

HP OpenView Reporting and Network Solutions

LAN/WAN Edge Smart Plug-in to Network Node Manager

User's Guide

Software Version: 2.1

for HP-UX, Solaris, Windows® operating systems



i n v e n t

Manufacturing Part Number: None

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1. Introducing the LAN/WAN Edge Smart Plug-in

Introduction	8
Features and Benefits of the LAN/WAN Edge SPI	9
Examining Faults of a Frame Relay Network	10
Behavior of the LAN/WAN Edge SPI	12
User Interaction with the LAN/WAN Edge SPI.	13
Cross-Launching	14
Related Documentation	15

2. Installing the LAN/WAN Edge Smart Plug-in

Preparing for Installation	18
Hardware Requirements	18
Software Requirements	18
Supported Operating Systems	18
Network Node Manager	18
Verifying Proper Installation of Network Node Manager.	19
Setting the NNM Environment Variables	19
MIB Dependencies	20
Installing the LAN/WAN Edge SPI.	21
Installing on a UNIX Operating System.	21
Installing on a Windows Operating System	22
Uninstalling the LAN/WAN Edge SPI	24
Uninstalling on a UNIX Operating System	24
Uninstalling on a Windows Operating System.	25
Manually Unloading the LAN/WAN Edge SPI.	26
Unloading on a UNIX Operating System	26
Unloading on a Windows Operating System.	27
Configuring NNM to Collect FECN and BECN Counters.	28

3. Understanding Events from the LAN/WAN Edge Smart Plug-in

Input to the LAN/WAN Edge SPI	32
Direct HP OpenView Events and SNMP Traps	32
Syslog Message Events.	33
Frame Relay Correlators	35
Output from the LAN/WAN Edge SPI	36
Diagnosing Frame Relay Problems.	37
Interface Down on the Local Frame Relay Interface	37
LMI Problem on the Local Frame Relay Interface	38

Contents

Carrier Problem Due to PVC Invalidation	39
DLCI Flapping Due to Circuit Problem.	40
DLCI Reset Problem	41
Setting Parameters in HP OpenView Correlation Composer	42

4. Troubleshooting the LAN/WAN Edge Smart Plug-in

Troubleshooting Checklist.	46
Verifying That the NNM Services are Operating on the Management Station.	48
Verifying that the LAN/WAN Edge SPI is Installed	49
Verifying that MIBs are Loaded	50
Verifying the Correlation Composer Circuit.	51
Handling Installation Errors.	52
Error Loading Frame Relay Correlation Rules.	52
Frame Relay Trap Definitions Already Loaded	52
Failure of csdeploy.ovpl.	52
Working Manually with the Correlation Composer Circuit	54
Tracing a Process to Document Error Messages	56

Support

Please visit the HP OpenView web site at:

<http://openview.hp.com/>

There you will find contact information and details about the products, services, and support that HP OpenView offers.

You can go directly to the HP OpenView support web site at:

<http://support.openview.hp.com/>

The support site includes:

- Downloadable documentation
- Troubleshooting information
- Patches and updates
- Problem reporting
- Training information
- Support program information

1 Introducing the LAN/WAN Edge Smart Plug-in

Introduction

Frame relay is an important wide-area network (WAN) service used by a large number of enterprise customers. It is common to buy frame relay services from service providers who provide connectivity between local-area networks (LANs) in geographically different locations.

The HP OpenView NNM Smart Plug-in for LAN/WAN Edge provides additional value to HP OpenView Network Node Manager (NNM). It helps users monitor frame relay outages caused by problems within the edge router or within the service provider network.

The LAN/WAN Edge Smart Plug-in (SPI) uses event reduction, a process of identifying relationships between events, to generate a smaller number of new events with the same or better information content. You can analyze these more meaningful events to react to and resolve problems within your frame relay network.

When HP OpenView Performance Insight (OVPI) is also installed, the LAN/WAN Edge SPI proactively works with NNM and OVPI to provide analysis and reporting of both fault and performance data.

Features and Benefits of the LAN/WAN Edge SPI

The following list outlines the features of the LAN/WAN Edge SPI and its benefits to you.

- The LAN/WAN Edge SPI provides network fault analysis capabilities to help determine the root cause of a frame relay-related problem.
- By correlating the frame relay events with the root cause events, the LAN/WAN Edge SPI generates new, more meaningful events for display in the NNM alarm browser.
- For frame relay, the NNM alarm browser displays the LAN/WAN Edge SPI-generated events only, not the raw traps. This greatly reduces the number of alarms operators must consider.
- For each type of problem from a specific source, the LAN/WAN Edge SPI generates only one event during a configurable period of time.
- When NNM Extended Topology is installed and configured for overlapping IP address domains, the LAN/WAN Edge SPI identifies the public internet address of the source and correlates alarms accordingly.
- Correlated traps are suppressed and logged. The correlated traps for an alarm can be viewed by opening a drill-down window.
- No traps are discarded before you configure the system to do so.
- When OVPI is installed, OVPI monitors the counters for FECN, BECN, and Discard Eligible and sends a trap to NNM when any counter crosses a configured threshold. The NNM alarm browser displays the trap as an alarm from which you can launch an OVPI report containing additional information about the interface that crossed the threshold.
- The LAN/WAN Edge SPI supports the advanced poller analyzer (APA). It correlates events generated by the APA and by netmon.

Examining Faults of a Frame Relay Network

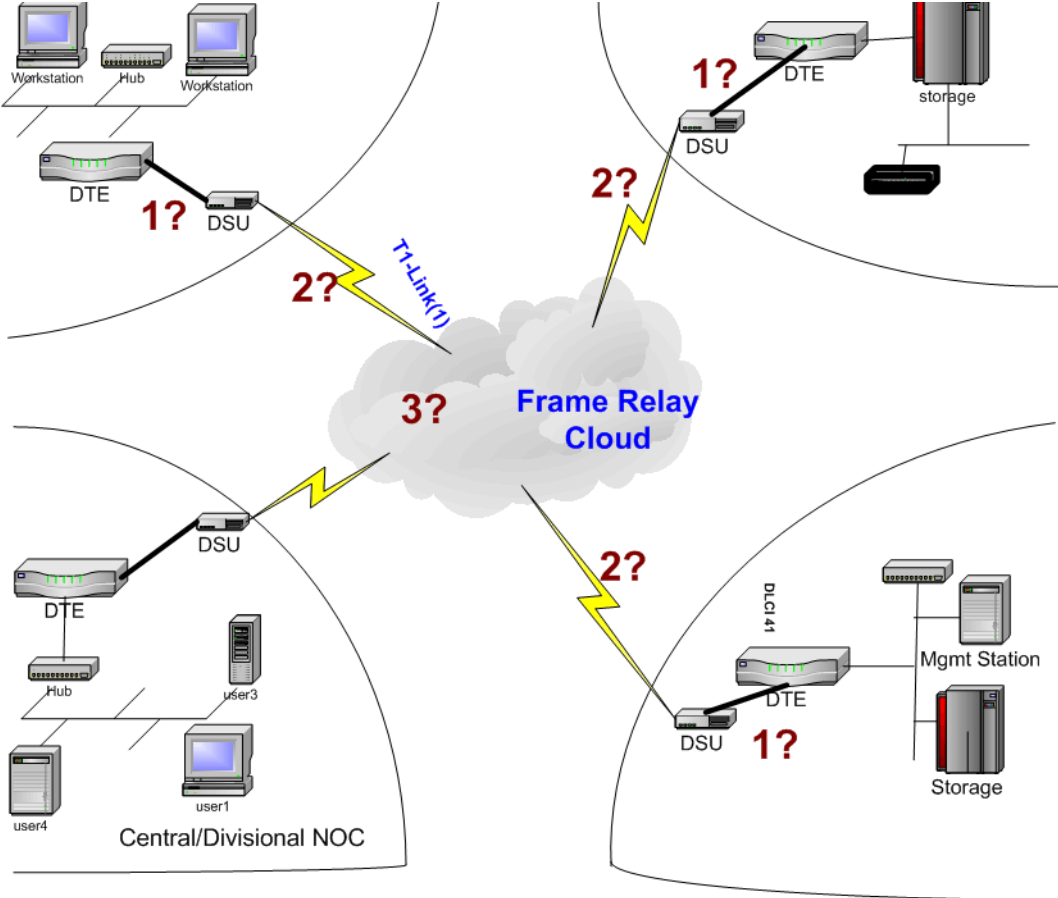
Figure 1-1 on page 11 illustrates an example frame relay network offered by a service provider. This illustration depicts three types of problems that are likely to occur in a frame relay network.

The three types of problems that could trigger frame relay traps or congestion statistics are:

- Frame relay private virtual connections (PVCs) are down due to a problem with the local frame relay data terminal equipment (DTE) interface (depicted in problem 1).
- A frame relay DTE cannot communicate with the frame relay cloud (depicted in problem 2). This problem could indicate that there is a protocol mismatch between the router and the service provider or that the local management interface (LMI) is down.
- A problem within the frame relay cloud (depicted in problem 3) indicates that there is a problem with the service provider.

Each problem maps to a unique problem scenario with its own root cause, related causes, and corresponding diagnosis. For more details on each of these problems and how the LAN/WAN Edge SPI handles these problems, see Chapter 3, “Understanding Events from the LAN/WAN Edge Smart Plug-in,” on page 31.

Figure 1-1 Frame Relay Network Example



Behavior of the LAN/WAN Edge SPI

The LAN/WAN Edge SPI detects and reports problems with frame relay virtual connections. It performs root cause analysis to distinguish between failures within the provider network and failures within the local edge router.

The LAN/WAN Edge SPI narrows the troubleshooting area for frame relay problems and reduces the number of events in the NNM alarm browser by reporting one alarm per frame relay fault during a pre-defined period of time.

The types of traps and events that the LAN/WAN Edge SPI detects and analyzes include:

- Data link connection identifier (DLCI) status change traps
- HP OpenView interface down events (generated by the APA and netmon)
- LMI failure traps

The LAN/WAN Edge SPI includes a set of correlators that augment the HP OpenView Correlation Composer circuit. These correlations analyze received traps and HP OpenView events to determine the type of frame relay fault occurring in the network. For descriptions of the LAN/WAN Edge SPI correlators, see “Frame Relay Correlators” on page 35.

When a frame relay fault is detected by the LAN/WAN Edge SPI, an alarm is generated and sent to the NNM alarm browser. Only one frame relay alarm is forwarded to the alarm browser per device during a period of time. After the time period expires, the correlators reset in preparation for the next frame relay fault analysis.

User Interaction with the LAN/WAN Edge SPI

The alarms that the LAN/WAN Edge SPI generates appear in the FrameRelay Alarms category of the NNM alarm browser. Click the FrameRelay Alarms category to open the FrameRelay Alarms browser.

The correlated traps and events associated with a frame relay alarm can be viewed from the FrameRelay Alarms browser by double-clicking the number in the `Corr` column for that alarm.

When the LAN/WAN Edge SPI detects a frame relay fault, it generates one of the following alarms:

- Frame Relay: Local PVC problem due to IF DOWN
- Frame Relay: Local PVC problem due to LMI failure
- Frame Relay: Carrier Problem
- Frame Relay: PVC Reset (Creation time changed)
- Frame Relay: PVC Flapping

An example message follows:

```
Frame Relay: Local PVC problem due to LMI failure. ifIndex=3 ((401, 2), (402, 1))  
connect to Cisco4k1-S0.1
```

The message field of a frame relay alarm indicates the nature of the frame relay fault that has occurred. It also contains three additional pieces of information:

- The correlated alarm reports the interface index on which the PVCs are configured. For example, `ifIndex=3` indicates that the interface index is three.
- The correlated alarm reports the affected DLCIs and the number of times a reset occurs within the time period. For example, `((401, 2), (402, 1))` indicates that there were two resets for DLCI 401 and one reset for DLCI 402.
- The correlated alarm reports the affected remote destination. For example, `connect to Cisco4k1-S0.1`. A remote destination value of `-1` indicates that the remote destination information is not available.

Cross-Launching

If OVPI and NNM are integrated, and if the Frame Relay Report Pack is installed on your OVPI server, you can launch reports in that package directly from the FrameRelay Alarms browser.

To start OVPI from NNM, follow these steps:

1. Click on an alarm in the FrameRelay Alarms browser, and then click Actions->Additional Actions.
2. In the Action list, click OVPI Report.
3. Click OK.

A web browser window displays an OVPI report, pre-filtered for the object that generated the alarm.

Related Documentation

Refer to the following documents for more information:

- *Network Node Manager Managing Your Network*
- *OVPI Frame Relay Report Pack User Guide*
- *Event Correlation Services Administrator's Guide*
- *HP OpenView Correlation Composer's Guide*

Introducing the LAN/WAN Edge Smart Plug-in

Related Documentation

2 **Installing the LAN/WAN Edge Smart Plug-in**

Preparing for Installation

Before installing the LAN/WAN Edge Smart Plug-in (SPI), verify that your computer meets hardware and software prerequisites, and that the prerequisite software has been set up properly.

Hardware Requirements

Verify that the following disk space settings are configured before installing the LAN/WAN Edge SPI:

Table 2-1 Recommended Disk Space Settings

Location	Size
<i>UNIX</i> : \$OV_MAIN_PATH <i>Windows</i> : %OV_MAIN_PATH%	3 MB

Software Requirements

Supported Operating Systems

The following operating systems are supported:

- HP-UX 11.0 or HP-UX 11i
- Solaris 2.8 or Solaris 2.9
- Windows® 2000 with service pack 3 or Windows® XP

Network Node Manager

Verify that the following software and all its prerequisites and patches are installed on all systems in the managed environment:

- HP OpenView Network Node Manager Advanced Edition (NNM), version 7.01

Refer to the *Network Node Manager Installation Guide* for instructions on how to install the NNM product.

Optionally, HP OpenView Performance Insight (OVPI) version 5.0 can be installed to view performance and utilization data. The product is integrated with NNM, allowing performance reports to be launched from events in the NNM alarm browser.

Verifying Proper Installation of Network Node Manager

To verify that the NNM product is installed, do the following:

UNIX:

```
/usr/sbin/swlist | grep "OpenView Network Node Manager"
```

Windows:

1. From the Start menu, launch the Control Panel.
2. Double-click Add/Remove Programs.
3. Verify that HP OpenView Network Node Manager is present in the list of programs.

Setting the NNM Environment Variables

To source the NNM environment variables, do the following:

- *UNIX* using sh or ksh: **. /opt/OV/bin/ov.envvars.sh**
- *UNIX* using csh: **source /opt/OV/bin/ov.envvars.csh**
- *Windows:* In a command window, type
install_dir\bin\ov.envvars.bat

This step sets the following environment variables required by the LAN/WAN Edge SPI:

- *UNIX:* \$OV_BIN, \$OV_LRF, \$OV_CONF, \$OV_MAIN_PATH
- *Windows:* %OV_BIN%, %OV_LRF%, %OV_CONF%, %OV_MAIN_PATH%

MIB Dependencies

The following MIBs must be loaded before the LAN/WAN Edge SPI can function properly:

- RFC1315 MIB or RFC 2115 MIB.
RFC 2115 MIB is shipped with NNM and is backward compatible with RFC 1315 MIB. The RFC2115 MIB is available on the installation CD. After NNM is installed, this MIB is also available in the following directory:
UNIX: \$OV_SNMP_MIBS/Standard
Windows: %OV_SNMP_MIBS%\Standard
- Cisco Frame Relay MIB
This MIB is shipped with LAN/WAN Edge SPI. It has the file name CISCO-FRAME-RELAY-MIB.my. After the LAN/WAN Edge SPI is installed, this MIB is available in the following directory:
UNIX: \$OV_MAIN_PATH/NetSolutions/FrameRelay/RCA
Windows: %OV_MAIN_PATH%\NetSolutions\FrameRelay\RCA
- Cisco SMI MIB
This MIB is shipped with LAN/WAN Edge SPI. It has the file name CISCO-SMI.my. After the LAN/WAN Edge SPI is installed, this MIB is available in the following directory:
UNIX: \$OV_MAIN_PATH/NetSolutions/FrameRelay/RCA
Windows: %OV_MAIN_PATH%\NetSolutions\FrameRelay\RCA

Installing the LAN/WAN Edge SPI

If you encounter problems while performing the installation, see Chapter 4, “Troubleshooting the LAN/WAN Edge Smart Plug-in,” on page 45, as well as the latest *Release Notes for LAN/WAN Edge Smart Plug-in for Network Node Manager* for assistance.

NOTE

If you are installing the LAN/WAN Edge SPI over an existing installation of the LAN/WAN Edge SPI, unload the frame relay correlators as described in “Uninstalling the LAN/WAN Edge SPI” on page 24 before continuing with the installation.

Installing on a UNIX Operating System

To install the LAN/WAN Edge SPI on a UNIX[®] operating system, follow these steps:

1. Log on to the NNM management station as user `root`.
2. Verify that the NNM environment variables are sourced properly as described in “Setting the NNM Environment Variables” on page 19.
3. Mount the Reporting and Network Solutions CD-ROM.
4. From the Reporting and Network Solutions CD-ROM directory, start setup.

The installation script verifies that the target system has the correct version of NNM installed and running. If NNM is not installed and running, the installation script exits with an error. See “Handling Installation Errors” on page 52 for more information.

5. Follow the instructions on the screen to install the LAN/WAN Edge SPI. Table 2-2 lists the decisions you will be asked to make during the installation process.

Table 2-2 **Installation Options for the LAN/WAN Edge SPI**

Option	Description
List of product types to install	Choose to install the NNM Smart Plug-ins.
List of smart plug-ins	Choose to install the LAN/WAN Edge SPI.

6. Load all required MIBs listed in “MIB Dependencies” on page 20.
7. Configure NNM to collect FECN and BECN counters as described in “Configuring NNM to Collect FECN and BECN Counters” on page 28.

NOTE

If OVPI is installed, do not perform step 7. Instead, follow the OVPI Frame Relay Report Pack instructions to enable reporting on the FECN and BECN counters.

Installing on a Windows Operating System

To install the LAN/WAN Edge SPI on a Windows operating system, follow these steps:

1. Log on to the NNM management station as user administrator.
2. Verify that the NNM environment variables are sourced properly as described in “Setting the NNM Environment Variables” on page 19.
3. Insert the Reporting and Network Solutions CD-ROM into the CD-ROM drive.
4. The CD-ROM should start automatically. If it does not, go to the Reporting and Network Solutions CD-ROM directory, and then double-click `setup.bat`.

The installation script verifies that the target system has the correct version of NNM installed and running. If NNM is not installed and running, the installation script exits with an error. See “Handling Installation Errors” on page 52 for more information.

5. Follow the instructions on the screen to install the LAN/WAN Edge SPI. Table 2-3 lists the decisions you will be asked to make during the installation process.

Table 2-3 Installation Options for the LAN/WAN Edge SPI

Option	Description
List of product types to install	Choose to install the NNM Smart Plug-ins.
List of smart plug-ins	Choose to install the LAN/WAN Edge SPI.

6. Load all required MIBs listed in “MIB Dependencies” on page 20.
7. Determine the state of the PMD process:

```
%OV_BIN%\ovstatus -c
```
8. If the PMD process is not running, stop and restart all NNM services:

```
%OV_BIN%\ovstop -c  
%OV_BIN%\ovstart -c
```
9. Configure NNM to collect FECN and BECN counters as described in “Configuring NNM to Collect FECN and BECN Counters” on page 28.

NOTE

If OVPI is installed, do not perform step 9. Instead, follow the OVPI Frame Relay Report Pack instructions to enable the FECN and BECN counters.

Uninstalling the LAN/WAN Edge SPI

To uninstall the LAN/WAN Edge SPI, follow the instructions relevant to your operating system.

CAUTION

If you have customized either or both of the HP OpenView Correlation Composer deploy file (`deploy.conf`) and the Correlation Composer name space file (`NameSpace.conf`), follow the unload process described in “Manually Unloading the LAN/WAN Edge SPI” on page 26.

Uninstalling on a UNIX Operating System

To uninstall the LAN/WAN Edge SPI on a UNIX operating system, follow these steps:

1. Log on to the NNM management station as user `root`.
2. Unload the Frame Relay correlation rules from Correlation Composer:
 - a. `cd $OV_MAIN_PATH/NetSolutions/FrameRelay/RCA`
 - b. `./ovframereLAYunload.ovpl`
3. Type the command relevant to your operating system to remove the LAN/WAN Edge SPI:

HP-UX: `/usr/sbin/swremove HPOvFRPac`

Solaris: `/usr/sbin/pkgrm HPOvFRPac`

Uninstalling on a Windows Operating System

To uninstall the LAN/WAN Edge SPI on a Windows operating system, follow these steps:

1. Log on to the NNM management station as user administrator.
2. Unload the Frame Relay correlation rules from Correlation Composer:
 - a. `cd %OV_MAIN_PATH%\NetSolutions\FrameRelay\RCA`
 - b. `ovframereLAYunload.ovpl`
3. Determine the state of the PMD process:
`%OV_BIN%\ovstatus -c`
4. If the PMD process is not running, stop and restart all NNM services:
`%OV_BIN%\ovstop -c`
`%OV_BIN%\ovstart -c`
5. On the taskbar, click Start, and then click Control Panel.
6. Double-click Add or Remove Programs.
7. Choose to remove the HP FrameRelay Package program.

Manually Unloading the LAN/WAN Edge SPI

If you have customized either or both of the following Correlation Composer files, unload the LAN/WAN Edge SPI manually to prevent the removal of your customizations. Follow the instructions relevant to your operating system.

- The deploy configuration file:
UNIX: `$OV_CONF/ecs/CIB/deploy.conf`
Windows: `%OV_CONF%\ecs\CIB\deploy.conf`
- The name space configuration file:
UNIX: `$OV_CONF/ecs/CIB/NameSpace.conf`
Windows: `%OV_CONF%\ecs\CIB\NameSpace.conf`

Unloading on a UNIX Operating System

To manually unload the LAN/WAN Edge SPI from Correlation Composer on a UNIX operating system, follow these steps:

1. Using any text editor, edit the file `NameSpace.conf` to remove or comment the entry for the LAN/WAN Edge SPI.
2. Start the script `csdeploy.ovpl` with the following syntax:

```
$OV_BIN/csdeploy.ovpl -p deploy_file
```

This script reads the specified deploy configuration file to determine the location of the name space configuration file, and then it deploys the correlators specified in the name space configuration file into the Correlation Composer circuit.

Unloading on a Windows Operating System

To manually unload the LAN/WAN Edge SPI from Correlation Composer on a Windows operating system, follow these steps:

1. Using any text editor, edit the file `NameSpace.conf` to remove or comment the entry for the LAN/WAN Edge SPI.
2. Start the script `csdeploy.ovpl` with the following syntax:

```
%OV_BIN%\csdeploy.ovpl -p deploy_file
```

This script reads the specified deploy configuration file to determine the location of the name space configuration file, and then it deploys the correlators specified in the name space configuration file into the Correlation Composer circuit.

3. Determine the state of the PMD process:

```
%OV_BIN%\ovstatus -c
```

4. If the PMD process is not running, stop and restart all NNM services:

```
%OV_BIN%\ovstop -c
```

```
%OV_BIN%\ovstart -c
```

Configuring NNM to Collect FECN and BECN Counters

NOTE

This configuration step is applicable on all platforms.

If you are using OVPI for performance monitoring, skip this section. Instead, follow the OVPI Frame Relay Report Pack instructions to enable the FECN and BECN counters.

The frame relay standard defines the forward explicit congestion notifier (FECN) and the backward explicit congestion notifier (BECN) as single bits that identify forward and backward congestion, respectively. In this document, the terms *FECN* and *BECN* refer to NNM's FECN and BECN counters.

To configure NNM to monitor the FECN and BECN counters for generating threshold events:

1. Start NNM.
2. Click **Options: Data Collection & Thresholds: SNMP**.
3. In the **Data Collection and Threshold** window, click **Edit: Add-> MIB Objects**.
4. In the **MIB Object Selection** window, select **Expression**.
5. In the **Expression ID list**, click **IfFRPctBECN** to configure collection of the BECN counter.
(To enable collection of the FECN counter, click **IfFROctFECN**.)
6. Click **Apply**.
The **Add IfFRPctBECN Collection for management station name** window appears.
7. In the **Set Collection Mode** list, click **Store, Check Thresholds**.
8. In the **Source** box, enter the list of nodes for which the BECN count should be monitored, and then click **Add**.

9. In the `Polling Interval` box, set the time between threshold checks.

The polling interval is in the format `xh` or `xm`. `x` is the numerical duration of the interval. `h` indicates hours, and `m` indicates minutes. The default polling interval is `4h` (or four hours).

10. In the `Threshold` list, click a threshold type.

11. Set the threshold level:

- If you chose a fixed threshold type in step 10, select an operand from the list, and then type the percentage value.
- If you chose a statistical threshold type in step 10, select a direction from the list, and then type the standard deviation.

12. Enter the number of consecutive samples from which to measure.

13. In the `Rearm` list, click a threshold type.

14. Set the rearm level:

- If you chose a fixed rearm type in step 13, select an operand from the list, select either `Percent of Threshold` or `Absolute`, and then type the rearm value.
- If you chose a statistical arm type in step 13, select a direction from the list, and then type the standard deviation.

15. Enter the number of consecutive samples from which to measure.

16. If needed, configure the threshold and rearm events.

17. Click `Apply`, and then click `OK` to save the changes.

For more information on configuring data collections, see *Network Node Manager Managing Your Network*.

Installing the LAN/WAN Edge Smart Plug-in
Configuring NNM to Collect FECN and BECN Counters

3 Understanding Events from the LAN/WAN Edge Smart Plug-in

Input to the LAN/WAN Edge SPI

The LAN/WAN Edge Smart Plug-in (SPI) accepts input events and traps from multiple sources:

- Direct HP OpenView events and SNMP traps regarding status changes
- Syslog message events

Typically, you will use either the direct HP OpenView events and SNMP traps *or* syslog message events as your input to the LAN/WAN Edge SPI.

Direct HP OpenView Events and SNMP Traps

The LAN/WAN Edge SPI interprets the following HP OpenView events and SNMP traps that indicate device status changes:

- Interface status change events regarding the frame relay devices generated by netmon.
- Interface status change events regarding the frame relay devices generated by the advanced poller analyzer (APA).
- Link down traps generated by Cisco frame relay devices.
- Data link connection identifier (DLCI) status change traps and LMI failure traps generated by frame relay devices.

Table 3-1 lists the HP OpenView events and SNMP traps that the LAN/WAN Edge SPIs accept as input to one or more correlators.

Table 3-1 Direct Events and Traps for Frame Relay Correlation

Event or Trap Name/ Identifier	Event or Trap Generator	Notes
OV_IF_Down/ .1.3.6.1.4.1.11.2.17.2.1.0.58916867	netmon	The seventh variable binding contains the index of the interface that is down.
OVO_APA_IF_DOWN/ .1.3.6.1.4.1.11.2.17.2.1.0.58983002	APA	The fifth variable binding contains the index of the interface that is down.
Cisco_Link_Down/ .1.3.6.1.4.1.9	Frame relay device (Cisco devices only)	If the fourth variable binding contains the value <code>LMI failed</code> , the LAN/WAN Edge SPI accepts this trap. The first variable binding contains the index of the interface that is down.
frDLCIStatusChange/ .1.3.6.1.2.1.10.32.0.1	Frame relay device	The third variable binding contains the DLCI status.

Syslog Message Events

The syslog integration functionality provided with Network Node Manager (NNM) enables the management of network equipment from syslog messages. Certain types of network equipment do not have SNMP traps nor supporting MIBs for all error and warning conditions. Also, some network administrators choose to manage the network through syslog messages. The syslog integration functionality provides the ability to map syslog messages into HP OpenView events for presentation or analysis.

The syslog integration functionality generates link, line protocol, and DLCI status change events from messages in the syslog file. Table 3-2 lists the syslog messages that pertain to frame relay devices. The third column in the table indicates whether the LAN/WAN Edge SPI accepts the generated HP OpenView event as input to one or more correlators.

Table 3-2 Syslog Event Mappings for Frame Relay Devices

Syslog Message Format	HP OpenView Event Generated	Correlated?
%LINK-3-UPDOWN (down)	OV_Syslog_LinkDown	No
%LINK-3-UPDOWN (up)	OV_Syslog_LinkUp	No
%LINEPROTO-5-UPDOWN (down)	OV_Syslog_LineProtoDown	Yes
%LINEPROTO-5-UPDOWN (up)	OV_Syslog_LineProtoUp	No
%FR-5-DLCICHANGE (INVALID)	OV_Syslog_FrameDLCI_Inactive	Yes
%FR-5-DLCICHANGE (INACTIVE)		
%FR-5-DLCICHANGE (ACTIVE)	OV_Syslog_FrameDLCI_Active	No

To initialize the syslog service:

UNIX: `$OV_BIN/setupSyslog.ovpl`

NOTE

The syslog integration functionality is not available on the Windows operating system.

Frame Relay Correlators

This section provides an explanation of the correlators included in the LAN/WAN Edge SPI. These correlators are defined using Correlation Composer.

- `OV_FR_DLCIFailedDueIFproblem`
Listens for interface down events (generated by netmon) and DLCI status change traps from the same device. This failure indicates that the device cannot communicate with the frame relay cloud because of a problem with the interface.
- `OV_FR_APA_DLCIFailedDueIFproblem`
Listens for interface down events (generated by the APA) and DLCI status change traps from the same device. This failure indicates that the device cannot communicate with the frame relay cloud because of a problem with the interface.

NOTE

If the APA is enabled, netmon does not generate any interface down events.

- `OV_FR_DLCIFailureDueToLMIDown`
Listens for DLCI status change traps and LMI failure traps to determine if the DLCI status changes are a result of the Local Management Interface (LMI) failing. This failure indicates that the interface is up, but the device cannot communicate with the frame relay cloud (meaning, a protocol mismatch exists between the router and the service provider).
- `OV_FR_DLCIFailureDueToCloudProblem`
Listens for DLCI status change traps and then performs additional work to determine if the problem resides with the service provider. A new event is generated when at least one DLCI status change trap is received within the configurable Time Window. The type of event generated depends on the type of information the correlation rule receives, such as if the creation time has changed or if the DLCI status is invalid or inactive.

Output from the LAN/WAN Edge SPI

Table 3-3 lists the HP OpenView events that the LAN/WAN Edge SPI correlators generate. For a description of the situation that causes each event, see “Diagnosing Frame Relay Problems” on page 37.

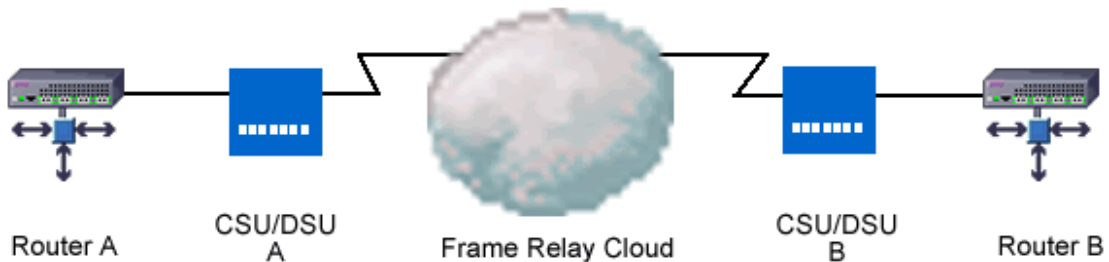
Table 3-3 Events Generated by the LAN/WAN Edge SPI

HP OpenView Event/ Identifier	Generating Correlator
OV_FrameRelayReset/ .1.3.6.1.4.1.11.2.17.1.0.58982428	OV_FR_DLCIFailureDueToCloudProblem
OV_FrameRelayCarrierProblem/ .1.3.6.1.4.1.11.2.17.1.0.58982429	OV_FR_DLCIFailureDueToCloudProblem
OV_FrameRelayLocalCircuitProblem/ .1.3.6.1.4.1.11.2.17.1.0.58982430	OV_FR_DLCIFailureDueToCloudProblem OV_FR_DLCIFailureDueToLMIDown
OV_FrameRelayCircuitProblem/ .1.3.6.1.4.1.11.2.17.1.0.58982431	OV_FR_DLCIFailureDueToCloudProblem
OV_FrameRelayIFProblem/ .1.3.6.1.4.1.11.2.17.1.0.58982433	OV_FR_DLCIFailedDueIFproblem OV_FR_APA_DLCIFailedDueIFProblem

Diagnosing Frame Relay Problems

This chapter provides examples of how to use the LAN/WAN Edge SPI to help you diagnose problems.

Figure 3-1 **The Frame Relay Network**



Interface Down on the Local Frame Relay Interface

This scenario corresponds to problem 1 in Figure 1-1 on page 11. Refer to Figure 3-1 on page 37 for the network used in this example.

The following steps illustrate when the LAN/WAN Edge SPI might generate a Frame Relay: Local PVC problem due to IF DOWN event:

1. The LAN/WAN Edge SPI receives an interface down event or a DLCI status change trap with status inactive (or invalid) that indicates a failure on Router A. The Window Period begins.
2. During the Window Period, the LAN/WAN Edge SPI continues to receive interface down events and DLCI status change traps with status inactive (or invalid) for Router A.
3. If the LAN/WAN Edge SPI receives the combination of at least one interface down event and one DLCI status change trap with status inactive (or invalid) for Router A during the Window Period, it generates an `OV_FrameRelayIFProblem` event (with text `Frame Relay: Local PVC problem due to IF DOWN`). This event indicates that there is a problem with the local frame relay interface (Router A).

The interface down on the DTE (Router A) is the root cause. The DLCI status change events are symptoms of not being able to reach the DLCI because the DTE is down.

For information about the format of this message, see “User Interaction with the LAN/WAN Edge SPI” on page 13.

For information about setting the value of the `Window Period`, see “Setting Parameters in HP OpenView Correlation Composer” on page 42.

NOTE

If the LAN/WAN Edge SPI receives a DLCI status change trap with invalid or inactive status before it receives an interface down event and both notifications arrive during the configurable `Window Period`, then two events may be generated and displayed in the FrameRelay Alarms browser: one event indicating the interface down status and another indicating PVC flapping. This situation occurs because the LAN/WAN Edge SPI does not that know the problem is due to an interface failure and the DLCI status change trap also satisfies the conditions of another correlator. In this case, the DLCI status change trap appears as a correlated trap under both events.

LMI Problem on the Local Frame Relay Interface

This scenario corresponds to problem 2 in Figure 1-1 on page 11. Refer to Figure 3-1 on page 37 for the network used in this example.

The following steps illustrate when the LAN/WAN Edge SPI might generate a Frame Relay: Local PVC problem due to LMI failure event:

NOTE

This correlation is applicable to Cisco devices only.

1. The LAN/WAN Edge SPI receives a Cisco-specific link down trap that indicates an LMI failure on Router A. The `Time Window` begins.
2. During the `Time Window`, the LAN/WAN Edge SPI continues to receive DLCI status change traps with inactive status for Router A.

3. The LAN/WAN Edge SPI generates an `OV_FrameRelayLocalCircuitProblem` event (with text `Frame Relay: Local PVC problem due to LMI failure`). This event indicates that there is a problem at the local frame relay interface.

Typically, this event indicates that the frame relay device cannot communicate with the service provider.

For information about the format of this message, see “User Interaction with the LAN/WAN Edge SPI” on page 13.

For information about setting the value of the `Time Window`, see “Setting Parameters in HP OpenView Correlation Composer” on page 42.

NOTE

If the LAN/WAN Edge SPI receives a DLCI status change trap with inactive status before it receives an LMI failure trap and both traps arrive during the configurable `Time Window`, then two events may be generated and displayed in the `FrameRelay Alarms` browser: one event indicating the LMI failure and another indicating PVC flapping. This situation occurs because the LAN/WAN Edge SPI does not know that the problem is due to an LMI failure, and the DLCI status change trap also satisfies the conditions of another correlator. In this case, the DLCI status change trap appears as a correlated trap under both events.

Carrier Problem Due to PVC Invalidation

This scenario corresponds to problem 3 in Figure 1-1 on page 11. Refer to Figure 3-1 on page 37 for the network used in this example.

The following steps illustrate when the LAN/WAN Edge SPI might generate a `Frame Relay: Carrier Problem` event:

1. The LAN/WAN Edge SPI receives a DLCI status change trap with invalid status for Router A. The `Time Window` begins.
2. The LAN/WAN Edge SPI verifies that the DLCI status change is not due to an interface down failure.
3. After the `Time Window` has expired, the LAN/WAN Edge SPI determines whether the DLCI status change is caused by a fault with the service provider or a fault with the interface or LMI configuration at the local data terminal equipment (DTE). In the following order, the LAN/WAN Edge SPI verifies that:

- a. The LMI link is operational.
 - b. The creation time has not changed.
 - c. The current DLCI status is *invalid*.
4. The LAN/WAN Edge SPI generates an `OV_FrameRelayCarrierProblem` event (with text `Frame Relay: Carrier Problem`). This event indicates that there is a problem within the frame relay cloud.

Typically, this event indicates that the service provider has inactivated the PVC. You may need to call your service provider.

For information about the format of this message, see “User Interaction with the LAN/WAN Edge SPI” on page 13.

For information about setting the value of the `Time Window`, see “Setting Parameters in HP OpenView Correlation Composer” on page 42.

DLCI Flapping Due to Circuit Problem

This scenario corresponds to problem 3 in Figure 1-1 on page 11. Refer to Figure 3-1 on page 37 for the network used in this example.

The following steps illustrate when the LAN/WAN Edge SPI might generate a `Frame Relay: PVC Flapping` event:

1. The LAN/WAN Edge SPI receives one or more DLCI status change traps for Router A with inactive status.
2. After the `Time Window` has expired, the LAN/WAN Edge SPI determines whether the DLCI status change is caused by a fault with the service provider or a fault with the interface or LMI configuration at the local DTE. In the following order, the correlator instance verifies that:
 - a. The LMI link is operational.
 - b. The creation time has not changed.
 - c. The current DLCI status is *inactive*.
3. The LAN/WAN Edge SPI generates an `OV_FrameRelayCircuitProblem` event (with text `Frame Relay: PVC Flapping`). This event indicates that there is a problem within the frame relay cloud.

This problem could be due to an issue with the remote destination interface DTE.

For information about the format of this message, see “User Interaction with the LAN/WAN Edge SPI” on page 13.

For information about setting the value of the `Time Window`, see “Setting Parameters in HP OpenView Correlation Composer” on page 42.

DLCI Reset Problem

This scenario corresponds to problem 3 in Figure 1-1 on page 11. Refer to Figure 3-1 on page 37 for the network used in this example.

The following steps illustrate when the LAN/WAN Edge SPI might generate a `Frame Relay: PVC Reset (Creation time changed)` event:

1. The LAN/WAN Edge SPI receives one or more DLCI status change traps for Router A with invalid or inactive status.
2. After the `Time Window` has expired, the LAN/WAN Edge SPI determines whether the DLCI status change is caused by a fault with the service provider or a fault with the interface or LMI configuration at the local DTE.
3. The LAN/WAN Edge SPI determines if the PVC has been reset in the last 30 minutes. If so, it generates an `OV_FrameRelayReset` event (with text `Frame Relay: PVC Reset (Creation time changed)`). This event indicates that there is a problem within the frame relay cloud.

For information about the format of this message, see “User Interaction with the LAN/WAN Edge SPI” on page 13.

For information about setting the value of the `Time Window`, see “Setting Parameters in HP OpenView Correlation Composer” on page 42.

Setting Parameters in HP OpenView Correlation Composer

To view more information about or to modify the parameters of the correlators of the LAN/WAN Edge SPI, follow these steps:

TIP

There are several ways to access the event correlation features. For more information, from any submap, select `Tools:HP OpenView Launcher`. Select the [?] tab. Click `Tasks, Event Correlation Management`. Read the information under *Accessing the Event Correlation Configuration Windows*.

1. From any NNM submap, click `Options:Event Configuration` to launch the `Event Configuration` window.
2. In the `Event Configuration` window, click `Edit:Event Correlation` to open the `ECS Configuration` window.
3. To enable or disable a correlation, in the `ECS Configuration` window, highlight the correlation, and then click `Enable` or `Disable`.
4. To display the correlation description, in the `ECS Configuration` window, highlight the correlation, and then click `Describe`.
5. To open the `CorrelatorName-Modify` window, in the `ECS Configuration` window, highlight the correlation, and then click `Modify`.

The only configurable parameters for the LAN/WAN Edge SPI correlations are those for changing the correlation window periods. See Table 3-4 on page 43 for more information.

6. To view a parameter's description or to modify a configurable parameter's value, select the parameter, and then click `View/Modify`.

Table 3-4 Configurable Correlator Parameters

Correlator Name	Configurable Parameter	Description
OV_FR_DLCIFailedDueIFproblem	Window Period	Correlation time window.
	Time Period	Time window to clean up the internal memory.
OV_FR_APA_DLCIFailedDueIFProblem	Window Period	Correlation time window.
	Time Period	Time window to clean up the internal memory.
OV_FR_DLCIFailureDueToLMIDown	Time Window	Correlation time window.
	timeperiodAddTwo	Time window to clean up the internal memory.
OV_FR_DLCIFailureDueToCloudProblem	Time Window	Correlation time window.
	timeperiodPlusTwo	Time window to clean up the internal memory.

A typical value for the time window to clean up the internal memory is 20 seconds greater than the value of the correlation time window. By default, the value of the correlation time window parameter is 300s and the value of the time window to clean up the internal memory parameter is 320s.

NOTE

Increasing the value of the correlation time window parameter causes the LAN/WAN Edge SPIs to consume more memory resources and delay correlation output.

Understanding Events from the LAN/WAN Edge Smart Plug-in
Setting Parameters in HP OpenView Correlation Composer

4

Troubleshooting the LAN/WAN Edge Smart Plug-in

Troubleshooting Checklist

Following is a summary of items to consider if you are having difficulties with the LAN/WAN Edge Smart Plug-in (SPI):

- Network Node Manager (NNM) cannot connect to the topology.
 - ❑ Verify that NNM is installed as described in “Verifying Proper Installation of Network Node Manager” on page 19.
 - ❑ Verify that the NNM environment variables have been sourced properly as described in “Setting the NNM Environment Variables” on page 19.
 - ❑ Verify that the NNM services are running properly as described in “Verifying That the NNM Services are Operating on the Management Station” on page 48.
- One or more frame relay devices is not appearing in the NNM topology.

NNM has not discovered this device.

- ❑ Use the `loadhosts` command or a seed file to help NNM locate all frame relay devices in the network. For instructions, see *Managing Your Network with NNM*.
- No events appear in the FrameRelay Alarms category of the NNM alarm browser.

The LAN/WAN Edge SPI is not receiving events about the frame relay devices.

- ❑ Verify that the required MIBs are loaded as described in “Verifying that MIBs are Loaded” on page 50.
- ❑ Verify that the managed devices are properly configured to forward traps to the NNM management station:
 - If you use SNMP access-control to limit the computers that can have SNMP access to a router, include the NNM management station in the access list on each frame relay device.
 - Configure each frame relay device to include the NNM management station as one of the SNMP trap recipients.

- For information about these configurations, see the documentation that came with your routers.
- ❑ Verify that the NNM management station is receiving events from the devices:
 - Look in the All Alarms browser for events regarding the frame relay devices. An easy way to create an event is to temporarily disconnect an interface card on the frame relay router from the network.
- ❑ Verify that the LAN/WAN Edge SPI is installed as described in “Verifying that the LAN/WAN Edge SPI is Installed” on page 49.
- ❑ Verify that Correlation Composer circuit is loaded into ECS and enabled as described in “Verifying the Correlation Composer Circuit” on page 51.
- ❑ Verify that `Composer.fs` exists as described in “Failure of `csdeploy.ovpl`” on page 52.
- ❑ If the error indicates a problem with loading, unloading, enabling, or disabling a circuit or fact store, verify that you can perform the respective operation manually as described in “Working Manually with the Correlation Composer Circuit” on page 54.
- If you are trying to install the LAN/WAN Edge SPI over an existing version, unload the LAN/WAN Edge SPI as described in “Manually Unloading the LAN/WAN Edge SPI” on page 26 before following the LAN/WAN Edge SPI installation steps.
- For additional troubleshooting information, refer to the latest *Release Notes for LAN/WAN Edge Smart Plug-in for Network Node Manager* and *Reporting and Network Solutions Release Notes* available on the Web at http://ovweb.external.hp.com/lpe/doc_serv under the Reporting and Network Solutions product category.

Verifying That the NNM Services are Operating on the Management Station

To verify that the NNM services are operating on the management station, follow these steps:

1. Verify that NNM is installed as described in “Verifying Proper Installation of Network Node Manager” on page 19.
2. Determine the status of the NNM services:

- *UNIX*: `$OV_BIN/ovstatus -v`
- *Windows*: `%OV_BIN%\ovstatus -v`

All of the processes, including PMD, should be running.

3. If NNM and all associated processes are not running, stop and restart the NNM services:

- *UNIX*:
`$OV_BIN/ovstop -c`
`$OV_BIN/ovstart -c`
- *Windows*:
`%OV_BIN%\ovstop -c`
`%OV_BIN%\ovstart -c`

Verifying that the LAN/WAN Edge SPI is Installed

To verify that the LAN/WAN Edge SPI is installed on the management station, follow these steps:

1. Examine the categories in the NNM alarm browser.
 - If the FrameRelay Alarms category exists, then the LAN/WAN Edge SPI is installed.
 - If the FrameRelay Alarms category does not exist, proceed to step 2.
2. Examine the name space configuration file:
UNIX: `$OV_CONF/ecs/CIB/NameSpace.conf`
Windows: `%OV_CONF%\ecs\CIB\NameSpace.conf`
 - If this file contains an entry for `FrameRelay` that is *not* preceded by a comment character (`#`), then the LAN/WAN Edge SPI is installed.

Update the list categories in the NNM alarm browser:

- Stop and restart NNM.
OR
- Stop and restart the NNM alarm browser only.
 - a. Close the alarm browser.
 - b. Type the command:
 - *UNIX*: `$OV_BIN/xnmevents`
 - *Windows*: `%OV_BIN%\xnmevents`
- If this file does not contain an entry for `FrameRelay`, then the LAN/WAN Edge SPI is not installed.

See “Installing the LAN/WAN Edge SPI” on page 21.

Verifying that MIBs are Loaded

To verify that the required MIBs are loaded onto the NNM management station, follow these steps:

1. In NNM, click Options->Load/Unload MIBs:SNMP.

The Load/Unload MIB:SNMP window appears. This window lists the MIBs that have been loaded onto the NNM management station.

2. Verify that the MIBs listed in “MIB Dependencies” on page 20 are loaded.
3. If one or more of the required MIBs is not loaded, add it using this window.

For more information, see *Network Node Manager Managing Your Network*.

Verifying the Correlation Composer Circuit

To verify that the Correlation Composer circuit is loaded into ECS and enabled, follow these steps:

1. Determine the current ECS configuration:

- *UNIX*: `$OV_BIN/ecsmgr -info`
- *Windows*: `%OV_BIN%\ecsmgr -info`

2. In the `ecsmgr` output, look for the line:

```
circuit name - Composer.
```

3. In the `Composer` circuit section of the `ecsmgr` output, look for the following lines:

- `fact store name - Composer`

This line indicates that the Correlation Composer circuit is loaded into ECS.

- `circuit state - stream default - enabled`

This line indicates that the Correlation Composer circuit is enabled.

- `Perl File loaded: ...fr.ovpl`

This line indicates that the frame relay perl script is loaded.

4. Evaluate your findings:

- If you saw the lines specified in step 3, then the Correlation Composer circuit is loaded and running correctly.
- If you did not see the lines specified in step 3, then load the Correlation Composer circuit.

To load the Correlation Composer circuit, stop and restart the NNM services. For instructions, see “Verifying That the NNM Services are Operating on the Management Station” on page 48.

Handling Installation Errors

If the installation of the LAN/WAN Edge SPI fails, it could be because of one of the following problems:

Error Loading Frame Relay Correlation Rules

The LAN/WAN Edge SPI could not connect to PMD. To resolve this installation error, verify that the NNM services are running as described in “Verifying That the NNM Services are Operating on the Management Station” on page 48.

Frame Relay Trap Definitions Already Loaded

A version of the LAN/WAN Edge SPI already exists on the NNM management station, so the frame relay trap definitions have already been loaded onto the system.

This message is informational only.

Failure of csdeploy.ovpl

The LAN/WAN Edge SPI correlators did not merge correctly with the Correlation Composer circuit.

- Verify that the Correlation Composer fact store file exists:

UNIX: `$OV_CONF/ecs/circuits/Composer.fs`

Windows: `%OV_CONF%\ecs\circuits\Composer.fs`

— If the Correlation Composer fact store file exists, the correlations are loaded and should work properly.

— If the Correlation Composer fact store file does not exist, then create this file:

— *UNIX:* `$OV_BIN/csdeploy.ovpl -p deploy_file`

— *Windows:* `%OV_BIN%\csdeploy.ovpl -p deploy_file`

- You can also examine the log file for the process that merges the fact store information:

UNIX: \$OV_LOG/ecs/csmerge.log

Windows: %OV_LOG%\ecs\csmerge.log

Working Manually with the Correlation Composer Circuit

If the LAN/WAN Edge SPI generates an error that indicates a problem with loading, unloading, enabling, or disabling a circuit or fact store, verify that you can perform the respective operation manually.

- To manually disable the Correlation Composer circuit:
 - *UNIX*: `$OV_BIN/ecsmgr -disable Composer`
 - *Windows*: `%OV_BIN%\ecsmgr -disable Composer`
- To manually enable the Correlation Composer circuit:
 - *UNIX*: `$OV_BIN/ecsmgr -enable Composer`
 - *Windows*: `%OV_BIN%\ecsmgr -enable Composer`
- To manually unload the Correlation Composer circuit:
 - *UNIX*: `$OV_BIN/ecsmgr -circuit_unload Composer`
 - *Windows*: `%OV_BIN%\ecsmgr -circuit_unload Composer`
- To manually unload the Correlation Composer fact store:
 - *UNIX*: `$OV_BIN/ecsmgr -fact_unload Composer`
 - *Windows*: `%OV_BIN%\ecsmgr -fact_unload Composer`
- To reload the Correlation Composer circuit or fact store, manually unload the circuit or fact store as described above, and then follow the steps relevant to your operating system:

UNIX:

1. `$OV_BIN/ecsmgr -fact_load Composer
$OV_CONF/ecs/circuits/Composer.fs`
2. `$OV_BIN/ecsmgr -data_load Composer
$OV_CONF/ecs/circuits/Composer.ds`

This command is only required if the data store has been unloaded using the command `ecsmgr -reset`.

The `Composer.ds` file contains no data. This file exists because it is required input to the next command.

3. **`$OV_BIN/ecsmgr -circuit_load Composer`
`$OV_CONF/ecs/circuits/Composer.eco Composer Composer`**

In the above command, the first `Composer` references the `Composer.ds` file. The second `Composer` references the `Composer.fs` file. Both references are required.

4. **`$OV_BIN/ecsmgr -enable Composer`**

Windows:

1. **`%OV_BIN%\ecsmgr -fact_load Composer`
`%OV_CONF%\ecs\circuits\Composer.fs`**
2. **`%OV_BIN%\ecsmgr -data_load Composer`
`%OV_CONF%\ecs\circuits\Composer.ds`**

This command is only required if the data store has been unloaded using the command `ecsmgr -reset`.

The `Composer.ds` file contains no data. This file exists because it is required input to the next command.

3. **`%OV_BIN%\ecsmgr -circuit_load Composer`
`%OV_CONF%\ecs\circuits\Composer.eco Composer Composer`**

In the above command, the first `Composer` references the `Composer.ds` file. The second `Composer` references the `Composer.fs` file. Both references are required.

4. **`%OV_BIN%\ecsmgr -enable Composer`**

NOTE

If one or more of the manual operations reports a failure, refer to the troubleshooting information in the ECS documentation for more information.

Tracing a Process to Document Error Messages

If errors occur that are not documented in this user guide, then collect a trace file of the error condition, by following these steps:

1. Enable tracing of the components related to the function of the LAN/WAN Edge SPI:

- a. Enable tracing:

```
UNIX: $OV_BIN/ecsmgr -trace 65536
```

```
Windows: %OV_BIN%\ecsmgr -trace 65536
```

- b. Enable tracing of the ECS engine:

```
UNIX: $OV_BIN/pmdmgr -Secss\;T0x00400000 -Qt -Q1
```

```
Windows: %OV_BIN%\pmdmgr -Secss;T0x00400000 -Qt -Q1
```

- c. Enable tracing of the Correlation Composer circuit:

```
UNIX: $OV_BIN/ecsmgr -fact_update Composer
```

```
$OV_CONTRIB/CompTraceOn.fs
```

```
Windows: %OV_BIN%\ecsmgr -fact_update Composer
```

```
%OV_CONTRIB%\CompTraceOn.fs
```

2. With tracing enabled, rerun your test scripts or repeat the steps necessary to recreate the scenario that caused the unexpected behavior.
3. View the `pmd.trc` files for more details. These files are in the following directory:

```
UNIX: $OV_LOG
```

```
Windows: %OV_LOG%
```

4. If necessary, contact your HP support representative.

Submit the following files:

```
UNIX:
```

- `$OV_LOG/pmd.trc*`
- `$OV_LOG/ecs/1/ecsin.evt*`

Windows:

- %OV_LOG%\pmd.trc*
- %OV_LOG%\ecs\1\ecsin.evt*

NOTE

Enabling tracing consumes some of PMD's processing power. After you have resolved the problem, disable tracing by executing:

UNIX:

- \$OV_BIN/pmdmgr -SECSS\;T0x0
- \$OV_BIN/ecsmgr -fact_update Composer
\$OV_CONTRIB/CompTraceOff.fs

Windows:

- %OV_BIN%\pmdmgr -SECSS;T0x0
 - %OV_BIN%\ecsmgr -fact_update Composer
%OV_CONTRIB%\CompTraceOff.fs
-

B

benefits
 LAN/WAN Edge SPI, 9

C

Carrier Problem event, 13, 39
Cisco link down traps, 32, 38
Composer
 modifying parameters, 42
 verifying the circuit, 51
configuration
 monitoring FECN and BECN counters, 28
Corr column
 display correlated alarms, 13
Correlation Composer
 modifying parameters, 42
 verifying the circuit, 51
correlators
 modifying, 42
creation time change, 35
cross-launch of OVPI reports, 14

D

DLCI resets, 13
DLCI status change traps, 12, 32, 35, 37, 38,
 39, 40, 41

E

ecsmgr
 -info, 51
 -trace, 56, 57

F

frame relay network
 types of problems, 10
FrameRelay Alarms browser, 13

I

iffIndex, 13
installation
 hardware prerequisite, 18
 on UNIX, 21
 on Windows, 22
 software prerequisite, 18
interface down events, 12, 32, 37
interface index, 13

L

LAN/WAN Edge SPI
 behavior, 12
 benefits, 9
 installation
 on UNIX, 21
 on Windows, 22
 verification, 49
 output events, 36
 software prerequisites, 18
 uninstall
 on UNIX, 24
 on Windows, 25
 unload of correlation rules
 manually, 26
 on UNIX, 24
 on Windows, 25
launch of OVPI reports, 14
LMI failure traps, 10, 32, 35, 38
Local PVC problem due to IF DOWN event,
 13, 37
Local PVC problem due to LMI failure event,
 13, 38

M

MIB dependencies, 20
 verification, 50
modification of correlators, 42
monitoring FECN and BECN counters, 28

N

Network Node Manager
 prerequisite, 18
NNM alarm browser
 FrameRelay Alarms, 13
NNM services
 verification, 48

O

operating systems
 supported, 18
ovframelayunload.ovpl, 24, 25
OVPI report
 launching, 14

P

pmd.trc
 pmd trace file, 56
PVC Flapping event, 13, 40

Index

PVC Reset (Creation time changed) event,
13, 41

R

remote destination, 13

S

support

contacting HP, 5

syslog message events, 33

T

time period, 12

Time Window, 35, 38, 39, 40, 41, 43

U

uninstall

on UNIX, 24

on Windows, 25

unload of correlation rules

manually, 26

on UNIX, 24

on Windows, 25

W

Window Period, 37, 43