



Configuring ATM PVC F5 OAM Recovery Traps

The ATM PVC F5 OAM Recovery Traps feature introduces Simple Network Management Protocol (SNMP) traps that notify the administrator when a permanent virtual circuit (PVC) has recovered from F5 Operation, Administration, and Maintenance (OAM) end-to-end loopback failures, and F5 OAM alarm indication signal/remote defect indication (AIS/RDI) failures.

The ATM PVC TRAP Enhancement for Segment and End AIS / RDI failures feature adds Segment and End AIS/RDI Failure notification (traps) to the existing ATM PVC trap infrastructure.

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Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and 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 module.

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

Prerequisites for ATM PVC F5 OAM Recovery Traps

- Extended ATM PVC up and down traps and ATM PVC traps for OAM F5 Continuity Check (CC), OAM F5 AIS/RDI, and OAM F5 loopback failures and recoveries cannot be used at the same time as legacy ATM PVC traps.
- Legacy ATM PVC traps must be disabled by using the **no snmp-server enable traps atm pvc** command before extended ATM PVC up and down traps and ATM PVC traps for OAM F5 CC, OAM F5 AIS/RDI, and OAM F5 loopback failures and recoveries can be configured. If the extended ATM PVC traps or ATM OAM F5 CC traps are enabled, you must disable them by using the **no snmp-server enable traps atm pvc extension** command before you can enable legacy ATM PVC traps.
- OAM management must be enabled on the PVC before you can use any ATM PVC traps.

Restrictions for ATM PVC F5 OAM Recovery Traps

- The F5 OAM recovery traps are supported for ATM PVCs only.
- The CISCO-ATM-PVCTRAP-EXTN-MIB is currently supported in Cisco IOS Release 12.0(27)S, Cisco IOS Release 12.2(33)SRE, Cisco IOS Release 15.0(1)M and later releases.
- The traps associated with CC are supported only on Cisco IOS 7500 series routers with PA-A3 and PA-A1 cards and Gigabit Switch Router (GSR).

Information About ATM PVC F5 OAM Recovery Traps

F5 OAM Recovery Traps for ATM PVCs

F5 OAM cells are used to detect connectivity failures and recoveries at the ATM layer. Before the introduction of this feature, Cisco IOS software provided support for SNMP traps (also called SNMP notifications) for F5 end-to-end loopback, and F5 AIS/RDI connectivity failures on a PVC. The ATM PVC F5 OAM Recovery Traps feature introduces SNMP traps that notify the network management system (NMS) when connectivity is restored to a PVC after the following types of failures:

- F5 OAM end-to-end loopback failures
- F5 OAM segment AIS/RDI failures
- F5 OAM end-to-end AIS/RDI failures

Information in the traps includes the number of PVCs that recovered and time stamps indicating when the first and last recoveries occurred during the notification interval.

To limit the amount of traffic that can be generated by the F5 OAM failure and recovery traps, only one trap of each type can be generated in each trap interval. Each trap can report on multiple PVCs, and successive PVCs that have the same failure or recovery are reported as a range.

In addition to the traps, MIB tables are maintained to provide information about the failures and recoveries on PVCs.

For a complete description of the extended ATM PVC TRAP MIB, including the supported notifications and tables, see the MIB file called CISCO-ATM-PVCTRAP-EXTN-MIB.my, available through Cisco.com at the following URL:

<http://www.cisco.com/go/mibs>

Benefits of F5 OAM Recovery Traps for ATM PVCs

Before the introduction of this feature, when F5 OAM failures were detected on PVCs, failure notifications were sent to the NMS, and the operational state of the PVC was kept up. There was no mechanism for notifying the NMS when connectivity was restored to the PVCs after F5 OAM failures. The F5 OAM Recovery Traps feature introduces traps that asynchronously notify the NMS when PVCs have recovered from F5 OAM failures.

ATM PVC Trap Enhancements for Segment and End AIS RDI Failures

ATM PVC trap support provides ATM PVC failure notification by sending a trap when a PVC on an ATM interface fails or leaves the UP operational state. F5 OAM cells are used to detect connectivity failures and recoveries at the ATM layer. The operator informs the NMS of these OAM failures using ATM PVC traps. The following ATM PVC Traps are supported:

- ATM PVC DOWN TRAP
- ATM PVC F5 Loop back failure TRAP
- ATM PVC F5 Segment CC failure TRAP
- ATM PVC F5 End-to-End CC failure TRAP
- ATM PVC F5 AIS/RDI failure TRAP

When connectivity is restored, the PVC state is brought UP for allowing data transfer to take place over the PVC. This connectivity restoration uses the OAM cells. The following recovery traps are used to inform the NMS about the restoration of connectivity:

- ATM PVC UP TRAP
- ATM PVC F5 Loop back recovery TRAP
- ATM PVC F5 Segment CC recovery TRAP
- ATM PVC F5 End-to-End CC recovery TRAP
- ATM PVC F5 AIS/RDI recovery TRAP

To limit the amount of traffic that can be generated by the F5 OAM failure and recovery traps, only one trap of each type can be generated in each trap interval. Each trap can report on multiple PVCs, and successive PVCs that have the same failure or recovery are reported as a range.

The ATM PVC Trap Enhancements for Segment and End AIS/RDI failures feature addresses the issue of generating the separate ATM F5 segment and end AIS/RDI failure and recovery traps.

Benefits of ATM PVC Trap Enhancements for Segment and End AIS RDI Failures

The ATM PVC TRAP Enhancement for Segment and End AIS/RDI Failures feature adds segment and end AIS/RDI Failure notification (traps) to the existing ATM PVC trap infrastructure. This feature adds the ifDescr object to the existing traps. The addition of this object allows the operator to get the interface name directly from the trap. The segment and end AIS/RDI failure and recovery traps are generated when AIS/RDI failure traps are enabled.

How to Configure F5 OAM Recovery Traps for ATM PVCs

Configuring ATM OAM Support

Perform this task to configure ATM OAM support on an ATM PVC.

SUMMARY STEPS

1. `enable`
2. `configure terminal`
3. `interface atm number`
4. `ip address ip-address mask`
5. `pvc [name] vpi/vci`
6. `oam-pvc manage [keep-vc-up [end aisrdi failure | seg aisrdi failure]]`
7. `end`

DETAILED STEPS

	Command or Action	Purpose
Step 1	<p><code>enable</code></p> <p>Example:</p> <pre>Router> enable</pre>	<p>Enables privileged EXEC mode.</p> <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	<p><code>configure terminal</code></p> <p>Example:</p> <pre>Router# configure terminal</pre>	<p>Enters global configuration mode.</p>
Step 3	<p><code>interface atm number</code></p> <p>Example:</p> <pre>Router(config)# interface atm 0</pre>	<p>Specifies an interface for configuration and enters interface configuration mode.</p>

	Command or Action	Purpose
Step 4	ip address <i>ip-address mask</i> Example: Router(config-if)# ip address 10.0.0.3 255.255.255.0	Sets a primary or secondary IP address for an interface.
Step 5	pvc [<i>name</i>] <i>vpi/vci</i> Example: Router(config-if)# pvc 0/40	Creates an ATM PVC and enters ATM virtual circuit configuration mode.
Step 6	oam-pvc manage [keep-vc-up [end aisrdi failure seg aisrdi failure]] Example: Router(config-if-atm-vc)# oam-pvc manage	Configures ATM OAM management.
Step 7	end Example: Router(config-if-atm-vc)# end	Exits ATM virtual circuit configuration mode.

Enabling OAM F5 Failure and Recovery Traps

Perform this task to enable the MIB and SNMP notifications that support ATM OAM F5 CC management.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **snmp-server enable traps atm pvc extension** {**up** | **down** | **oam failure** [**aisrdi** | **loopback**]}
4. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable	Enables privileged EXEC mode.

	Command or Action	Purpose
	Example: Router> enable	<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	snmp-server enable traps atm pvc extension {up down oam failure [aisrdi loopback]} Example: Router(config)# snmp-server enable traps atm pvc extension oam failure aisrdi	Enables ATM OAM F5 AIS/RDI failure and recovery traps and ATM OAM F5 end-to-end loopback failure and recovery traps.
Step 4	end Example: Router(config)# end	Exits global configuration mode.

Troubleshooting Tips

- Use the **show running-config** command to verify the configuration of ATM OAM management.
- Use the **show atm pvccommand** to verify that ATM OAM management is enabled and to display the state of the PVC.
- Use the **debug snmp packet** command to display which SNMP traps are being generated.

Configuration Examples for ATM PVC F5 OAM Recovery Traps

Enabling OAM PVC Management Example

The following example shows how to enable ATM PVC OAM management:

```
Router(config)# interface ATM 2/0.1 point-to-point
Router(config-subif)# pvc pvc 45/54
Router(config-if-atm-vc)# oam-pvc manage
Router(config-if-atm-vc)# end
```

**Note**

Enhanced Interior Gateway Routing Protocol (EIGRP) must be configured on the router if you want the notification packets to be sent to the NMS.

ATM PVC Extended Up and Down Notifications Examples

Enabling ATM PVC Extended Up and Down Notifications

The following example shows how to enable ATM PVC extended up and down notifications:

```
Router(config)# snmp-server community public RW
Router(config)# snmp-server host 172.16.61.90 public
Router(config)# snmp-server enable traps atm pvc extension up
Router(config)# snmp-server enable traps atm pvc extension down
Router(config)# snmp-server host 10.0.0.115 vrf Mgmt-intf version 2c public udp-port 2030
```

ATM PVC Down Notification

The following sample output shows an ATM PVC in the DOWN state:

```
Router# show atm vc
Codes: DN - DOWN, IN - INACTIVE
      VCD /
Interface Name          VPI  VCI Type  Encaps  SC      Peak Av/Min Burst
0/3/0.100 pvc100        0    100 PVC   SNAP    UBR    149760  Kbps Kbps Cells St
Received SNMPv2c Trap:
Community: public
From: 10.0.0.54
sysUpTimeInstance = 1918435
snmpTrapOID.0 = catmIntfPvcDownTrap
ifIndex.52 = 52
atmIntfPvcFailures.15 = 4
atmIntfCurrentlyFailingPVcls.15 = 1
ifDescr.52 = ATM0/3/0.100
catmPVclCurFailTime.52.0.100 = 1915435
catmPVclPrevRecoverTime.52.0.100 = 259552
catmPVclFailureReason.52.0.100 = catmLoopbackOAMFailure(1)
```

ATM PVC Up Notification

The following sample output shows an ATM PVC in the UP state:

```
Router# show atm vc
Codes: DN - DOWN, IN - INACTIVE
      VCD /
Interface Name          VPI  VCI Type  Encaps  SC      Peak Av/Min Burst
0/3/0.100 pvc100        0    100 PVC   SNAP    UBR    149760  Kbps Kbps Cells St
Received SNMPv2c Trap:
Community: public
From: 9.0.0.54
sysUpTimeInstance = 1933376
snmpTrapOID.0 = catmIntfPvcUp2Trap
ifIndex.52 = 52
catmIntfCurrentlyDownToUpPVcls.15 = 1
ifDescr.52 = ATM0/3/0.100
catmPVclCurRecoverTime.52.0.100 = 1930676
catmPVclPrevFailTime.52.0.100 = 1915435
catmPVclRecoveryReason.52.0.100 = catmLoopbackOAMRecover(1)
```

ATM OAM Failure Loopback Notification Examples

Enabling ATM OAM Failure Loopback Notification

The following example shows how to enable ATM PVC OAM failure loopback notifications and extended up and down notifications:

```
Router(config)# snmp-server community public RW
Router(config)# snmp-server enable traps atm pvc extension up
Router(config)# snmp-server enable traps atm pvc extension down
Router(config)# snmp-server enable traps atm pvc extension oam failure loopback
Router(config)# snmp-server host 10.0.0.115 vrf Mgmt-intf version 2c public udp-port 2030
```



Note

If you configure the **snmp-server enable traps atm pvc extension oam failure** command, you may not see up or down traps when an OAM failure trap is generated. Additionally, the PVC will stay in the UP state.

OAM Loopback Failure Notification

The following sample output shows an ATM PVC that has failed. Note that the output indicates the PVC is still in the UP state.

```
Router# show atm vc
Codes: DN - DOWN, IN - INACTIVE
      VCD /
Interface Name          VPI  VCI Type  Encaps  SC      Peak Av/Min Burst
0/3/0.100 pvc100          0    100 PVC   SNAP    UBR    Kbps Kbps Cells St
Received SNMPv2c Trap:
Community: public
From: 9.0.0.54
sysUpTimeInstance = 1964155
snmpTrapOID.0 = catmIntfPvcOAMFailureTrap
ifIndex.52 = 52
catmIntfOAMFailedPVcls.15 = 65
catmIntfCurrentOAMFailingPVcls.15 = 1
ifDescr.52 = ATM0/3/0.100
catmPVclStatusTransition.52.0.100 = 1
catmPVclStatusChangeStart.52.0.100 = 1961155
catmPVclStatusChangeEnd.52.0.100 = 1961155
```

OAM Loopback Recovery Notification

The following sample output shows an ATM PVC in the UP state:

```
Router# show atm vc
Codes: DN - DOWN, IN - INACTIVE
      VCD /
Interface Name          VPI  VCI Type  Encaps  SC      Peak Av/Min Burst
0/3/0.100 pvc100          0    100 PVC   SNAP    UBR    Kbps Kbps Cells St
Received SNMPv2c Trap:
Community: public
From: 9.0.0.54
sysUpTimeInstance = 1986456
snmpTrapOID.0 = catmIntfPvcOAMRecoverTrap
ifIndex.52 = 52
catmIntfOAMRcovedPVcls.15 = 10
catmIntfCurrentOAMRcovingPVcls.15 = 1
ifDescr.52 = ATM0/3/0.100
catmPVclStatusUpTransition.52.0.100 = 1
```



```
catmPvc1StatusUpStart.52.0.100 = 1983456
catmPvc1StatusUpEnd.52.0.100 = 1983456
```

Additional References

Related Documents

Related Topic	Document Title
ATM commands: complete command syntax, defaults, command mode, command history, usage guidelines, and examples.	<i>Cisco IOS Asynchronous Transfer Mode Command Reference</i>
Cisco IOS commands	Cisco IOS Master Commands List, All Releases

Standards

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

MIBs

MIBs	MIBs Link
<ul style="list-style-type: none"> • ATM PVC MIB • CISCO-ATM-PVCTRAP-EXTN-MIB.my • CISCO-IETF-ATM2-PVCTRAP-MIB 	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 features.	--

Technical Assistance

Description	Link
<p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p>	<p>http://www.cisco.com/cisco/web/support/index.html</p>

Feature Information for ATM PVC F5 OAM Recovery Traps

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

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

Table 1: Feature Information for Configuring ATM PVC F5 OAM Recovery Traps

Feature Name	Releases	Feature Information
ATM PVC F5 OAM Recovery Traps	12.0(26)S 15.0(1)M	<p>The ATM PVC F5 OAM Recovery Traps feature introduces SNMP traps that notify the administrator when a PVC has recovered from F5 OAM end-to-end loopback failures and F5 OAM AIS/RDI failures.</p> <p>The following sections provide information about this feature:</p> <p>The following command was introduced: snmp-server enable traps atm pvc extension.</p>

Feature Name	Releases	Feature Information
ATM PVC Trap Enhancements for Segment and End AIS/RDI Failures	12.0(27)S 15.0(1)M	<p>The ATM PVC TRAP Enhancement for Segment and End AIS/RDI failures feature adds segment and end AIS/RDI failure notification (traps) to the existing ATM PVC trap infrastructure.</p> <p>The following sections provide information about this feature:</p>

