OAM Loop detection: Disabled
ILMI VC state: Not Managed
InPkts: 564, OutPkts: 560, InBytes: 19792, OutBytes: 19680
InPRoc: 0, OutPRoc: 0
InFast: 4, OutFast: 0, InAS: 560, OutAS: 560
InPktDrops: 0, OutPktDrops: 0
CrcErrors: 0, SarTimeOuts: 0, OverSizedSDUs: 0
Out CLP=1 Pkts: 0
OAM cells received: 26
F5 InEndloop: 0, F5 InSegloop: 0, F5 InAIS: 0, F5 InRDI: 26
OAM cells sent: 77
F5 OutEndloop: 0, F5 OutSegloop: 0, F5 OutAIS: 77, F5 OutRDI: 0 !!!
OAM cell drops: 0
Status: UP

```

The following is sample output from the **show atm pvc** command with the ATM subinterface specified:

```
Router# show atm pvc interface atm 2/0.2
```

Interface	VCD/ Name	VPI	VCI	Type	Encaps	Peak Kbps	Avg/Min Kbps	Burst Cells	Sts
2/0.2	101	0	50	PVC	SNAP	155000	155000		UP
2/0.2	102	0	60	PVC	SNAP	155000	155000		DOWN
2/0.2	104	0	80	PVC	SNAP	155000	155000		UP

The following is sample output for the **show atm pvc** command for a PVC that is a member of a multilink PPP bundle:

```
Router# show atm pvc 15/200
```

```

ATM4/0.10000:VCD:16, VPI:15, VCI:200
UBR, PeakRate:149760 (353208 cps)
AAL5-LLC/SNAP, etype:0x0, Flags:0xC20, VCmode:0x0, Encapsiz:12
OAM frequency:0 second(s), OAM retry frequency:1 second(s)
OAM up retry count:3, OAM down retry count:5
OAM Loopback status:OAM Disabled
OAM VC State:Not Managed
OAM Loop detection: Disabled
ILMI VC status:Not Managed
VC TxRingLimit:40 particles
VC Rx Limit:800 particles
InARP frequency:15 minutes(s)
Transmit priority 6
InPkts:347, OutPkts:399, InBytes:6268, OutBytes:7728
InCells:347, OutCells:399
InPRoc:7, OutPRoc:228
InFast:338, OutFast:169, 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, CPICErrors:0
Out CLP=1 Pkts:0, Cells:0
OAM cells received:0
F5 InEndloop:0, F5 InSegloop:0, F5 InAIS:0, F5 InRDI:0
F4 InEndloop:0, F4 InSegloop:0, F4 InAIS:0, F4 InRDI:0
OAM cells sent:0
F5 OutEndloop:0, F5 OutSegloop:0, F5 OutRDI:0
F4 OutEndloop:0, F4 OutSegloop:0, F4 OutRDI:0
OAM cell drops:0
Status:UP
PPP:Virtual-Access3 from Virtual-Templatel
PPPoA Current State = LOCALLY_TERMINATED
PPPoA Latest Event = Vaccess Up

```

```

PPPoA Latest Error = None
PPPoA Session ID = 7
PPPoA Handle = 0x4D000006, SSS Handle = 0x00000000
Switch Handle = 0xB5000006, PPP Handle = 0xD700000A
AAA Unique ID = 0x00000007, AIE Handle = 0xE7000006
PVC belongs to Multilink PPP Bundle Virtual-Access4 as a PPPoA member link
Packets in VC Holdq:0 , Particles in VC Tx Ring:0

```

The following is sample output from the **show atm pvc** command with loopback detection mode through OAM enabled:

```

Router# show atm pvc 4/100

ATM1/0: VCD: 4, VPI: 4, VCI: 100
UBR, PeakRate: 149760
AAL5-LLC/SNAP, etype:0x0, Flags: 0xC20, VCmode: 0x0
!
OAM frequency: 10 second(s), OAM retry frequency: 1 second(s)
OAM up retry count: 3, OAM down retry count: 5
OAM Loopback status: OAM Received
OAM VC state: Verified
OAM Loop detection: Enabled ! Indicates that loopback mode detection is enabled.
!
ILMI VC state: Not Managed
VC is managed by OAM.
InARP frequency: 15 minutes(s)
Transmit priority 4
InPkts: 0, OutPkts: 0, InBytes: 0, OutBytes: 0
InPRoc: 0, OutPRoc: 0, Broadcasts: 0
InFast: 0, OutFast: 0, InAS: 0, OutAS: 0
InPktDrops: 0, OutPktDrops: 0
CrcErrors: 0, SarTimeOuts: 0, OverSizedSDUs: 0
Out CLP=1 Pkts: 0
OAM cells received: 27
F5 InEndloop: 27, F5 InSegloop: 0, F5 InAIS: 0, F5 InRDI: 0
OAM cells sent: 27
F5 OutEndloop: 27, F5 OutSegloop: 0, F5 OutAIS: 0, F5 OutRDI: 0
OAM cell drops: 3
Status: UP

```

The following is sample output from the **show atm pvc** command when loopback mode has been detected:

```

Router# show atm pvc 4/100

ATM1/0: VCD: 4, VPI: 4, VCI: 100
UBR, PeakRate: 149760
AAL5-LLC/SNAP, etype:0x0, Flags: 0xC20, VCmode: 0x0
!
OAM frequency: 10 second(s), OAM retry frequency: 1 second(s)
OAM up retry count: 3, OAM down retry count: 5
OAM Loopback status: OAM Sent
OAM VC state: Not Verified
OAM Loop detection: Enabled, Detected ! Indicates that loopback mode has been detected on
this interface.
!
ILMI VC state: Not Managed
VC is managed by OAM.
InARP frequency: 15 minutes(s)
Transmit priority 4
InPkts: 0, OutPkts: 0, InBytes: 0, OutBytes: 0
InPRoc: 0, OutPRoc: 0, Broadcasts: 0
InFast: 0, OutFast: 0, InAS: 0, OutAS: 0
InPktDrops: 0, OutPktDrops: 0

```

```

CrcErrors: 0, SarTimeOuts: 0, OverSizedSDUs: 0
Out CLP=1 Pkts: 0
OAM cells received: 20
F5 InEndloop: 20, F5 InSegloop: 0, F5 InAIS: 0, F5 InRDI: 0
OAM cells sent: 20
F5 OutEndloop: 20, F5 OutSegloop: 0, F5 OutAIS: 0, F5 OutRDI: 0
OAM cell drops: 1
Status: DOWN, State: NOT_VERIFIED

```

Table 1 describes significant fields shown in the displays.

Table 1 *show atm pvc Field Descriptions*

Field	Description
Interface	Interface and subinterface slot and port.
VCD/Name	Virtual connection descriptor (virtual connection number). The connection name is displayed if a name for the VC was configured using the pvc command.
VPI	Virtual path identifier.
VCI	Virtual channel identifier.
Type	Type of PVC detected from PVC discovery, either PVC-D, PVC-L, or PVC-M: <ul style="list-style-type: none"> PVC-D—PVC created as a result of PVC discovery. PVC-L—The corresponding peer of this PVC could not be found on the switch. PVC-M—Some or all of the QoS¹ parameters of this PVC fail to match those of the corresponding peer on the switch.
Encaps	Type of ATM adaptation layer (AAL) and encapsulation.
Peak or PeakRate	Kilobits per second sent at the peak rate.
Avg/Min or Average Rate	Kilobits per second sent at the average rate.
Burst Cells	Maximum number of ATM cells that the VC can send at peak rate.
Sts or Status	Status of the VC connection: <ul style="list-style-type: none"> UP—The connection is enabled for data traffic. DOWN—The connection is not ready for data traffic. When the Status field is DOWN, a State field is shown. See a description of the different values for the State field later in this table. INACTIVE—The interface is down.
Connection Name	Name of the PVC.

Table 1 show atm pvc Field Descriptions (continued)

Field	Description
UBR, UBR+, or VBR-NRT	<ul style="list-style-type: none"> • UBR—Unspecified bit rate QoS is specified for this PVC. See the ubr command for further information. • UBR+—Unspecified bit rate QoS is specified for this PVC. See the ubr+ command for further information. • VBR-NRT—Variable bit rate-non-real-time QoS rates are specified for this PVC. See the vbr-nrt command for further information.
etype	Encapsulation type.
Flags	<p>Bit mask describing VC information. The flag values are summed to result in the displayed value:</p> <ul style="list-style-type: none"> • 0x40—SVC • 0x20—PVC • 0x10—ACTIVE • 0x0—AAL5-SNAP • 0x1—AAL5-NLPID • 0x2—AAL5-FRNLPID • 0x3—AAL5-MUX • 0x4—AAL3/4-SMDS • 0x5—QSAAL • 0x6—ILMI • 0x7—AAL5-LANE • 0x9—AAL5-CISCOPPP
virtual-access	Virtual-access interface identifier.
virtual-template	Virtual template identifier.
VCmode	AIP-specific or NPM-specific register describing the usage of the VC. This register contains values such as rate queue, peak rate, and AAL mode, which are also displayed in other fields.
OAM Cell emulation	The status of the OAM cell emulation functionality. It is either enabled or disabled.
F5 end2end AIS xmit frequency	Number of seconds between transmission of AIS cells.
OAM frequency	Number of seconds between transmission of OAM loopback cells.
OAM retry frequency	Frequency (in seconds) at which end-to-end F5 loopback cells should be sent when a change in state (up or down) is being verified. For example, if a PVC is up and a loopback cell response is not received after the value of the <i>frequency</i> argument (in seconds) specified using the oam-pvc command, loopback cells are sent at the value of the <i>retry-frequency</i> argument to determine whether the PVC is down.
OAM up retry count	Number of consecutive end-to-end F5 OAM loopback cell responses that must be received in order to change a PVC state to up. Does not apply to SVCs.

Table 1 *show atm pvc Field Descriptions (continued)*

Field	Description
OAM down retry count	Number of consecutive end-to-end F5 OAM loopback cell responses that are not received in order to change a PVC state to down or tear down an SVC.
OAM Loopback status	Status of end-to-end F5 OAM loopback cell generation for this VC. This field will have one of the following values: <ul style="list-style-type: none"> • OAM Disabled—End-to-end F5 OAM loopback cell generation is disabled. • OAM Sent—OAM cell was sent. • OAM Received—OAM cell was received. • OAM Failed—OAM reply was not received within the frequency period or contained a bad correlation tag.
OAM VC state	This field will have one of the following states for this VC: <ul style="list-style-type: none"> • AIS²/RDI³—The VC received AIS/RDI cells. End-to-end F5 OAM loopback cells are not sent in this state. • Down Retry—An OAM loopback failed. End-to-end F5 OAM loopback cells are sent at retry frequency to verify that the VC is really down. After down-count unsuccessful retries, the VC goes to the Not Verified state. • Not Managed—VC is not being managed by OAM. • Not Verified—VC has not been verified by end-to-end F5 OAM loopback cells. AIS and RDI conditions are cleared. • Up Retry—An OAM loopback was successful. End-to-end F5 OAM loopback cells are sent at retry frequency to verify that the VC is really up. After up-count successive and successful loopback retries, the VC goes to the Verified state. • Verified—Loopbacks are successful. AIS/RDI cell was not received.
OAM Loop detection	Status of loopback detection mode through OAM: <ul style="list-style-type: none"> • Disabled—Automatic loopback detection is disabled. • Enabled—Automatic loopback detection is enabled. • Detected—Loopback mode is detected on an ATM interface.
ILMI VC state	This field will have one of the following states for this VC: <ul style="list-style-type: none"> • Not Managed—VC is not being managed by ILMI⁴. • Not Verified—VC has not been verified by ILMI. • Verified—VC has been verified by ILMI.
VC is managed by OAM/ILMI	VC is managed by OAM or ILMI.
InARP frequency	Number of minutes for the Inverse Address Resolution Protocol (ARP) time period.
InPkts	Total number of packets received on this VC. This number includes all fast-switched and process-switched packets.
OutPkts	Total number of packets sent on this VC. This number includes all fast-switched and process-switched packets.

Table 1 *show atm pvc Field Descriptions (continued)*

Field	Description
InBytes	Total number of bytes received on this VC. This number includes all fast-switched and process-switched bytes.
OutBytes	Total number of bytes sent on this VC. This number includes all fast-switched and process-switched bytes.
InPRoc	Number of process-switched input packets.
OutPRoc	Number of process-switched output packets.
Broadcasts	Number of process-switched broadcast packets.
InFast	Number of fast-switched input packets.
OutFast	Number of fast-switched output packets.
InAS	Number of autonomous-switched or silicon-switched input packets.
OutAS	Number of autonomous-switched or silicon-switched output packets.
OAM cells received	Total number of OAM cells received on this VC.
F5 InEndloop	Number of end-to-end F5 OAM loopback cells received.
F5 InSegloop	Number of segment F5 OAM loopback cells received.
F5 InAIS	Number of F5 OAM AIS cells received.
F5 InRDI	Number of F5 OAM RDI cells received.
F4 InEndloop	Number of end-to-end F4 OAM loopback cells received.
F4 InSegloop	Number of segment F4 OAM loopback cells received.
F4 InAIS	Number of F4 OAM AIS cells received.
F4 InRDI	Number of F4 OAM RDI cells received.
OAM cells sent	Total number of OAM cells sent on this VC.
F5 OutEndloop	Number of end-to-end F5 OAM loopback cells sent.
F5 OutSegloop	Number of segment F5 OAM loopback cells sent.
F5 OutRDI	Number of F5 OAM RDI cells sent.
OAM cell drops	Number of OAM cells dropped (or flushed).

Table 1 *show atm pvc Field Descriptions (continued)*

Field	Description
PVC Discovery	<ul style="list-style-type: none"> • NOT_VERIFIED—This PVC is manually configured on the router and not yet verified with the attached adjacent switch. • WELL_KNOWN—This PVC has a VCI value of 0 through 31. • DISCOVERED—This PVC is learned from the attached adjacent switch via ILMI. • MIXED—Some of the traffic parameters for this PVC were learned from the switch via ILMI. • MATCHED—This PVC is manually configured on the router, and the local traffic-shaping parameters match the parameters learned from the switch. • MISMATCHED—This PVC is manually configured on the router, and the local traffic-shaping parameters do not match the parameters learned from the switch. • LOCAL_ONLY—This PVC is configured locally on the router and not on the remote switch.
Status	When the Status field indicates UP, the VC is established. When the Status field indicates DOWN, refer to the State field for further information about the VC state.
State	<p>When the Status field is UP, this field does not appear. When the Status field is DOWN or INACTIVE, the State field will appear with one of the following values:</p> <ul style="list-style-type: none"> • NOT_VERIFIED—The VC has been established successfully; waiting for OAM (if enabled) and ILMI (if enabled) to verify that the VC is up. • NOT_EXIST—VC has not been created. • HASHING_IN—VC has been hashed into a hash table. • ESTABLISHING—Ready to establish VC connection. • MODIFYING—VC parameters have been modified. • DELETING—VC is being deleted. • DELETED—VC has been deleted. • NOT_IN_SERVICE—ATM interface is shut down.
PPP	For PPP over ATM, indicates the virtual access interface number and virtual template number being used.
PPPoA Current State	State of the PPPoA session associated with the VC.
PPPoA Latest Event	The latest event that occurred on the PPPoA session associated with the VC.
PPPoA Latest Error	The latest error that occurred on the PPPoA session associated with the VC.
PPPoA Session ID	PPPoA session identifier of the PPPoA session associated with the VC.
PPPoA Handle	PPPoA context handle.
SSS Handle	SSS handle for PPPoA session associated with the VC.
Switch Handle	SSS handle for switch management.
PPP Handle	Handle associated with the PPP context.

Table 1 *show atm pvc Field Descriptions (continued)*

Field	Description
AAA Unique ID	Unique identifier associated with the AAA session.
AIE Handle	Access IE handle for the PPPoA session.
Packets in VC Holdq	Number of packets in the hold queue of the VC.
Particles in VC Tx Ring	Number of particles in the Tx ring of the VC.

1. QoS = quality of service
2. AIS = alarm indication signal
3. RDI = remote defect identification
4. ILMI = Interim Local Management Interface

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