

帧中继到 ATM 服务互工作 (FRF.8) 的端到端 PVC 管理

目录

[简介](#)

[开始使用前](#)

[规则](#)

[先决条件](#)

[使用的组件](#)

[配置](#)

[FRF.8 PVC 管理过程](#)

[使用 Catalyst 8540 MSR 作为 IWF 交换机的示例](#)

[使用 Cisco 7200 路由器作为 IWF 的示例](#)

[故障排除](#)

[相关信息](#)

简介

在FRF.8实施协议中，[宽带论坛](#)（以前称为帧中继论坛）定义了帧中继终端和ATM终端之间通过路由器或交换机进行交互或连接两个第2层协议的通信。本文档介绍通过FRF.8服务互通(IWF)连接实现的永久虚电路(PVC)管理过程，并提供使用路由器和交换机的示例配置。

开始使用前

规则

有关文档规则的详细信息，请参阅 [Cisco 技术提示规则](#)。

先决条件

本文档没有任何特定的前提条件。

使用的组件

本文档不限于特定的软件和硬件版本。

本文档中的信息都是基于特定实验室环境中的设备创建的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您是在真实网络上操作，请确保您在使用任何命令前已经了解其潜在影响。

配置

本部分提供有关如何配置本文档所述功能的信息。

注：要查找有关本文档中使用的命令的其他信息，请使用[命令查找工具](#)(仅注册客户)。

FRF.8 PVC 管理过程

FRF.8的5.2节介绍ATM和帧中继PVC管理过程。在ATM端，这些过程使用F5操作、管理和维护(OAM)信元和临时本地管理接口(ILMI)管理信息库(MIB)变量。然后，ATM状态信息由互通设备映射到相应的帧中继状态指示符。

帧中继端使用本地管理接口(LMI)协议来传达状态信息。标准2字节帧中继报头不包含任何指示终端虚电路(VC)状态的字段。因此，LMI协议使用一种机制来增强帧中继，该机制在永久虚电路(PVC)添加、删除或更改状态时通知终端。它还提供了一种轮询机制，用于验证链路是否保持运行。它在数据链路连接标识符(DLCI)上发送LMI帧，该标识符与用于数据流量的DLCI不同。

LMI帧中的消息类型字段为8位，由状态查询和状态消息组成。帧中继终端(用户)每隔几秒向网络发送一条状态查询消息；此消息验证链路完整性。网络以包含所请求信息的状态消息作出响应。在定义数量的状态查询后，帧中继终端请求所谓的完全状态响应。网络以状态消息作出响应，该消息包含该链路上配置的每条PVC的信息元素(IE)。

PVC状态IE为5个字节。除了报告的PVC的DLCI外，IE还包含两个重要状态位：

- 新位 — 在交换机上添加PVC时由网络设置。网络继续将新位设置为完整状态消息中的1位，直到它收到来自帧中继终端(用户)的状态查询消息，该消息包含与网络当前发送序列号相等的接收序列号。
- 活动位 — 当网络确信到达目的地的完整路径存在且PVC端到端完全建立时设置。

帧中继状态机制的一个注意事项是它不是实时进程，必须等待计划状态消息发送。在某些情况下，当PVC在网络中可用后，两个帧中继终端收到完整状态消息，活动位在不同时间设置为1时，可能会出现计时问题。一个终端将在另一个终端(目标)收到活动状态消息之前通过PVC发送数据帧。

LMI协议通过异步状态报告类型IE克服了这一缺点。异步消息包括在PVC状态发生更改后立即发送的状态和状态查询消息，而不等待消息计时器过期。执行交互工作的思科路由器不支持异步状态消息的过程。

根据状态位，在帧中继端为PVC分配四个状态值之一。执行IWF的交换机或思科路由器使用一组标准来确定要分配给VC的状态。

状态	指示和匹配条件
已添加	帧中继网络将新位设置为IWF的完整状态报告。
已删除	IWF以完整状态报告的形式向帧中继网络报告此状态。
非活动	IWF使用以下条件确定非活动状态： <ul style="list-style-type: none">• 警报指示信号(AIS)或远程缺陷指示器(RDI)OAM F5信元明确表示ATM PVC在端到端路径的某处关闭。

	<ul style="list-style-type: none"> ILMI MIB在变量atmfVccOperStatus中报告 localDown或end2EndDown。 IWF发送完整状态报告，活动位设置为零。
主用	IWF使用以下条件确定活动状态： <ul style="list-style-type: none"> 在OAM规范ITU-I.610中定义的时间间隔内，AIS OAM信元和ATM网络中的RDI OAM信元不存在 ILMI MIB不在变量atmfVccOperStatus中报告 localDown或end2EndDown。 IWF将VC置于帧中继端的活动状态，当两个条件均满足（如果同时使用）且ATM端的IWF未检测到物理警报时。IWF将活动位设置为1的完整状态报告发送到帧中继网络。

使用 Catalyst 8540 MSR 作为 IWF 交换机的示例

以下示例显示Catalyst 8540 MSR作为IWF交换机。

网络图

拓扑如下所示：



注意：ATM路由器是7500路由器，在VIP2-50中使用PA-A3-OC3MM并运行12.1(13)E。FR路由器是运行12.1(17)的7200路由器。ATM/FR-IWF-switch是运行12.1(12c)EY的Catalyst 8540MSR。

配置

帧中继路由器
<pre> controller E1 4/0 channel-group 0 timeslots 1-31 ! interface Serial4/0:0 ip address 12.12.12.2 255.255.255.0 encapsulation frame-relay IETF no fair-queue frame-relay map ip 12.12.12.1 123 broadcast </pre>
ATM-FR/IWF-switch
<pre> controller E1 10/0/0 channel-group 1 timeslots 1-31 ! interface Serial10/0/0:1 no ip address encapsulation frame-relay IETF no arp frame-relay frame-relay intf-type dce </pre>

```

frame-relay pvc 123 service translation interface
ATM9/1/2 0 123
  atm oam interface ATM9/1/2 0 123

```

ATM路由器

```

interface ATM2/1/0.1 point-to-point
  ip address 12.12.12.1 255.255.255.0
  pvc 0/123
    oam-pvc manage
    encapsulation aal5snap

```

显示命令

ATM-router#show atm pvc 0/123

```

ATM2/1/0.1: VCD: 2, VPI: 0, VCI: 123
UBR, PeakRate: 149760
AAL5-LLC/SNAP, etype:0x0, Flags: 0xC20, VCmode: 0x0
OAM frequency: 10 second(s), OAM retry frequency: 1 second(s), OAM retry frequen
cy: 1 second(s)
OAM up retry count: 3, OAM down retry count: 5
OAM Loopback status: OAM Received
OAM VC state: Verified
ILMI VC state: Not Managed
VC is managed by OAM.
InARP frequency: 15 minutes(s)
Transmit priority 4
InPkts: 5, OutPkts: 8, InBytes: 540, OutBytes: 624
InPRoc: 5, OutPRoc: 5
InFast: 0, OutFast: 0, InAS: 0, OutAS: 3
InPktDrops: 0, OutPktDrops: 0
CrcErrors: 0, SarTimeOuts: 0, OverSizedSDUs: 0
OAM cells received: 124713
F5 InEndloop: 74872, F5 InSegloop: 49841, F5 InAIS: 0, F5 InRDI: 0
F4 InEndloop: 0, F4 InSegloop: 0, F4 InAIS: 0, F4 InRDI: 0
OAM cells sent: 124756
F5 OutEndloop: 74915, F5 OutSegloop: 49841, F5 OutRDI: 0
F4 OutEndloop: 0, F4 OutSegloop: 0, F4 OutRDI: 0
OAM cell drops: 0
Status: UP

```

FR-router#show frame-relay pvc

PVC Statistics for interface **Serial4/0:0** (Frame Relay DTE)

	Active	Inactive	Deleted	Static
Local	1	0	0	0
Switched	0	0	0	0
Unused	0	0	0	0

DLCI = 123, DLCI USAGE = LOCAL, **PVC STATUS = ACTIVE**, INTERFACE = Serial4/0:0

```

input pkts 8          output pkts 5          in bytes 1633
out bytes 520         dropped pkts 0        in FECN pkts 0
in BECN pkts 0       out FECN pkts 0      out BECN pkts 0
in DE pkts 0         out DE pkts 0
out bcast pkts 0     out bcast bytes 0
pvc create time 00:02:44, last time pvc status changed 00:02:44

```

ATM-FR/IWF-switch#show frame-relay pvc

PVC Statistics for **interface Serial10/0/0:1** (Frame Relay DCE)

	Active	Inactive	Deleted	Static
Local	0	0	0	0
Switched	1	0	0	0
Unused	0	0	0	0

DLCI = 123, DLCI USAGE = SWITCHED, **PVC STATUS = ACTIVE**, INTERFACE = Serial10/0/0:1

```
input pkts 5          output pkts 6          in bytes 520
out bytes 550         dropped pkts 0         in FECN pkts 0
in BECN pkts 0       out FECN pkts 0       out BECN pkts 0
in DE pkts 0         out DE pkts 0
out bcast pkts 4151  out bcast bytes 1494481  Num Pkts Switched 0
pvc create time 2d21h, last time pvc status changed 2d21h
```

ATM-FR/IWF-switch#show atm vc interface atm 9/1/2 0 123

Interface: ATM9/1/2, Type: oc3suni

VPI = 0 VCI = 123

Status: UP

Time-since-last-status-change: 2d21h

Connection-type: PVC

Cast-type: point-to-point

Packet-discard-option: disabled

Usage-Parameter-Control (UPC): pass

Wrr weight: 2

Number of OAM-configured connections: 32

OAM-configuration: Seg-loopback-on End-to-end-loopback-on Ais-on Rdi-on

OAM-states: OAM-Up

OAM-Loopback-Tx-Interval: 5

Cross-connect-interface: ATM-P10/0/0, Type: ATM-PSEUDO

Cross-connect-VPI = 1

Cross-connect-VCI = 155

Cross-connect-UPC: pass

Cross-connect OAM-configuration: Ais-on

Cross-connect OAM-state: OAM-Up

OAM-Loopback-Tx-Interval: 5

Threshold Group: 3, Cells queued: 0

Rx cells: 16, Tx cells: 15

Tx Clp0:15, Tx Clp1: 0

Rx Clp0:16, Rx Clp1: 0

Rx Upc Violations:9, Rx cell drops:0

Rx Clp0 q full drops:0, Rx Clp1 qthresh drops:0

Rx connection-traffic-table-index: 100

Rx service-category: VBR-NRT (Non-Realtime Variable Bit Rate)

Rx pcr-clp01: 81

Rx scr-clp0 : 81

Rx mcr-clp01: none

Rx cdvt: 1024 (from default for interface)

Rx mbs: 50

Tx connection-traffic-table-index: 100

Tx service-category: VBR-NRT (Non-Realtime Variable Bit Rate)

Tx pcr-clp01: 81

Tx scr-clp0 : 81

Tx mcr-clp01: none

Tx cdvt: none

Tx mbs: 50

场景1

使用上述配置，让我们了解两台路由器对网络中的故障有何反应。在第一个场景中，我们将关闭 ATM路由器ATM接口，并查看此故障对FR路由器PVC的影响。

1. 关闭ATM路由器上的ATM子接口：

```
ATM-router#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
ATM-router(config)#interface atm 2/1/0.1
ATM-router(config-subif)#shut
```

2. 检查ATM-FR/IWF-switch上PVC的状态：

```
ATM-FR/IWF-switch#show atm vc interface atm 9/1/2 0 123
```

```
Interface: ATM9/1/2, Type: oc3suni
VPI = 0 VCI = 123
Status: UP
Time-since-last-status-change: 00:00:44
Connection-type: PVC
Cast-type: point-to-point
Packet-discard-option: disabled
Usage-Parameter-Control (UPC): pass
Wrr weight: 2
Number of OAM-configured connections: 32
OAM-configuration: Seg-loopback-on End-to-end-loopback-on Ais-on Rdi-on
OAM-states: OAM-Up Segment-loopback-failed End-to-end-loopback-failed
OAM-Loopback-Tx-Interval: 5
Cross-connect-interface: ATM-P10/0/0, Type: ATM-PSEUDO
Cross-connect-VPI = 1
Cross-connect-VCI = 155
Cross-connect-UPC: pass
Cross-connect OAM-configuration: Ais-on
Cross-connect OAM-state: OAM-Up
OAM-Loopback-Tx-Interval: 5
Threshold Group: 3, Cells queued: 0
Rx cells: 1, Tx cells: 0
Tx Clp0:0, Tx Clp1: 0
Rx Clp0:1, Rx Clp1: 0
Rx Upc Violations:0, Rx cell drops:0
Rx Clp0 q full drops:0, Rx Clp1 qthresh drops:0
Rx connection-traffic-table-index: 100
Rx service-category: VBR-NRT (Non-Realtime Variable Bit Rate)
Rx pcr-clp01: 81
Rx scr-clp0 : 81
Rx mcr-clp01: none
Rx cdvt: 1024 (from default for interface)
Rx mbs: 50
Tx connection-traffic-table-index: 100
Tx service-category: VBR-NRT (Non-Realtime Variable Bit Rate)
Tx pcr-clp01: 81
Tx scr-clp0 : 81
Tx mcr-clp01: none
Tx cdvt: none
Tx mbs: 50
```

3. 检查FR-router上的PVC状态：

```
FR-router#show frame-relay pvc
```

```
PVC Statistics for interface Serial4/0:0 (Frame Relay DTE)
```

	Active	Inactive	Deleted	Static
Local	0	1	0	0
Switched	0	0	0	0
Unused	0	0	0	0

```
DLCI = 123, DLCI USAGE = LOCAL, PVC STATUS = INACTIVE, INTERFACE = Serial4/0:0
```

```
input pkts 18          output pkts 5          in bytes 4320
```

```

out bytes 520                dropped pkts 5                in FECN pkts 0
in BECN pkts 0              out FECN pkts 0            out BECN pkts 0
in DE pkts 0                out DE pkts 0
out bcst pkts 0            out bcst bytes 0
pvc create time 00:15:21, last time pvc status changed 00:03:50

```

如上面的输出所示，ATM端故障反映在FR端。实际上，FR PVC进入非活动状态。

场景2

现在，让我们看看当FR云中发生故障时，ATM端会发生什么情况。要模拟这种故障类型，让我们关闭FR路由器上的串行接口，并了解ATM路由器的反应。

1. 关闭FR-router上的串行接口，并查看ATM-router如何反应：

```

FR-router#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
FR-router(config)#int serial 4/0:0
FR-router(config-if)#shut

```

2. debug atm oam在ATM路由器上启用。我们可以看到，在检测到故障后，ATM-FR/IWF-switch正在向ATM路由器发送AIS信号：

```

3d12h: atm_oam_ais(ATM2/1/0): AIS signal, failure=0x6A, VC 0/123
3d12h: atm_oam_setstate - VCD#3, VC 0/123: newstate = AIS/RDI
3d12h: %LINEPROTO-5-UPDOWN: Line protocol on Interface ATM2/1/0.1, changed state to
down
3d12h: atm_oam_ais_inline(ATM2/1/0): AIS signal, failure=0x6A, VC 0/123

```

如果检查ATM路由器上的PVC状态，我们可以看到PVC关闭：

```

ATM-router#show atm pvc 0/123
ATM2/1/0.1: VCD: 3, VPI: 0, VCI: 123
UBR, PeakRate: 149760
AAL5-LLC/SNAP, etype:0x0, Flags: 0xC20, VCmode: 0x0
OAM frequency: 10 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 Received
OAM VC state: AIS/RDI
ILMI VC state: Not Managed
VC is managed by OAM.
InARP frequency: 15 minutes(s)
Transmit priority 4
InPkts: 0, OutPkts: 4, InBytes: 0, OutBytes: 112
InPRoc: 0, OutPRoc: 0
InFast: 0, OutFast: 0, InAS: 0, OutAS: 4
InPktDrops: 0, OutPktDrops: 0
CrcErrors: 0, SarTimeOuts: 0, OverSizedSDUs: 0
OAM cells received: 304
F5 InEndloop: 114, F5 InSegloop: 69, F5 InAIS: 121, F5 InRDI: 0
F4 InEndloop: 0, F4 InSegloop: 0, F4 InAIS: 0, F4 InRDI: 0
OAM cells sent: 310
F5 OutEndloop: 120, F5 OutSegloop: 69, F5 OutRDI: 121
F4 OutEndloop: 0, F4 OutSegloop: 0, F4 OutRDI: 0
OAM cell drops: 0
Status: DOWN, State: NOT_VERIFIED

```

3. 检查ATM-FR/IWF-switch的状态：

```

ATM-FR/IWF-switch#show atm vc interface atm 9/1/2 0 123

Interface: ATM9/1/2, Type: oc3suni
VPI = 0 VCI = 123
Status: DOWN
Time-since-last-status-change: 00:03:04

```

```

Connection-type: PVC
Cast-type: point-to-point
Packet-discard-option: disabled
Usage-Parameter-Control (UPC): pass
Wrr weight: 2
Number of OAM-configured connections: 32
OAM-configuration: Seg-loopback-on End-to-end-loopback-on Ais-on Rdi-on
OAM-states: OAM-Up
OAM-Loopback-Tx-Interval: 5
Cross-connect-interface: ATM-P10/0/0, Type: ATM-PSEUDO
Cross-connect-VPI = 1
Cross-connect-VCI = 155
Cross-connect-UPC: pass
Cross-connect OAM-configuration: Ais-on
Cross-connect OAM-state: OAM-Down
OAM-Loopback-Tx-Interval: 5
Threshold Group: 3, Cells queued: 0
Rx cells: 3, Tx cells: 0
Tx Clp0:0, Tx Clp1: 0
Rx Clp0:3, Rx Clp1: 0
Rx Upc Violations:0, Rx cell drops:0
Rx Clp0 q full drops:0, Rx Clp1 qthresh drops:0
Rx connection-traffic-table-index: 100
Rx service-category: VBR-NRT (Non-Realtime Variable Bit Rate)
Rx pcr-clp01: 81
Rx scr-clp0 : 81
Rx mcr-clp01: none
Rx cdvt: 1024 (from default for interface)
Rx mbs: 50
Tx connection-traffic-table-index: 100
Tx service-category: VBR-NRT (Non-Realtime Variable Bit Rate)
Tx pcr-clp01: 81
Tx scr-clp0 : 81
Tx mcr-clp01: none
Tx cdvt: none
Tx mbs: 50

```

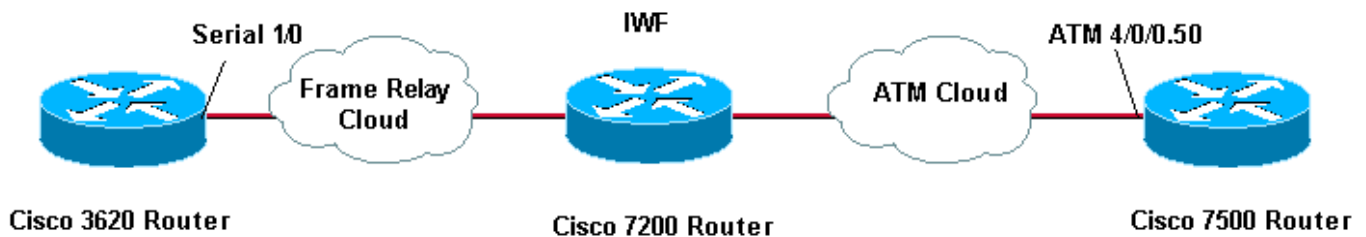
因此，我们可以看到，由于OAM，ATM路由器将通过关闭相应的ATM PVC对FR云中的故障做出响应。

已知问题说明

- CSCdu78168(CSCdt04356的副本):OAM管理在MSR上不适用，FR到ATM IWF

使用 Cisco 7200 路由器作为 IWF 的示例

网络图



配置

3620
<pre>interface Serial1/0 ip address 10.10.10.1 255.255.255.0 encapsulation frame-relay IETF frame-relay interface-dlci 50 frame-relay lmi-type ansi</pre>
7206
<pre>frame-relay switching ! interface Serial4/3 no ip address encapsulation frame-relay IETF frame-relay interface-dlci 50 switched frame-relay lmi-type ansi frame-relay intf-type dce clockrate 115200 ! interface ATM5/0 no ip address atm clock INTERNAL no atm ilmi-keepalive pvc 5/50 vbr-nrt 100 75 oam-pvc manage encapsulation aal5mux fr-atm-srv ! connect SIVA Serial4/3 50 ATM5/0 5/50 service- interworking</pre>
7500
<pre>interface atm 4/0/0.50 multi ip address 10.10.10.2 255.255.255.0 pvc 5/50 vbr-nrt 100 75 30 protocol ip 10.10.10.1</pre>

场景1

以下场景假设我们已使用oam-pvc manage命令在IWF上配置了ATM终端和ATM接口。我们将从ATM终端删除PVC配置语句。当ATM PVC关闭时，帧中继PVC将变为非活动状态。

1. 启用debug atm oam并清除计数器

```
1d09h: ATM OAM(ATM4/0/0.50): Timer: VCD#5 VC 5/50 Status:2 CTag:8586 Tries:0
1d09h: ATM OAM LOOP(ATM4/0/0.50) O: VCD#5 VC 5/50 CTag:218B
1d09h: ATM OAM LOOP(ATM4/0/0) I: VCD#5 VC 5/50 LoopInd:0 CTag:218B
1d09h: ATM OAM LOOP(ATM4/0/0) I: VCD#5 VC 5/50 LoopInd:1 CTag:4850
1d09h: ATM OAM LOOP(ATM4/0/0.50) O: VCD#5 VC 5/50 CTag:4850
```

2. 使用new-style pvc命令的“no”形式从ATM终端删除PVC。

```
7500#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
7500(config)#interface atm 4/0/0.50
7500(config-subif)#no pvc 5/50
```

3. 执行show atm vc命令并确认IWF 7200上VC的状态为DOWN。

```
7200#show atm vc
```

Interface	VCD / Name	VPI	VCI	Type	Encaps	SC	Peak Kbps	Avg/Min Kbps	Burst Cells	Sts
5/0.200	test	2	20	PVC	SNAP	UBR	149760			UP
5/0.100	2	3	300	PVC	SNAP	UBR	149760			UP
5/0	1	5	50	PVC	FRATMSRV	VBR	100	75	95	DOWN

4. 执行show atm pvc {vpi/vci}命令并确认OAM VC状态：未验证。

```
7200#show atm pvc 5/50
ATM5/0: VCD: 1, VPI: 5, VCI: 50
VBR-NRT, PeakRate: 100, Average Rate: 75, Burst Cells: 95
AAL5-FRATMSRV, etype:0x15, Flags: 0x23, VCmode: 0x0
OAM frequency: 10 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 Sent
OAM VC state: Not Verified
ILMI VC state: Not Managed
VC is managed by OAM.
InARP DISABLED
Transmit priority 2
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, LengthViolation: 0, CPIErrors: 0
Out CLP=1 Pkts: 0
OAM cells received: 19
F5 InEndloop: 19, F5 InSegloop: 0, F5 InAIS: 0, F5 InRDI: 0
F4 InEndloop: 0, F4 InSegloop: 0, F4 InAIS: 0, F4 InRDI: 0
OAM cells sent: 82
F5 OutEndloop: 82, F5 OutSegloop: 0, F5 OutRDI: 0
F4 OutEndloop: 0, F4 OutSegloop: 0, F4 OutRDI: 0
OAM cell drops: 0
Status: DOWN, State: NOT_VERIFIED
```

5. 在帧中继终端上启用调试帧中继数据包。观察帧中继连接的用户和网络端之间交换的状态和状态查询(StEnq)消息的顺序。确认VC的状态从0x2 (活动)更改为0x0 (非活动)。

```
*Apr 7 01:53:18.407: Serial1/0(in): Status, myseq 69
*Apr 7 01:53:18.407: RT IE 1, length 1, type 0
*Apr 7 01:53:18.407: KA IE 3, length 2, yourseq 67, myseq 69
*Apr 7 01:53:18.407: PVC IE 0x7 , length 0x3 , dlci 50, status 0x2
! -- A value of 0x2 indicates active status. *Apr 7 01:53:28.403: Serial1/0(out): StEnq,
myseq 70, yourseen 67, DTE up *Apr 7 01:53:28.403: datagramstart = 0x3D53954, datagramsize
= 14 *Apr 7 01:53:28.403: FR encap = 0x00010308 *Apr 7 01:53:28.403: 00 75 95 01 01 01 03
02 46 43 *Apr 7 01:53:28.403: *Apr 7 01:53:28.407: Serial1/0(in): Status, myseq 70 *Apr 7
01:53:28.407: RT IE 1, length 1, type 1 *Apr 7 01:53:28.407: KA IE 3, length 2, yourseq 68,
myseq 70 *Apr 7 01:53:38.403: Serial1/0(out): StEnq, myseq 71, yourseen 68, DTE up *Apr 7
01:53:38.403: datagramstart = 0x3D53954, datagramsize = 14 *Apr 7 01:53:38.403: FR encap =
0x00010308 *Apr 7 01:53:38.403: 00 75 95 01 01 01 03 02 47 44 *Apr 7 01:53:38.403: *Apr 7
01:53:38.407: Serial1/0(in): Status, myseq 71 *Apr 7 01:53:38.407: RT IE 1, length 1, type
0 *Apr 7 01:53:38.407: KA IE 3, length 2, yourseq 69, myseq 71 *Apr 7 01:53:38.407: PVC IE
0x7 , length 0x3 , dlci 50, status 0x0
! -- A value of 0x0 indicates inactive status.
```

状态字段的可能值说明如下：**0x0** — 已添加且不活动。DLCI已在交换机中编程，但不可用。一个潜在原因是PVC的另一端关闭。**0x2** — 已添加并处于活动状态。DLCI在交换机中编程，PVC工作正常。**0x3** — 组合活动状态(0x2)和设置(0x1)的接收方未就绪(RNR) (或r位)。值0x03表示交换机或交换机上此PVC的特定队列已备份，因此帧中继接口停止传输以避免丢失帧。**0x4** — 已删除。DLCI未在交换机中编程，而是先前编程的。或者，删除状态可能是由路由器上的DLCI颠倒或由帧中继网云中的电信公司删除的PVC引起的。在帧中继终端上配置一个DLCI，而交换机上没有匹配值，则VC的状态值为0x4。

6. 如果无法在生产路由器上运行debug frame-relay packet，只需执行show frame pvc，并确认帧中继终端至少列出一个非活动的本地PVC。

```
3620#show frame pvc
PVC Statistics for interface Serial1/0 (Frame Relay DTE)
      Active      Inactive      Deleted      Static
Local          0            1            0            0
Switched       0            0            0            0
Unused         0            0            0            0
DLCI = 50, DLCI USAGE = LOCAL, PVC STATUS = INACTIVE, INTERFACE = Serial1/0
input pkts 0          output pkts 0          in bytes 0
out bytes 0          dropped pkts 0          in FECN pkts 0
in BECN pkts 0      out FECN pkts 0 out    BECN pkts 0
in DE pkts 0          out DE pkts 0
out bcast pkts 0      out bcast bytes 0
pvc create time 3d04h, last time pvc status changed 00:05:04
```

场景2

以下场景假设我们只需从IWF 7200中删除oam-pvc manage命令即可。ATM VC保持为UP状态，然后在帧中继端保持活动状态。

1. 在IWF 7200的ATM接口上删除oam-pvc manage命令。

```
7200(config)#int atm 5/0
7200(config-if)#pvc 5/50
7200(config-if-atm-vc)#no oam-pvc manage
7200(config-if-atm-vc)#end
7200#show atm vc
*May 31 01:20:01.499: %LINEPROTO-5-UPDOWN: Line protocol on Interface ATM5/0, changed
state to up
      VCD /
Interface Name  VPI  VCI  Type  Encaps  SC  Peak  Avg/Min  Burst  Sts
5/0.100        2    3    300  PVC    SNAP  UBR  149760  75     95    UP
5/0            1    5    50   PVC    FRATMSRV  VBR  100    75     95    UP
```

2. 使用pvc命令的“no”形式删除ATM终端上的PVC。

```
7500(config)#int atm 4/0/0.50
7500(config-subif)#no pvc 5/50
7500(config-subif)#end
```

3. show atm pvc vpi/vci命令可确认ATM端的状态保持为UP状态。

```
7200-2.4#show atm pvc 5/50
ATM5/0: VCD: 1, VPI: 5, VCI: 50
VBR-NRT, PeakRate: 100, Average Rate: 75, Burst Cells: 95
AAL5-FRATMSRV, etype:0x15, Flags: 0x23, 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
ILMI VC state: Not Managed
InARP DISABLED
Transmit priority 2
InPkts: 15, OutPkts: 19, InBytes: 1680, OutBytes: 1332
InPProc: 0, OutPProc: 0, Broadcasts: 0
InFast: 15, OutFast: 19, InAS: 0, OutAS: 0
InPktDrops: 0, OutPktDrops: 0
CrcErrors: 0, SarTimeOuts: 0, OverSizedSDUs: 0, LengthViolation: 0, CPIErrors: 0
Out CLP=1 Pkts: 0
OAM cells received: 157
F5 InEndloop: 157, F5 InSegloop: 0, F5 InAIS: 0, F5 InRDI: 0
F4 InEndloop: 0, F4 InSegloop: 0, F4 InAIS: 0, F4 InRDI: 0
OAM cells sent: 214
F5 OutEndloop: 214, F5 OutSegloop: 0, F5 OutRDI: 0
```

F4 OutEndloop: 0, F4 OutSegloop: 0, F4 OutRDI: 0

OAM cell drops: 0

Status: UP

4. 帧中继端的PVC状态也保持活动状态。

*Apr 7 02:25:08.407: Serial1/0(in): Status, myseq 5

*Apr 7 02:25:08.407: RT IE 1, length 1, type 0

*Apr 7 02:25:08.407: KA IE 3, length 2, yourseq 3 , myseq 5

*Apr 7 02:25:08.407: PVC IE 0x7 , length 0x3 , dlci 50, **status 0x2**

! -- The Frame Relay PVC retains an active status (0x2). *Apr 7 02:25:18.403:

Serial1/0(out): StEnq, myseq 6, yourseen 3, DTE up *Apr 7 02:25:18.403: datagramstart = 0x3D53094, datagramsize = 14 *Apr 7 02:25:18.403: FR encap = 0x00010308 *Apr 7 02:25:18.403: 00 75 95 01 01 00 03 02 06 03

5. show frame pvc命令可确认帧中继终端上PVC的活动状态。

3620#show frame pvc

PVC Statistics for interface Serial1/0 (Frame Relay DTE)

	Active	Inactive	Deleted	Static
Local	1	0	0	0
Switched	0	0	0	0
Unused	0	0	0	0

DLCI = 50, DLCI USAGE = LOCAL, PVC STATUS = ACTIVE, INTERFACE = Serial1/0

input pkts 0	output pkts 0	in bytes 0
out bytes 0	dropped pkts 0	in FECN pkts 0
in BECN pkts 0	out FECN pkts 0	out BECN pkts 0
in DE pkts 0	out DE pkts 0	
out bcast pkts 0	out bcast bytes 0	
pvc create time 3d04h, last time pvc status changed 00:02:45		

故障排除

目前没有针对此配置的故障排除信息。

相关信息

- [ATM到帧中继互通技术支持](#)
- [宽带论坛](#)
- [ATM技术支持页](#)
- [技术支持和文档 - Cisco Systems](#)