NOKIA

NSP
Network Services Platform

Network Functions Manager - Packet (NFM-P)

Release 18.12

Optical Integration Module User Guide

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Legal notice

Contents

About this document

Purpose

This guide describes how to perform NFM-P and NFM-T integration for an 1830 PSS based OTN network that includes:

- Photonic and electrical switching
- Photonic and electrical GMPLS
- SDH aggregation and switching
- L2/Ethernet-over-WDM switching functions embedded with 1830 PSS

Safety information

For your safety, this document contains safety statements. Safety statements are given at points where risks of damage to personnel, equipment, and operation may exist. Failure to follow the directions in a safety statement may result in serious consequences.

Document support

Customer documentation and product support URLs:

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1 What's new?

1.1 Overview

1.1.1 Purpose

This chapter highlights new features for NFM-P Release 18 and provides references to the specific feature content. Feature lists and high-level feature descriptions are also available in the *NSP NFM-P Release Description*.

1.1.2 Contents

1.2 What's new in NFM-P Release 18 for OIM

1.2.1 Maintenance releases

Some maintenance releases may not be listed in this section, either because no new features are introduced or the features introduced do not require documentation.

1.2.2 What's new in NFM-P 18.12 for OIM

No new features are added in NFM-P Release 18.12 for OIM.

See the *NSP NFM-P User Guide* for more information about non-OIM features and functions.

1.2.3 What's new in NFM-P 18.9 for OIM

No new features are added in NFM-P Release 18.9 for OIM.

See the *NSP NFM-P User Guide* for more information about non-OIM features and functions.

1.2.4 What's new in NFM-P 18.6 for OIM

No new features are added in NFM-P Release 18.6 for OIM.

See the *NSP NFM-P User Guide* for more information about non-OIM features and functions.

1.2.5 What's new in NFM-P 18.3 for OIM

No new features are added in NFM-P Release 18.3 for OIM.

See the *NSP NFM-P User Guide* for more information about non-OIM features and functions.

2 Platform architecture

2.1 Overview

2.1.1 Purpose

This chapter provides information about the OIM platform architecture.

2.1.2 Contents

2.2 Introduction

2.2.1 Functional description

NFM-T is a management and provisioning solution for optical networks that NFM-P can manage as an EMS with the following functionality:

- Discovery of optical nodes managed by NFM-T as EMS NEs in NFM-P.
- Display of physical connectivity between EMS NEs on the network topology map.
- Fault management and display of alarms from EMS NEs, HIP links, and NFM-T platform.
- Cross-launch of NFM-T web GUI for nodes, physical links (external optical links), alarms, and from NFM-P FM application.

2.2.2 NFM-T integration with NFM-P

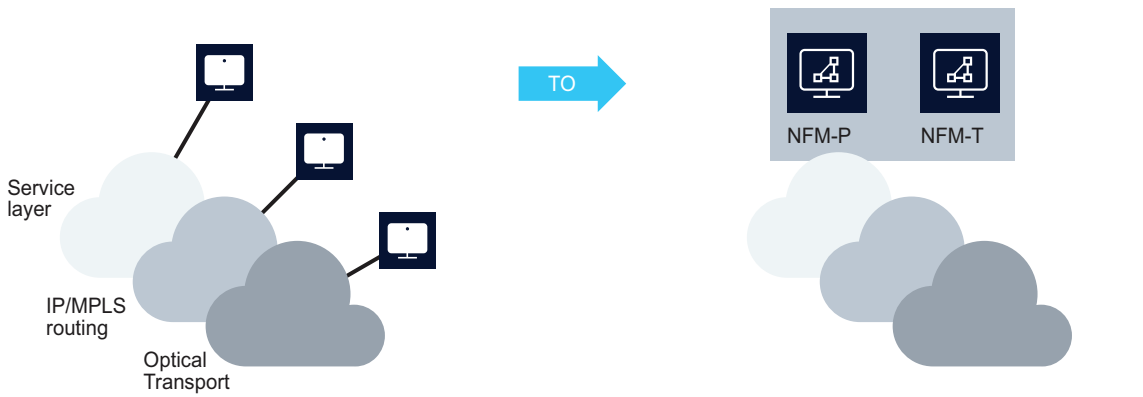
NFM-P and NFM-T integration for an 1830 PSS based OTN network includes the following objectives:

- Photonic and electrical switching (L0 and L1 OTN)
- Photonic and electrical GMPLS
- SDH aggregation and switching
- L2/Ethernet-over-WDM switching functions embedded with 1830 PSS

NFM-T and NFM-P are installed on the same server as coresidents. The integrated network management system functions along with the rest of NFM-P software when IP and optical convergence is required. The integrated network management system can function standalone when it is associated with optical network management.

NFM-T and NFM-P integration is also supported when NFM-T and NFM-P are on different servers.

Figure 2-1 NFM-T integration with NFM-P



NFM-T shares the following with NFM-P applications:

- Infrastructure (VMWare)
- Common FM application
- Common Network Inventories
- NBI (XML API) for common functions (Alarms/Events and Inventory)

NFM-T is compatible with the standard hardware platform of NFM-P and the required middleware.

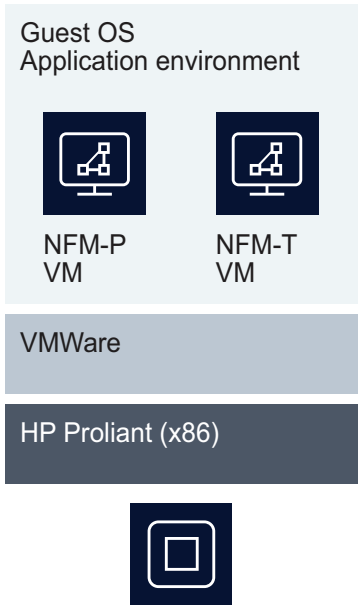
2.3 Single hardware infrastructure

2.3.1 Single hardware platform

The hardware server that is supported is the HP-based x86 server (HP Proliant line) running RHEL.

The 1646 SM and NFM-P are installed on a single virtualized machine, where all the software components supporting the HIP solution are integrated as per the following figure.

Figure 2-2 Coresident platform architecture



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2.3.2 High availability

NFM-P and NFM-T support redundant configurations. The active and spare servers host both NFM-P and NFM-T components; that is, different virtual machines are coresident in the same machine. NFM-P automatically connects to the active NFM-T server for HIP communication after manual or disaster switch over happens. NFM-P alternates between the two IP addresses, server IP address and the second server IP address, until one of the servers in active and then requests a resynchronization. The objects, alarms, and links sent by the standby NFM-T after the switch over is consistent with what was sent by the previous active server.

Note: Ensure that the data replication is configured in NFM-T before switch over and both the active and standby servers are synchronized.

When switch-over happens from active (main) server to spare (DRC) server:

- HIP reactivation happens automatically

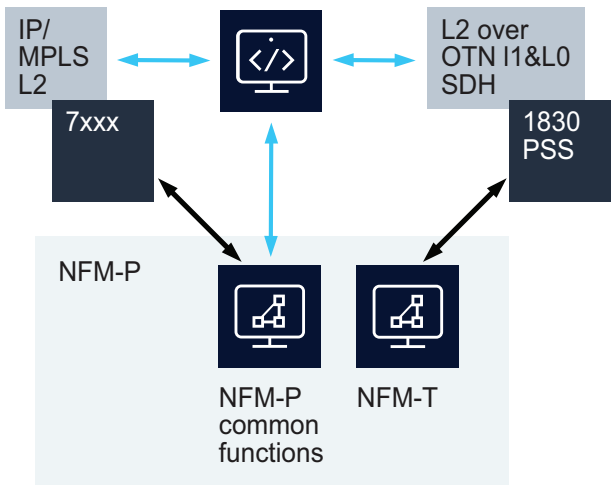
- configurations in both NFM-P and NFM-T are retained
- hardware inventory is available in both NFM-P and NFM-T
- physical links between 1830 PSS and 1830 PSS are retained in both NFM-P and NFM-T
- physical links between 1830 PSS and SR are retained in NFM-P
- active alarms and the alarm status in NFM-P are synchronized with the number of active alarms in NFM-T

2.3.3 System layout

NFM-P and NFM-T integration is performed for the overall IP/OTN/SDH management in a unified operational environment where the different tasks and processes are carried out on different technologies—IP/MPLS, Ethernet L2, OTN L1 and L0, and SDH.

NFM-P users access the native user interface to perform all the end-to-end operations in the IP/MPLS and L2 Ethernet domains running on the 7X50 router product families. NFM-T users access the web GUI to perform all the end-to-end operations across Ethernet, electrical and photonic switching, and TDM switching domains implemented with the 1830 PSS product family. The Figure 2-3, “System layout” (p. 12) shows NFM-P and NFM-T system layout.

Figure 2-3 System layout



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3 User and HIP configuration in NFM-T

3.1 Overview

3.1.1 Purpose

This chapter describes how to configure the user and HIP in NFM-T.

3.1.2 Contents

3.2 Overview

3.2.1 Introduction

HIP is implemented in the HI component embedded in NFM-T OTN package. HIP is automatically configured with default values during NFM-T installation.

You must configure the *FM.HIP* parameter as **YES** to activate HIP on NFM-T. See 3.6 “To configure HIP on NFM-T” (p. 21) for more information about configuring HIP on NFM-T. When you configure the EM system in NFM-P, you must provide the default user name, password and port that are available in NFM-T IntegrationDetails file to connect to HIP. See 4.7 “To manage NFM-T as an EMS in NFM-P” (p. 34) for more information about managing NFM-T as an EMS in NFM-P.

3.2.2 OIM user configuration in NFM-P and NFM-T

Configure NFM-P user and a NFM-T user with the same user name and privileges. When you login to NFM-P and navigate to NFM-T, the application that opens has the user privileges that are configured for the specific user. The privileges are limited to the application that has been opened and not to all the applications that can be opened from NFM-T. For example, when you navigate to the equipment view application, you can perform the operations in the equipment view application but other applications like, user management and process monitoring and control cannot be accessed. See 3.4 “To configure NFM-P user account” (p. 18) and 3.5 “To configure a NFM-T user account” (p. 20).

3.2.3 User activity

NFM-P logs each GUI and OSS user action, such as a system access attempt or the configuration of an object, in NFM-P database. The GUI actions performed using NFM-T NEs are also logged in the User Activity form. See “User activity logging” in the *NFM-P System Administrator Guide* for more information.

3.3 Workflow for configuring HIP on NFM-T

3.3.1 Stages

The following are the stages for the HIP installation:

1

Configure NFM-P user account. See 3.4 “To configure NFM-P user account” (p. 18).

2

Configure a NFM-T user account. See 3.5 “To configure a NFM-T user account” (p. 20).

3

Configure HIP on NFM-T platform of the OTN virtual machine. See 3.6 “To configure HIP on NFM-T” (p. 21).

3.4 To configure NFM-P user account

3.4.1 Steps

User group configuration

1

Using an account with an assigned security scope of command role, choose Administration→Security→NFM-P User Security from NFM-P main menu. NFM-P User Security - Security Management (Edit) form opens.

2

Click on the User Groups tab and click Create. The User Group (Create) form opens.

3

Configure the required parameters.

4

If the user group is for OSS users or remote GUI users, configure the required parameters in the Remote Users panel.

5

Select a scope of command profile in the Scope of Command panel.

Note: Ensure that the privileges are same in NFM-P and NFM-T.

6

Select a span of control profile in the Span of Control panel.

Note: Ensure that the privileges are same in NFM-P and NFM-T.

7

If you are modifying a user group, click on the Format and Range Policies tab. The Select Format or Range Policies form opens.

8

Select one or more policies and click OK.

9

Save your changes and close the form.

User account configuration

10

Using an account with an assigned security scope of command role, choose Administration→Security→NFM-P User Security from NFM-P main menu. NFM-P User Security - Security Management (Edit) form opens.

11

Click on the Users tab and click Create. The User (Create) form opens.

12

Configure the required parameters.

Note: Ensure that the User Name parameter has the same value in NFM-P and NFM-T.

13

Click Select and choose a user group.

14

If required, test the validity of the user e-mail address by clicking Test E-mail beside the E-mail Address parameter.

15

Configure the parameters in the Password panel.

16

Configure the Non-Web Maximum Sessions Allowed parameter.

17

Configure an OSS user account:

1. Configure the required parameters in the OSS Session panel.
2. To apply a GUI alarm filter to alarm information requests from the OSS user, click Select in the OSS Session panel and choose an alarm filter.

18

Configure the required parameters in the Client IP Address panel.

19

Save your changes and close the form.

END OF STEPS

3.5 To configure a NFM-T user account

3.5.1 Steps

1

Log in to NFM-T Presentation and choose Administer→User Management from the web GUI main menu.

Result: The User Management application opens.

2

On the navigation tree, expand secdb and choose User Accounts→Create User from the User Management main menu. The Log in Info form appears.

3

Configure the following parameters:

- Log in: *User Name*
- New Password
- Confirm Password

Note: Ensure that the User Name parameter has the same value in NFM-P and NFM-T.

4

Click on the Attributes tab and configure the following parameters:

- Name: *User Name*
- LockPassword: *FALSE*
- ResetPassword: *FALSE*

Note: Ensure that the User Name parameter has the same value in NFM-P and NFM-T.

5

Click on the Profiles tab, choose the specific NFM-T package in the OS Name panel, then choose the parameter in the Profile Name panel, and click on the arrow icon to assign the profile to the specific NFM-T package.

Note: Ensure that the privileges are same in NFM-P and NFM-T.

Result: The user is listed in the Users navigation tree.

6

Save your changes and close the forms.

END OF STEPS

3.6 To configure HIP on NFM-T

3.6.1 Steps

Start HIP from CLI

1

Log in to NFM-T-OTN VM as user **otn**.

2

Perform the following to execute the *lt_param_reconfig* script:

```
SVTOTNE,gadmin,otn # pwd

/usr/Systems/OTNE_1/WDM_PLATFORM/script

SVTOTNE,gadmin,otn # ls

SVTOTNE,gadmin,otn # /usr/Systems/OTNE_1/WDM_PLATFORM/bin
```

Result: The following output appears:

```
**********

System parameters main menu:

**********

Select One of the following:

1) Element Adminstration Variables

2) Connection Variables

3) Order Handling Variables

4) System Variables

5) NBI Variables

6) FM Variables

7) Display Current Values

Type in the number to select a sub-menu [1-7] or quit[Q,q]:
```

3

Enter **6.**

Result: The following output appears:

```
FM parameters Menu:

**********

1) Enable HIP [NO]

2) HIP User [oms]

3) HIP Password [consult Nokia support]

4) EMS User [alcatel]

5) EMS Password [consult Nokia support]

Enter parameter to be modified [1-5] or previous menu [P,p] or quit
[Q,q]:
```

4

Enter **1.**

Result: The following output appears:

```
Enter choice [y,p,q]:
```

5

Enter **y.**

Restart HIP from PMC

6

Log in to NFM-T WebUI and choose Administer→System Monitor from the main menu.

Note: HIP restart should always be from the Processes Monitoring and Control. Do not restart HIP from the command line.

Result: The Processes Monitoring and Control GUI opens.

7

On the navigation tree, expand PMC→OIMOTNE→OTN_1 — RL = 0 FullFunctionality→WDMCntrl and choose OTN_HIP.

8

To start HIP configuration, right-click on OTN_HIP and choose Start.

Result:

When the HIP configuration starts, the OIM-server:

- establishes connection with NFM-T-OIS Virtual Machine (unbi) for retrieving NFM-T objects (that is, alarms, NE, remote inventory, and physical connections) and notifications
- accepts any requests from NFM-P (OIM-Client) based on HIP.

Stop HIP

9

To stop HIP configuration, right-click on OTN_HIP and choose Stop.

Result: When you restart the HIP configuration, NFM-P resynchronizes the inventory by retrieving all objects from the OIM. The operation can take a long time to complete depending on the size of NFM-T network.

Note:

- Ensure that you stop jvm_hip process from the Processes Monitoring and Control before HIP restart. The HIP restart should always be performed from the Processes Monitoring and Control.
- The HIP restart should not be performed from the command line interface.
- The jvm_hip process is respawned a few seconds after the HIP process is stopped.
- Start OTN_HIP manually if the process does not come up on its own. Right click on OTN_HIP and choose start.

END OF STEPS

4 Network topology and inventory

4.1 Overview

4.1.1 Purpose

This chapter provides information about the network topology and inventory.

4.1.2 Contents

NFM-T management as an EMS

4.2 Overview

4.2.1 Purpose

This section describes how to manage NFM-T as an EMS in NFM-P.

4.2.2 Contents

4.3 Managing NFM-T as an EMS in NFM-P

4.3.1 Introduction

NFM-T integration with NFM-P supports synchronization of the following objects between the two applications:

- Optical Node directory
- Nodal Equipment Inventory
- Optical Nodes in Map
- Optical Links Inventory (Map)

4.3.2 EMS equipment group

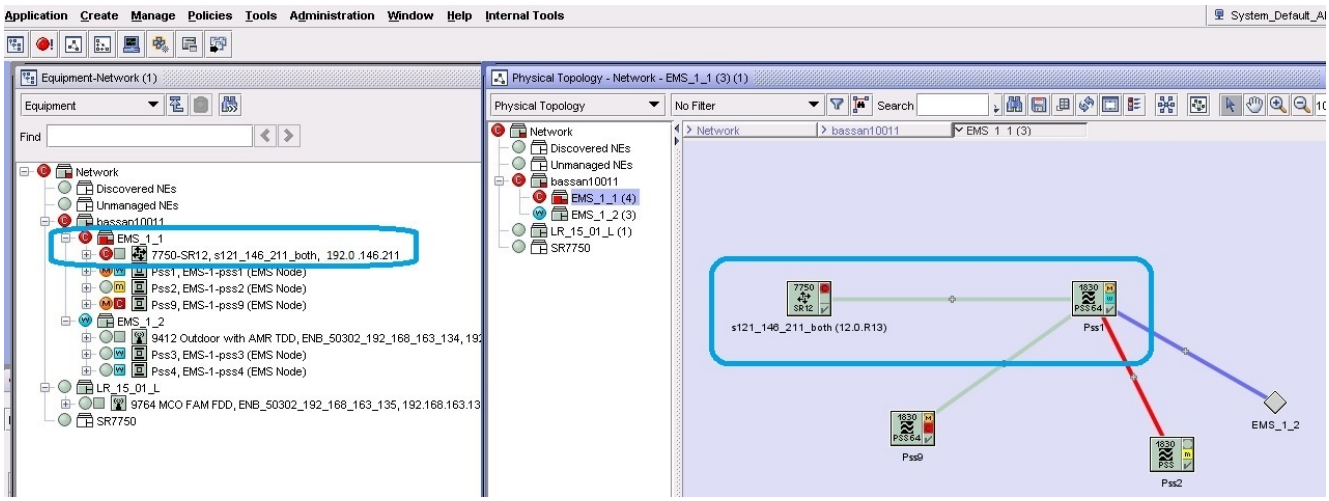
Equipment groups allow you to organize the network into logical groupings of NEs; for example, in a geographical area, or by equipment type. An equipment group is sometimes called a topology group. Some of the views in the view selector, for example the Equipment view, allow you to use the navigation tree to create and manage equipment groups.

The EMS equipment group is an equipment group created to organize NFM-T and the NEs managed by NFM-T. See 4.7 “To manage NFM-T as an EMS in NFM-P” (p. 34) for more information about creating an EMS equipment group.

You can move the HIP and non-HIP NEs to and from the EMS equipment groups by clicking and dragging icons on the navigation tree or topology map. Non-HIP NEs can be added to an EMS group by selecting the group name as the name of the EMS group during the discovery rule configuration of the non-HIP NEs.

When the communication between NFM-P and NFM-T is lost, the EMSNetworkElementSystemUnreachable alarm is generated on one of the HIP NEs in the EMS equipment group. The alarm is retained in the HIP NE even after the HIP NE is dragged and dropped into another equipment group. If no HIP NEs remain in the EMS equipment group, the EMSNetworkElementSystemUnreachable alarm is not generated.

Figure 4-1 EMS equipment group



4.3.3 Status of HIP NEs on topology map and equipment tree

The following colors of HIP NE icons represent the status of HIP NEs:

- Green means that HIP NEs are up.
- Yellow means that HIP NEs are being synchronized.
- Red means that HIP NEs are down. The supervision state is up and the communication state is down in NFM-T. NFM-P generates ReachabilityProblem alarms.
- Purple means that HIP NEs are in a suspended management state. The supervision state is down and the communication state is down in NFM-T. NFM-P generates NodeSuspended alarms.
- The 1830 PSS NEs turn red in color when the OIM interface is disrupted between NFM-P and NFM-T.

4.3.4 HIP NE version and location

You can view the HIP NE version from the HIP NE properties form and the inventory list.

See 4.9 “To view HIP-NE location and version from the equipment tree” (p. 39) for more information about how to view the NE version and location from the equipment tree.

See 4.10 “To view the HIP-NE version and location from the inventory list” (p. 40) for more information about how to view the NE version and location from the inventory list.

4.3.5 Configuring navigation URLs

The navigation URLs must be defined in the EM System object when configuring the discovery rule for NFM-T management by NFM-P.

The following navigation URLs are supported and the syntax is configured during the EM System creation in the Administration→Discovery Manager→Discovery Rule→EM System→Element Manager (Create) form.

- NE navigation URL
- Link navigation URL
- Port to port link navigation URL

Mandatory attributes

The mandatory attributes are the following:

- oms_server_IP and port
- timestamps
- samServerAddress
- userName
- tokenId

All other attributes are optional in the URL. See 4.7 “To manage NFM-T as an EMS in NFM-P” (p. 34) for more information about managing NFM-T as an EMS in NFM-P.

NE navigation URL syntax

```
https://$activeEmsAddress:8443/oms1350/mainOtn/extNav?entity=node&nern=
$rn&displayName=$displayedName&typeDescription=$typeDescription&
timestamps=$timestamps&samServerAddress=$samServerAddress&userName=
$userName&userGroup=$userGroup&tokenId=$token
```

Link navigation URL syntax

```
https://$activeEmsAddress:8443/oms1350/mainOtn/extNav?entity=link&
displayName=$displayedName&endPoint1Fdn=$endPoint1NeRn&endPoint2Fdn=
$endPoint2NeRn&notes=$notes&timestamps=$timestamps&samServerAddress=
$samServerAddress&userName=$userName&userGroup=$userGroup&tokenId=$token
```

Port to port link navigation URL syntax

```
https://$activeEmsAddress:8443/oms1350/mainOtn/extNav?entity=link&
activeEmsAddress=$activeEmsAddress&displayName=$displayedName&neLabel=
$neLabel&portLabel=$portLabel&description=$description&notes=$notes&
timestamps=$timestamps&samServerAddress=$samServerAddress&userName=
$userName&userGroup=$userGroup&tokenId=$token
```

4.4 OIM workspace

4.4.1 General information

A workspace is a configuration of the main NFM-P GUI elements, such as the window layout or menu options. System-defined workspaces are provided, but you can also create and save your own customized workspaces to simplify navigation and operation according to your requirements. See *NSP NFM-P User Guide* for more information about workspaces.

4.4.2 OIM workspace

You can access the OIM workspace by navigating to Application→Manage Workspace .

You can set the Optics_OIM as the default workspace. See 4.5 “To set the Optics_OIM workspace as the default workspace” (p. 32) for more information.

4.5 To set the Optics_OIM workspace as the default workspace

4.5.1 Steps

1

Choose Application→User Preferences from NFM-P main menu. The User Preferences form opens.

2

Click on the Workspaces tab and click Add. The Add Workspace form opens.

3

Choose Optics_OIM and click OK. The Add Workspace form closes and the Optics_OIM workspace is listed in the User Preferences form.

4

Choose the Optics_OIM workspace and click Set as Default.

5

Save your changes and close the form.

END OF STEPS

4.6 OIM considerations and limitations

4.6.1 General information

Table 4-1, “OIM considerations and limitations” (p. 33) lists the important considerations and limitations for OIM.

Table 4-1 OIM considerations and limitations

Type	Considerations/limitations
Links	• If a physical link is modified in NFM-T, you can either restart HIP or resynchronize HIP NEs involved in the physical link for the modifications to reflect in NFM-P.
Navigation	• All navigations from NFM-P take more than 10 s. • You cannot disable Opt_Connection navigation from NFM-P to NFM-T using NFM-P. • Navigation from alarms on physical links will launch NFM-P instead of OMS. This is an expected behavior and not a bug.
Objects	• Modification of HIP-node name is not supported. • Compound node appears as two NEs in NFM-P. • Shelf, slot, and port objects are not displayed in order in the equipment tree.
Ports	• Port CTPs will not be listed in NFM-P. • If you need to navigate to a service which terminates on a CTP, physical link should be provisioned between SR port and 1830 PSS physical port. For example, 11DPE12E-1-1-C1-1 will not be listed in NFM-P. You should configure link to 11DPE12E-1-1-C1.
Status	• Port administrative state will always be shown as “UP” as part of notification. You need to perform manual synchronization to update the status.
Synchronization	• create and delete notifications are not sent by the 1646 SM. You should perform manual synchronization. All create tasks are handled as DBCHG in the node. • If the link, equipment, or alarm is not as per HIP guidelines, all of the further synchronizations for specific type are skipped.
User	• You cannot use the same browser to log in to two different NFM-T users simultaneously. One of the users will be logged off.

4.7 To manage NFM-T as an EMS in NFM-P

Note: You must specify an equipment group other than the default Discovered NEs group when discovering an EMS. Step 1 of this procedure describes a basic process for creating an equipment group. See the *NSP NFM-P User Guide* for more information about creating and populating equipment groups.

4.7.1 Steps

1

Create an equipment group for the EMS:

1. Choose Create→Equipment→Group from NFM-P main menu. The Group (New Instance) (Create) form opens.
2. Configure the required parameters.
3. Click OK. The form closes and the equipment group appears in the navigation tree and topology map.

2

Choose Administration→Discovery Manager from NFM-P main menu. The Discovery Manager (Edit) form opens.

3

Click Create. The Create Discovery Rule form opens with the Specify General Attributes step displayed.

4

Click Select for the Group Name, select the equipment group created in Step 1, and click OK. The form is updated with the group name.

5

Click Next until the Add EM Systems step appears.

6

Complete the Add EM Systems step:

1. Click Create. The EM System (Create) form opens.
2. Configure the required parameters.
3. Click on the Element Managers tab.

4. Click Create. The Element Manager (Create) form opens.
5. Configure the parameters as follows:
   - Host Name — Enter the OTN host name

   Communication panel parameters
   - Server IP Address — Enter the IP address of the first server specified in NFM-T file, */usr/Systems/OTN_1_13_Master/WDM_APPL/config/IntegrationDetails*.
   - Second Server IP Address — Enter the IP address of the second server specified in NFM-T file, */usr/Systems/OTN_1_13_Master/WDM_APPL/config/IntegrationDetails*.

   Identification panel parameters
   - User Name — Enter the user name specified in NFM-T file, */usr/Systems/OTN_1_13_Master/WDM_APPL/config/IntegrationDetails*. See 4.8 “To change the HIP user name and password” (p. 36) for more information about changing the user name.
   - Password — Enter the password specified in NFM-T file, */usr/Systems/OTN_1_13_Master/WDM_APPL/config/IntegrationDetails*. See 4.8 “To change the HIP user name and password” (p. 36) for more information about changing the user password.
   - Confirm Password — Re-enter the password. See 4.8 “To change the HIP user name and password” (p. 36) for more information about changing the user password.

   Navigation panel parameters
   - NE navigation URL — See 4.3.5 “Configuring navigation URLs” (p. 30) for URL syntax
   - Link navigation URL — See 4.3.5 “Configuring navigation URLs” (p. 30) for URL syntax
   - Port to port Link navigation URL — See 4.3.5 “Configuring navigation URLs” (p. 30) for URL syntax
6. Save the changes and return to the Create Discovery Rule form.
7. Click Finish.
8. Save the changes to the discovery rule and close the forms.

7

Activate the EMS discovery:

1. In the Discovery Manager (Edit) form, click on the EM Systems tab.
2. Select the EM system that you created in Step 6 and click Properties. The EM System (Edit) form opens.
3. Set the Administrative State parameter to Up.
4. Save the changes. NFM-P attempts to discover the EM system.

Note: NFM-P does not discover an EMS until you set the Administrative State parameter of the EMS object to Up and save the changes in the Discovery Manager.

END OF STEPS

4.8 To change the HIP user name and password

4.8.1 Steps

1

Log in to NFM-T-OTN Virtual Machine as **otn** and perform the following to execute the *lt_param_reconfig* script:

```
SVTOTNE,gadmin,otn # pwd

/usr/Systems/OTNE_1/WDM_PLATFORM/script

SVTOTNE,gadmin,otn # ./lt_param_reconfig
```

Result: The following output appears:

```
**********

System parameters main menu:

**********

Select One of the following:

1) Element Adminstration Variables

2) Connection Variables

3) Order Handling Variables

4) System Variables

5) NBI Variables

6) FM Variables

7) Display Current Values

Type in the number to select a sub-menu [1-7] or quit[Q,q]:
```

2

Enter **6**.

Result: The following output appears:

```
FM parameters Menu:

**********
```

```
1) Enable HIP [YES]

2) HIP User [oms]

3) HIP Password [consult Nokia support]

4) EMS User [alcatel]

5) EMS Password [consult Nokia support]

Enter parameter to be modified [1-5] or previous menu [P,p] or quit
[Q,q]:
```

3

Perform one of the following:

a. To change user name, enter **2.**

b. To change password, enter **3.**.

Result: The following output appears:

```
Enter new value:
```

4

Enter the new user name or password.

Result: The following output appears:

```
CONFIRM PARAMETER CHANGE : FM.HIP_USER

Current setting:
```

5

Enter the current user name or password.

Result: The following output appears:

```
Proposed setting:
```

6

Enter the new user name or password.

Result: The following output appears:

```
Do you want to accept this change?

y) Accept

 p) Reject and return to previous menu
```

```
 q) Reject and quit program

Enter choice [y,p,q]:
```

7

Enter **y**.

Result: The following output appears:

```
Storing new setting...

1 row updated.

Update completed

Enter return to continue

FM parameters Menu:

1) Enable HIP [YES]

2) HIP User [oms]

3) HIP Password [consult Nokia support]

4) EMS User [alcatel]

5) EMS Password [consult Nokia support]

Enter parameter to be modified [1-5] or previous menu [P,p] or quit
[Q,q]: q

QUIT selected, program exiting.

* These changes will take immediate effect and do not *

* require an application restart                      *
```

END OF STEPS

4.9 To view HIP-NE location and version from the equipment tree

4.9.1 Steps

1

Expand Network→NFM-T→EMS→HIP-NE from NFM-P equipment tree.

2

Right-click on the NE object and choose properties. The Network Element (Edit) form opens displaying the location and version information.

END OF STEPS

4.10 To view the HIP-NE version and location from the inventory list

4.10.1 Steps

1

Choose Manage→Equipment→Equipment from NFM-P main menu. The Manage Equipment form opens.

2

Choose Network Element (Network) from the object drop-down menu. Click Search and the network element inventory list appears.

3

Right-click on the column heading and choose Column Display. The Column Display form opens.

4

Select the columns to remove from the Displayed on Table list, then click on the left arrow. The columns move to the Available for Table list.

5

Select the following properties in the Available for Sorting panel:

- Location
- Software Version
- Chassis Type
- Latitude
- Longitude

6

Click on the right arrow button and the properties move to the Used for Sorting panel. Click OK to display the location and version information of the network elements.

END OF STEPS

Node navigation

4.11 Overview

4.11.1 Purpose

This section provides information about node navigation.

4.11.2 Contents

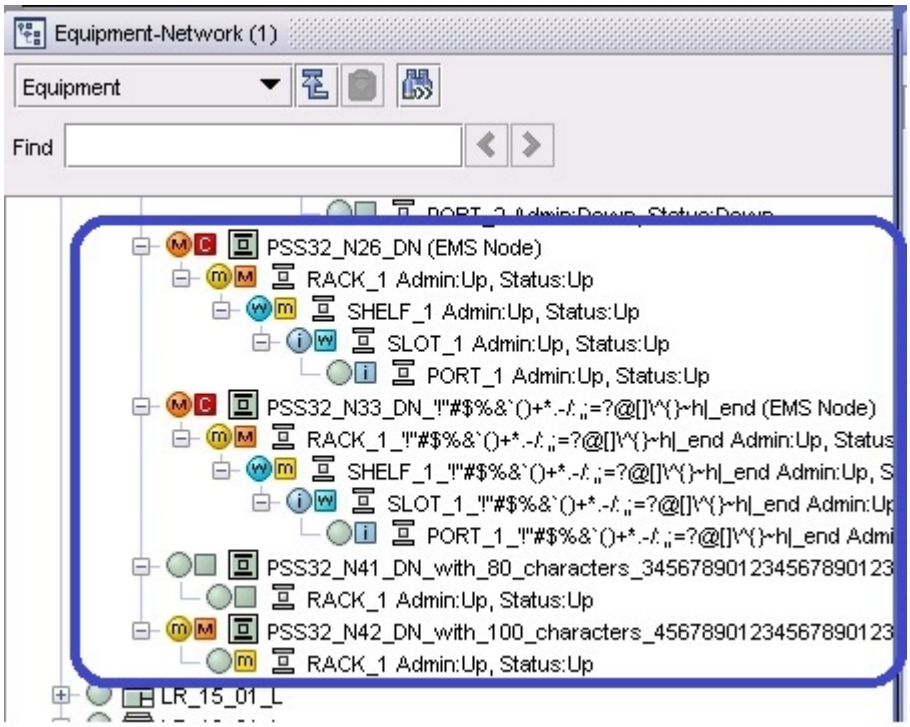
4.12 Optical node navigation

4.12.1 Introduction

NFM-T sends node list data to NFM-P and keeps the node data synchronized both on NFM-T and NFM-P. NFM-P receives the node list on initial discovery of NFM-T as a managed EMS, and NFM-T keeps the list synchronized, based on object creation/deletion events and state changes using HIP notifications.

Figure 4-2, “NFM-T-based optical node display in NFM-P” (p. 42) shows the optical node inventory and hardware.

Figure 4-2 NFM-T-based optical node display in NFM-P



4.12.2 Node navigation

You can navigate to NFM-T EQM from NFM-P equipment tree or topology map when the selected NE is a photonic or OCS node. When the 1646 SMC is selected, the 1646 SMC user interface opens. See 4.13 “To cross-launch the NFM-T web GUI from an optical node or a link context” (p. 45) for more information about cross launch from NFM-P to NFM-T.

Figure 4-3, “Navigation from the topology map” (p. 43) shows the navigation from the topology map. Figure 4-4, “Navigation to NFM-T EQM” (p. 43) shows NFM-T EQM application that opens when the HIP NE is 1830 PSS. Figure 4-5, “Navigation to the 1646 SMC” (p. 44)shows the 1646 SMC application that opens when the HIP NE is 1646 SMC.

Figure 4-3 Navigation from the topology map

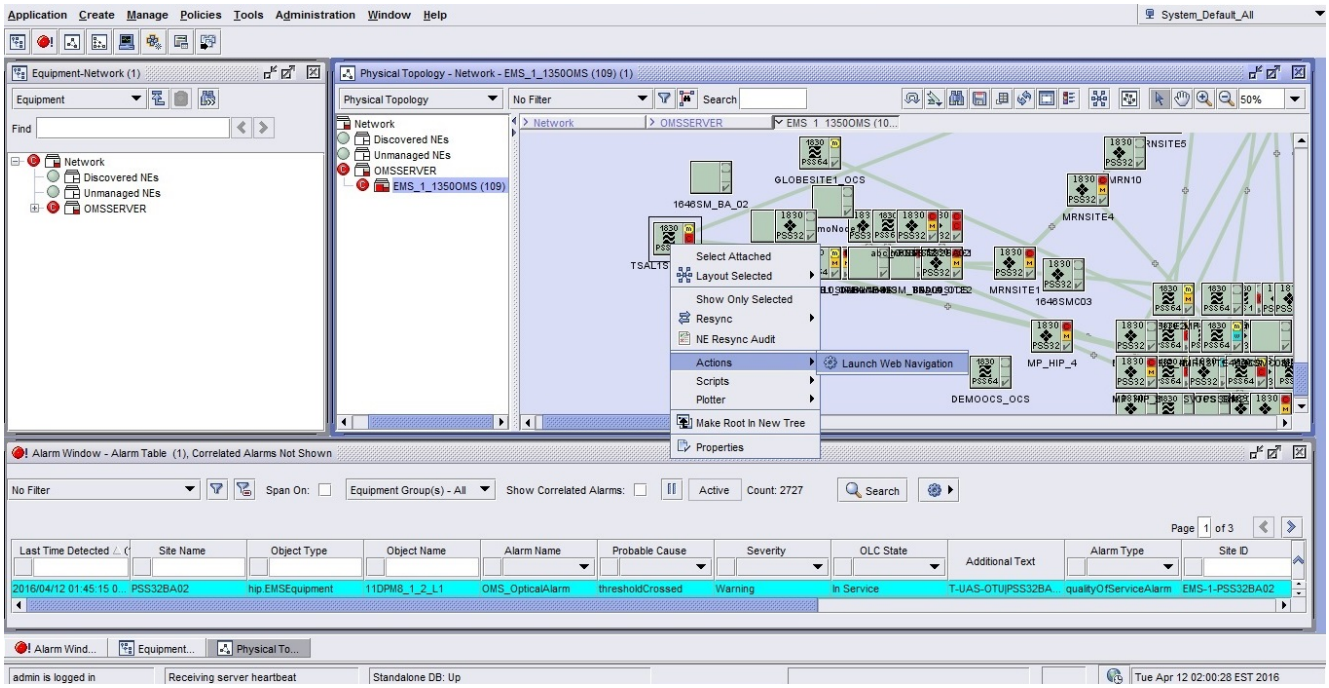


Figure 4-4 Navigation to NFM-T EQM

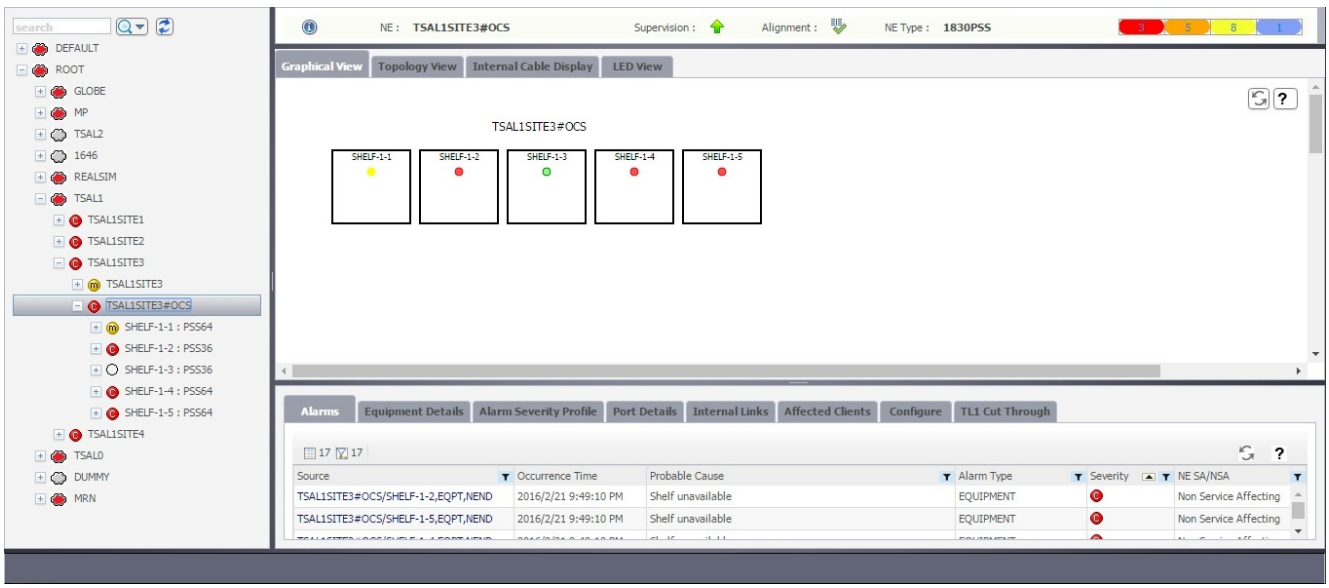
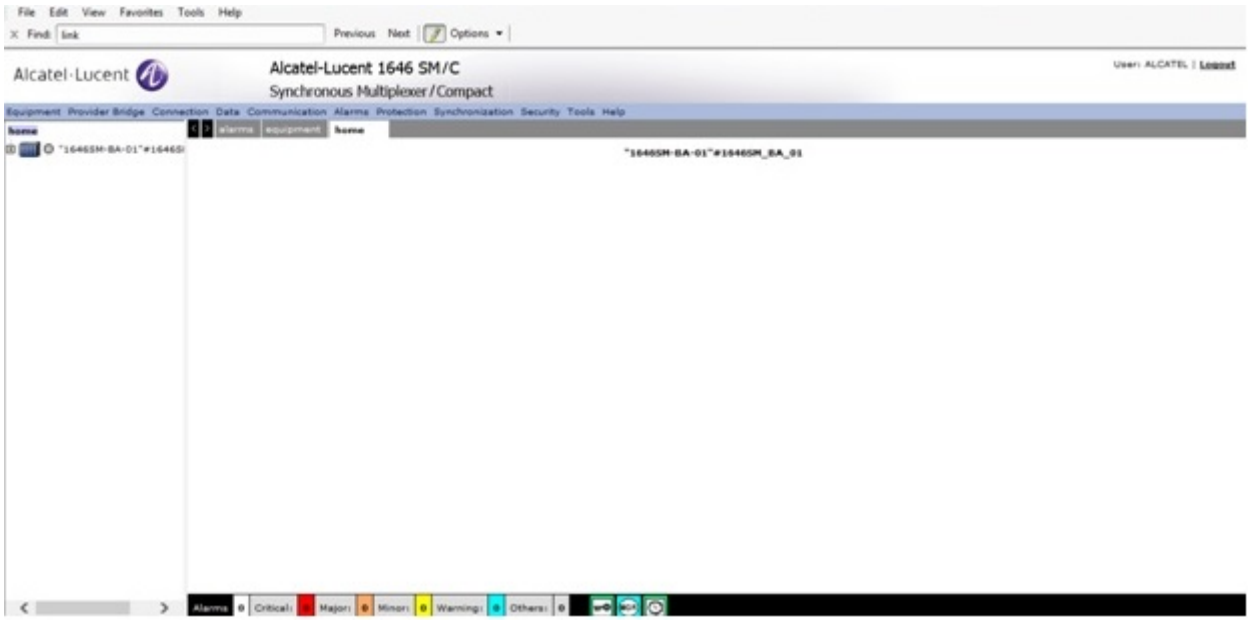


Figure 4-5 Navigation to the 1646 SMC



4.13 To cross-launch the NFM-T web GUI from an optical node or a link context

4.13.1 Before you begin

The following must be true before you can cross-launch the NFM-T web GUI from NFM-P client:

- NFM-T is managed as an EMS in NFM-P, and at least one optical node and one link are discovered for node and link context navigation, respectively.
- The URLs are configured correctly in the EM System object.

Active connectivity between NFM-T and NFM-P is not necessarily required for cross-launch. The Administrative State of the EMS can be down and cross-launch will succeed if the client can access the URL successfully.

4.13.2 Steps

1

Navigate to NFM-T optical node or link on NFM-P equipment tree, topology map, or properties form.

Launch equipment view on NFM-T

2

Right-click on the node in NFM-P equipment tree or topology map, or open the node properties form and choose Actions→Launch Web Navigation. The equipment view of the chosen node opens on NFM-T web GUI in the default browser, according to the defined URL for the node.

Launch physical connection details on NFM-T

3

Right-click on the plus sign of the optical link group in NFM-P topology map and choose Expand Group. The link or links constituting the group are displayed.

4

Right-click on an optical link and choose Actions→Launch Web Navigation. The physical connections details of the chosen link opens on NFM-T web GUI in the default browser, according to the defined URL for the link.

Note: You can also cross-launch the physical connection details on the NFM-T web GUI by clicking Actions→Launch Web Navigation from the properties form of an optical link.

End of steps

Link navigation

4.14 Overview

4.14.1 Purpose

This section provides information about link navigation.

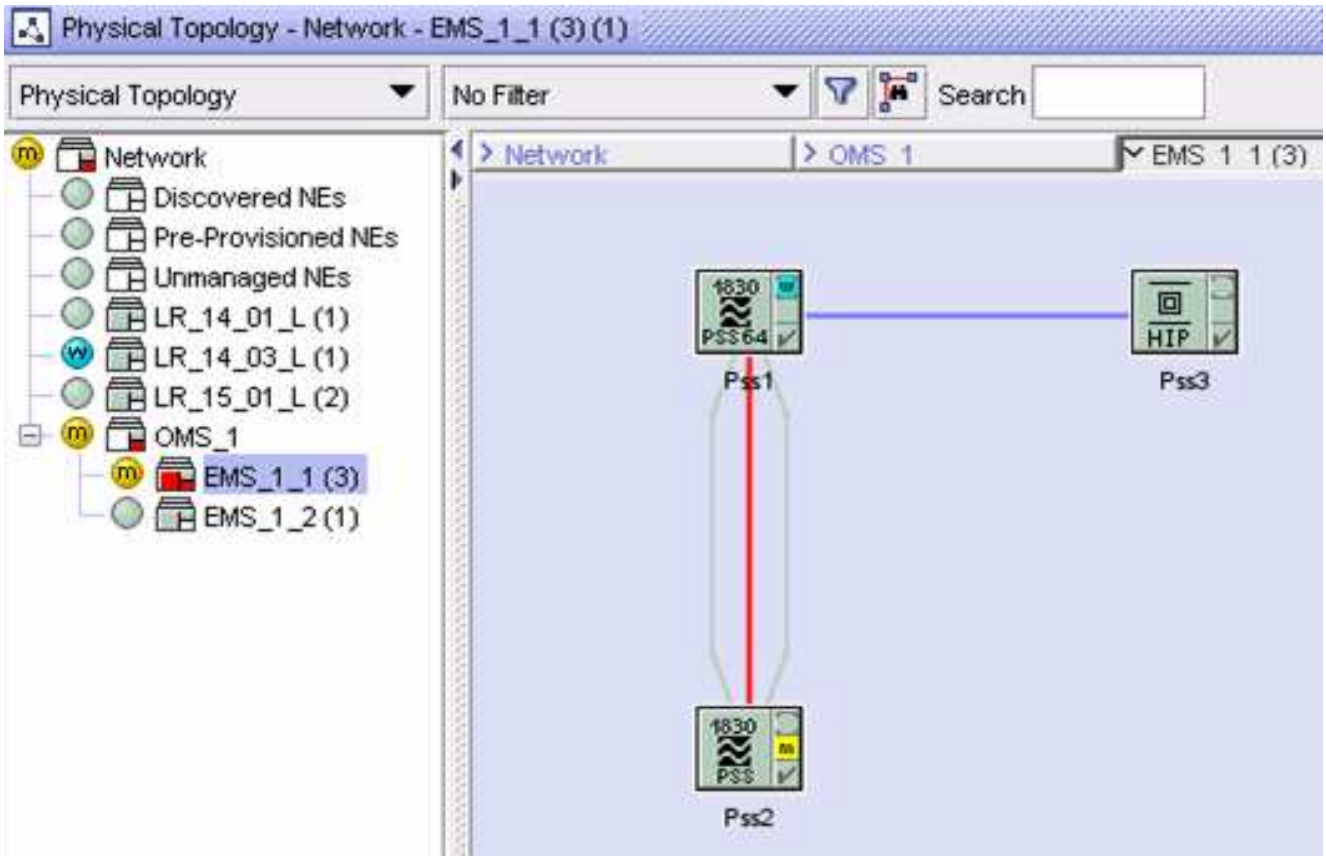
4.14.2 Contents

4.15 Optical link navigation

4.15.1 Introduction

NFM-T also sends optical link data to NFM-P on initial discovery and synchronizes the link data over HIP for creation/deletion and state changes. NFM-P displays links between NFM-T nodes on the topology map,as follows. Links are colored according to their Operational State.

Figure 4-6 Optical node link display on topology map



4.15.2 Link navigation

You can navigate to NFM-T Physical Connections from NFM-P equipment tree or topology map when the selected NE is a photonic or OCS node. See 4.13 “To cross-launch the NFM-T web GUI from an optical node or a link context” (p. 45) for more information about cross launch from NFM-P to NFM-T.

Figure 4-7 Expand group

Figure 4-8 Navigation from NFM-P

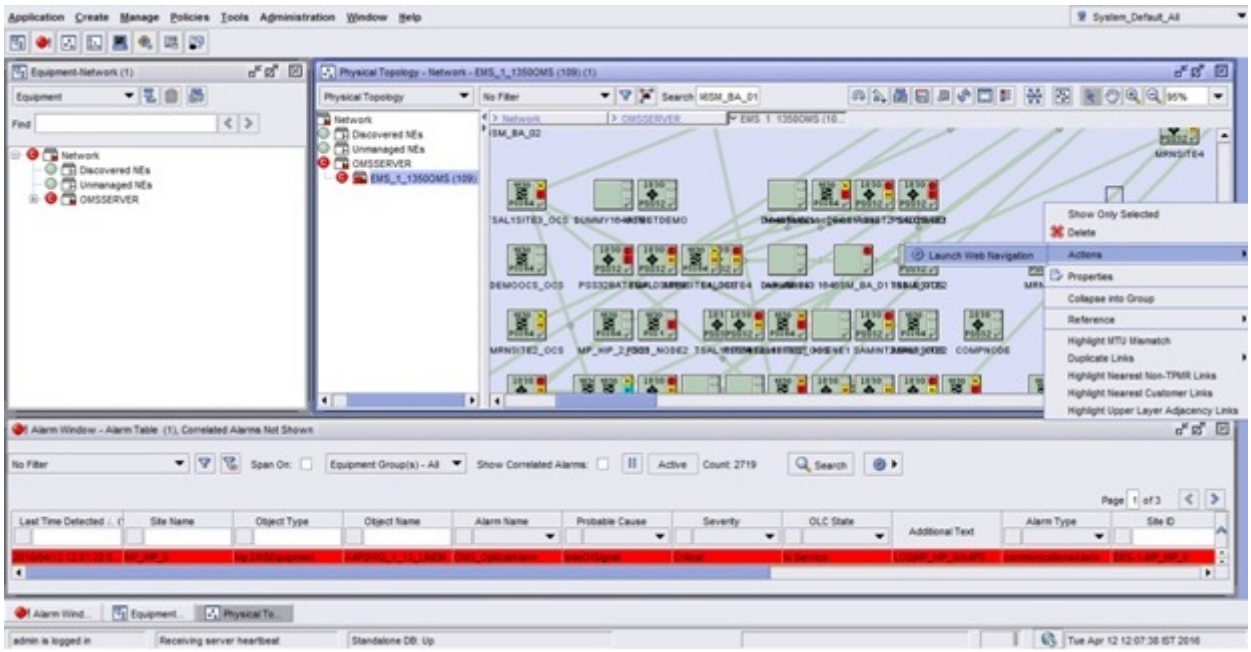
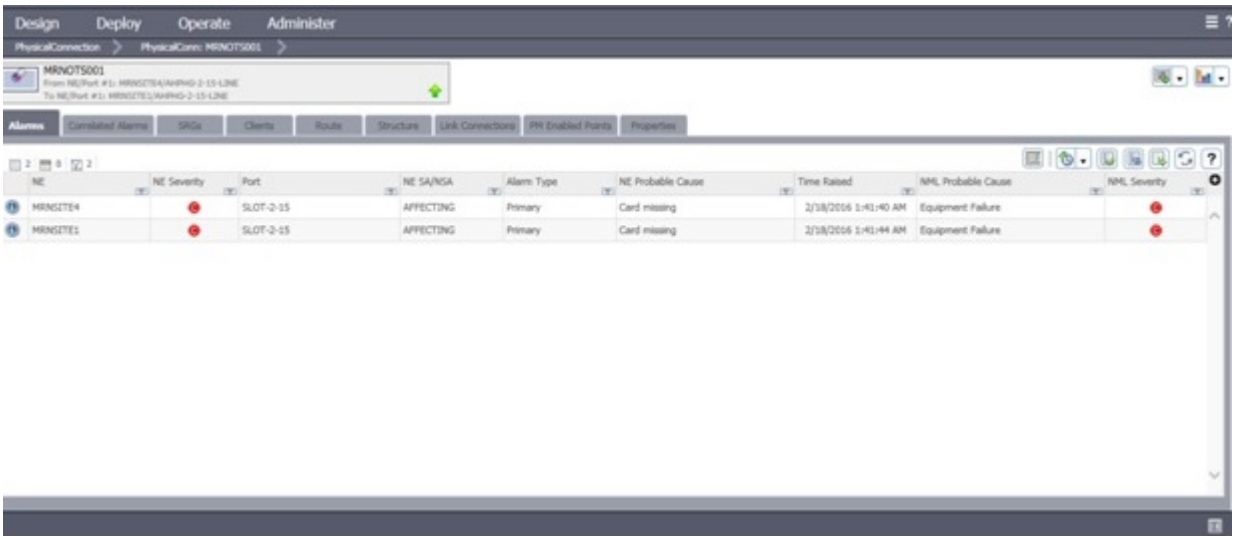


Figure 4-9 Navigation to NFM-T Physical Connection



4.15.3 Link navigation — MPLS tunnels

MPLS link navigation is also supported from NFM-P. You can navigate from MPLS adjacency link between SRs to the corresponding DSR service in NFM-T. See "Link configuration between 7750 SR and 1830 PSS HIP NE" (p. 54) for more information about configuring a link between 7750 SR and 1830 PSS HIP NE.

Figure 4-10, "MPLS link — LDP navigation" (p. 50) shows navigation from LDP.

Figure 4-11, "MPLS link — RSVP navigation" (p. 51) shows navigation from RSVP.

Figure 4-10 MPLS link — LDP navigation

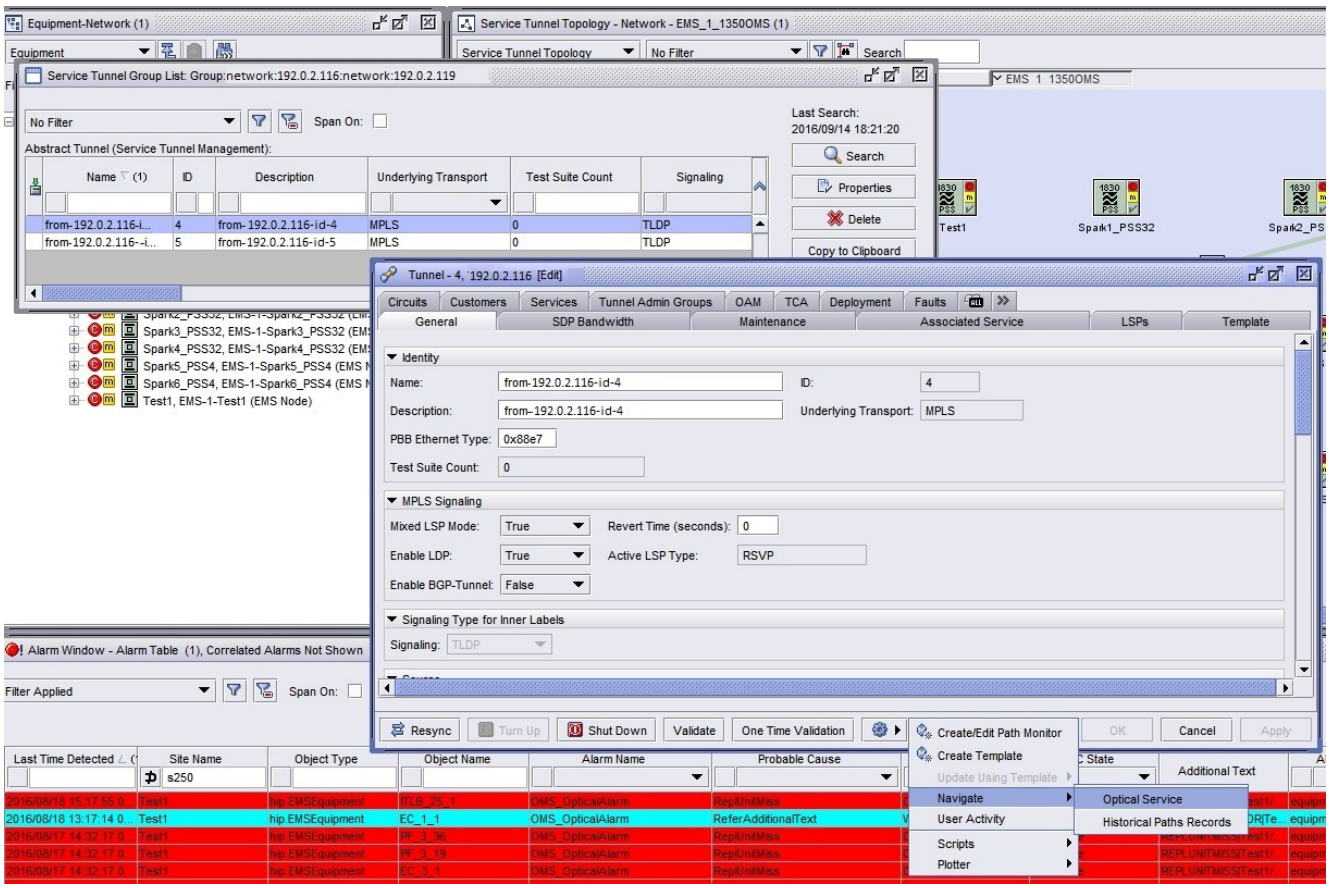
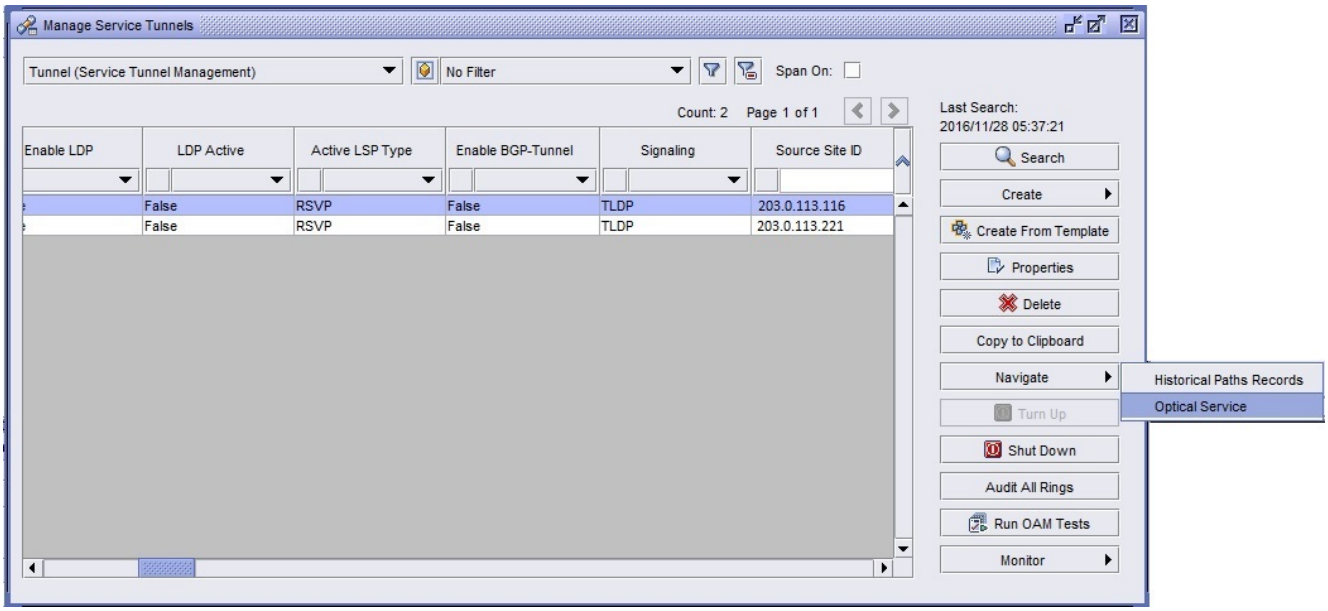


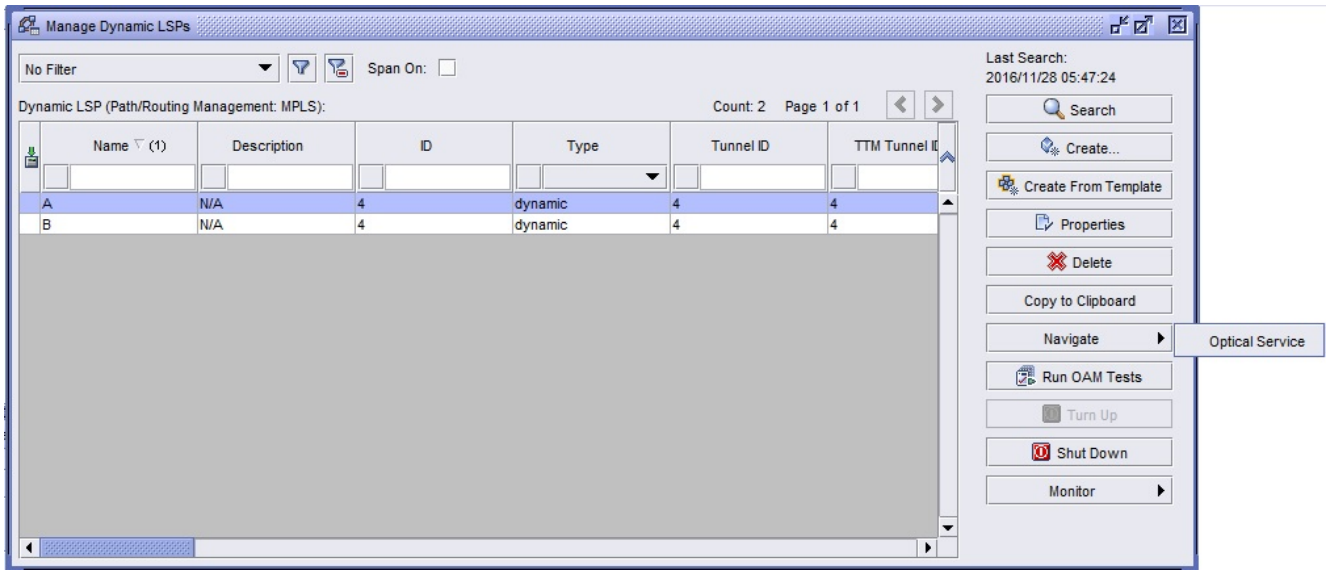
Figure 4-11 MPLS link — RSVP navigation



4.15.4 Link navigation — LSP

Figure 4-12, “LSP navigation” (p. 52) shows navigation from LSP. Navigation from the primary LSP only lists the DSR services in the primary path and navigation from secondary LSP only lists the DSR services in the secondary path. When the operational state of the LSP is down, the navigation is successful if the hops are configured manually.

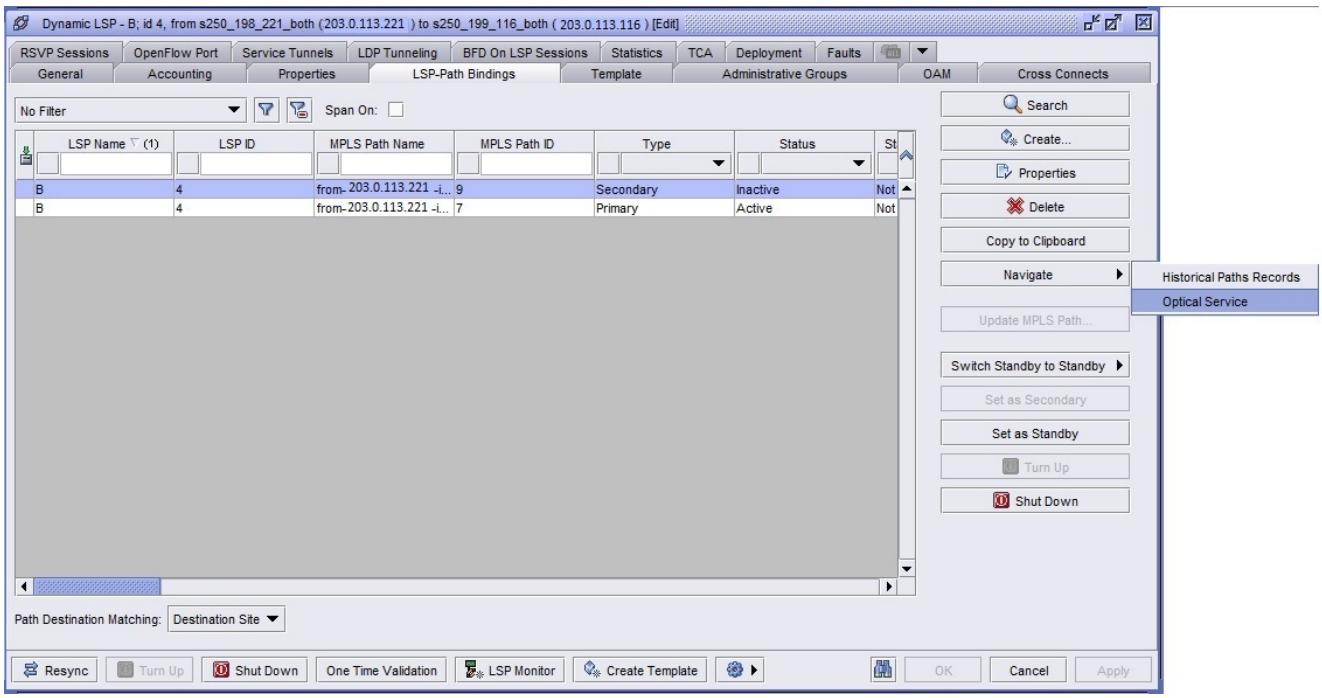
Figure 4-12 LSP navigation



4.15.5 Link navigation — LSP path binding

Figure 4-13, “LSP path navigation” (p. 52) shows navigation from LSP path binding.

Figure 4-13 LSP path navigation



Link configuration between 7750 SR and 1830 PSS HIP NE

4.16 Overview

4.16.1 Purpose

This section describes how to configure a physical link between a 7750 SR and a 1830 PSS HIP NE in NFM-T managed as an EMS in NFM-P.

4.16.2 Contents

4.17 To create a link between a 7750 SR and 1830 PSS HIP NE

4.17.1 Steps

1

Choose Create→Equipment→Physical Link from NFM-P main menu. The Physical Link (Create) form opens.

2

Configure the parameters.

3

Set the Endpoint A Type and Endpoint B Type parameters as Port.

Note: You can configure the physical links between two 1830 PSS physical ports, between 1830 PSS physical ports and SR physical ports, and also between 1830 PSS physical ports and SR LAG ports.
Based on the end point selected object, the SR network interface must be configured accordingly:

- If physical link is configured between an 1830 PSS physical port and SR physical port, the network interface needs to be configured to physical port.
- If physical link is configured between 1830 PSS physical port and SR LAG port, the network interface needs to be configured to LAG port.
  The navigation from LSP and MPLS is supported only when the above conditions are met.

4

Select the ports in the Endpoint A-Port and Endpoint B-Port panel.

5

Save the changes and close the form. NFM-P creates the link object between the specified nodes.

END OF STEPS

Delete a NFM-T EMS

4.18 Overview

4.18.1 Purpose

This section describes how to delete a NFM-T that is managed as an EMS in NFM-P.

4.18.2 Contents

4.19 To delete a NFM-T EMS from NFM-P

4.19.1 Before you begin

You must set the Administrative State of the EMS to “Down” before you can delete the object from NFM-P.

4.19.2 Steps

1

Choose Administration→Discovery Manager from NFM-P main menu. The Discovery Manager (Edit) form opens.

2

Click on the EM System tab.

3

If required, configure the Administrative State parameter:

1. Select the EM System and click Properties.
2. Set the Administrative State parameter to “Down”.
3. Save the changes and close the form.

4

In the Discovery Manager form, select the EM System and click Delete. NFM-P deletes the EM System and all associated optical nodes and links.

Note: The EMS group does not get deleted from Physical Topology view if non-Hip NEs are present in the EMS group.

END OF STEPS

5 OSS integration and fault management

5.1 Overview

5.1.1 Purpose

This chapter provides information about the OSS integration and fault management.

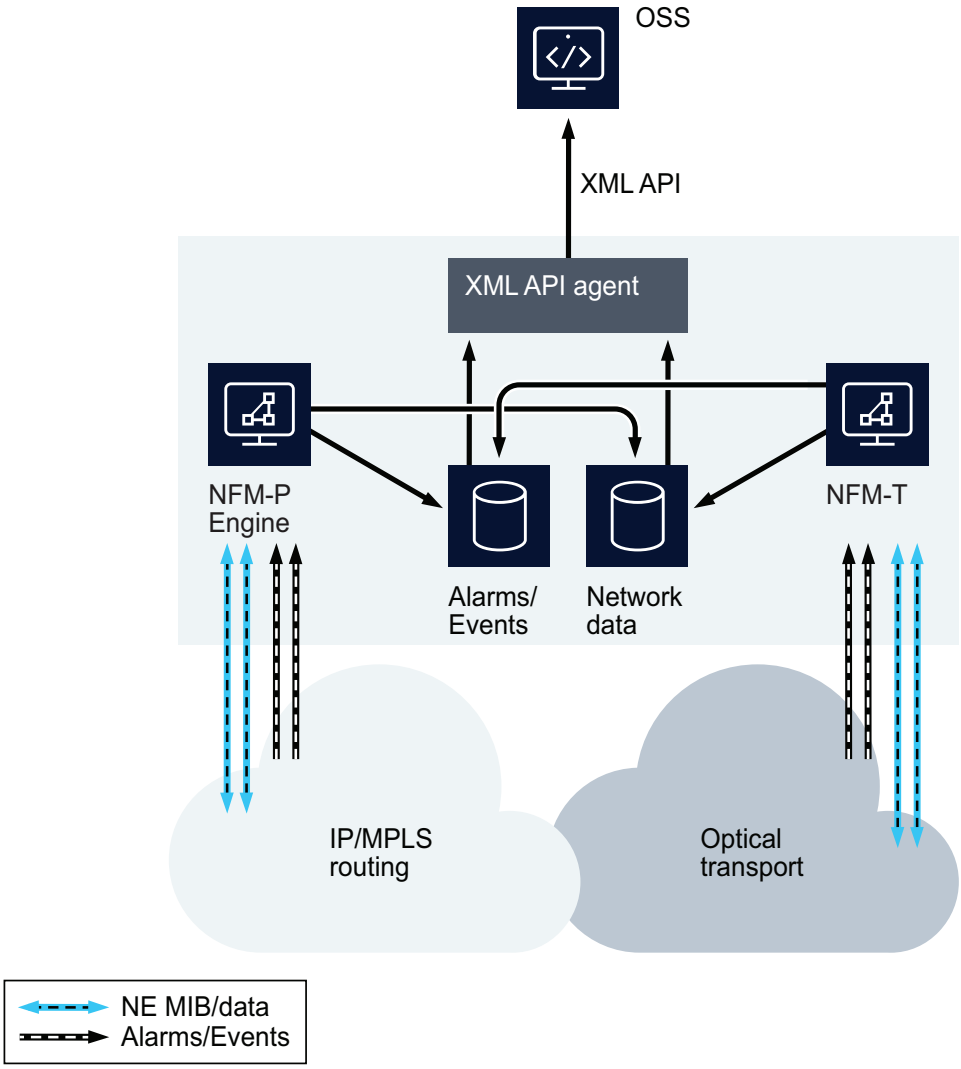
5.1.2 Contents

5.2 OSS integration

5.2.1 Introduction

One NBI is supported for NFM-P and NFM-T using XML API interface. The interface exports NFM-P and NFM-T objects, inventories, and alarms of the 1830 PSS managed network.

Figure 5-1 NFM-P and NFM-T OSS integration



5.3 Fault and event management

5.3.1 Introduction

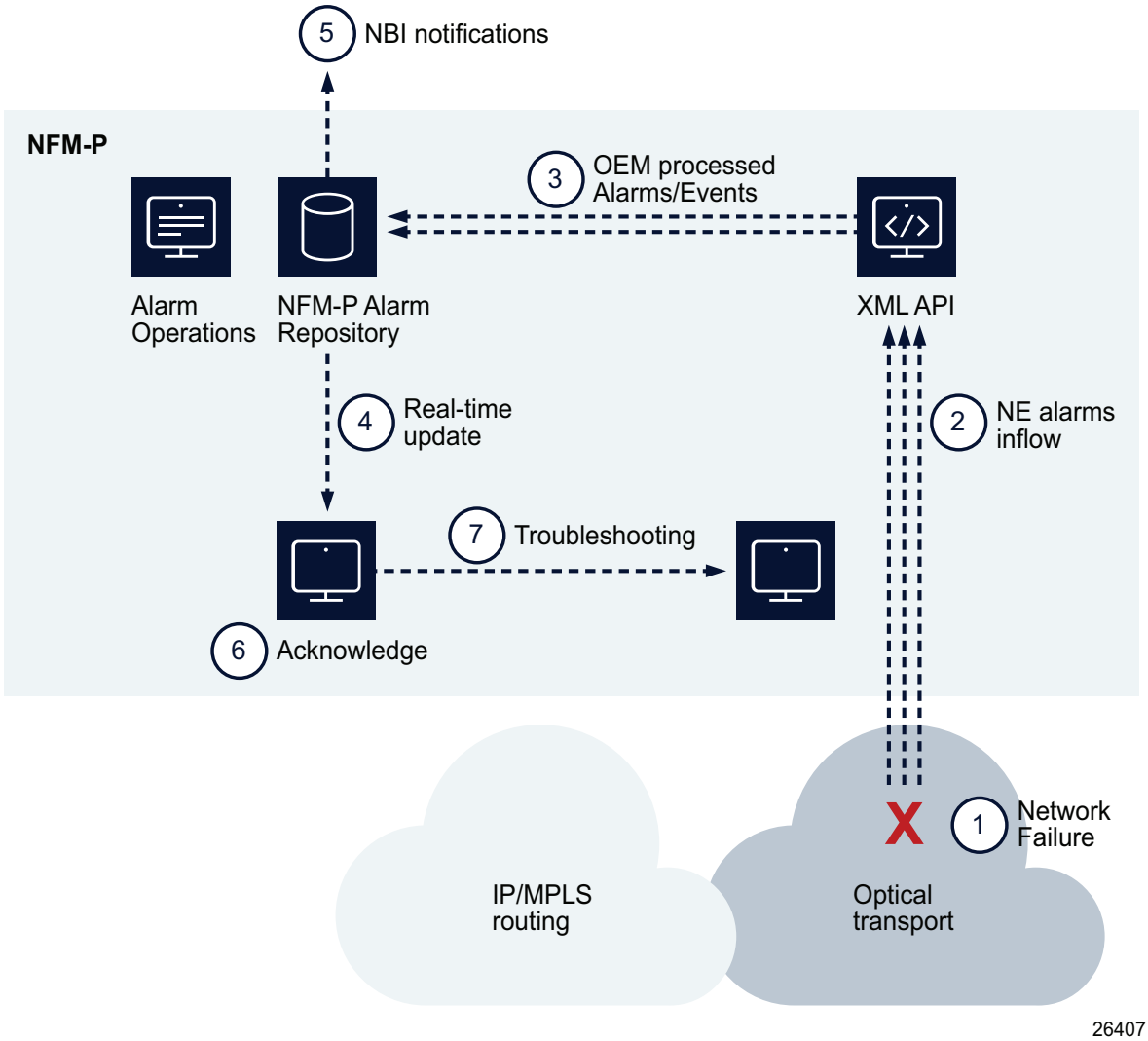
NFM-P and NFM-T integration supports an enhanced fault management application, to provide a single point of handling for the alarms of a multi-layer IP and optical network, and a centralized environment where the fault correlation process takes place.

5.3.2 Fault management

NFM-T feeds platform and nodal alarms, including correlation information, to NFM-P over HIP. The following statements describe FM support for NFM-T integration:

- Alarm raising and clearing from NFM-T to NFM-P is supported.
- Acknowledging the alarm from NFM-P results in the alarm acknowledgment in NFM-T. See 6.3 “To acknowledge alarms” (p. 69) for more information about acknowledging alarms in NFM-P.
- Unacknowledging the alarm from the NFM-P FM application. See 6.4 “To unacknowledge alarms” (p. 70) for more information about unacknowledging alarms in the NFM-P FM application.
- Basic nodal alarms are associated with the expected node objects from NFM-T in NFM-P network. See 5.4 “Enabling cross-launch from the FM application to NFM-T for classic OIM with HIP users” (p. 64) and 5.5 “To cross-launch the NFM-T web GUI from the NFM-P FM application” (p. 66) for more information about cross-launching from NFM-P FM application to NFM-T.
- Correlated alarms on optical links are associated with the expected object types in NFM-P. Correlated alarms on OTU-k/ODU-k layers and services are associated with Opt_Connection.
- XML API support for alarms originating from NFM-T via HIP is provided.

Figure 5-2 NFM-P and NFM-T fault and event management

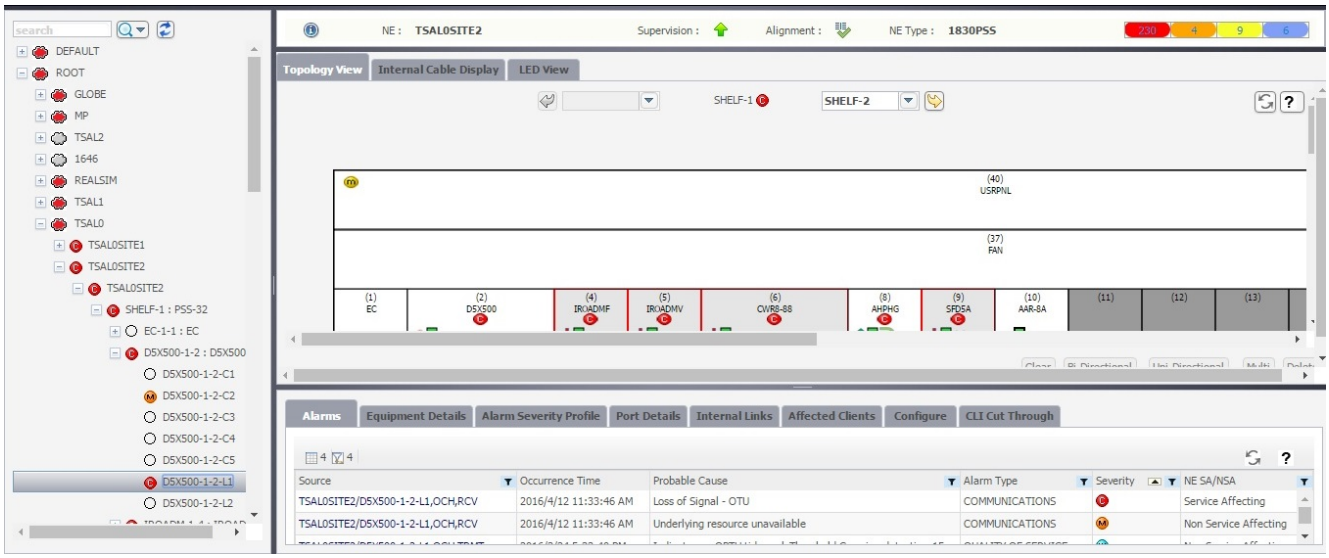


5.3.3 Alarm navigation

Navigation to elementary alarms

You can navigate to the NFM-T EQM elementary alarm from the NFM-P Fault Management Application. See 5.4 “Enabling cross-launch from the FM application to NFM-T for classic OIM with HIP users” (p. 64) and 5.5 “To cross-launch the NFM-T web GUI from the NFM-P FM application” (p. 66) for more information.

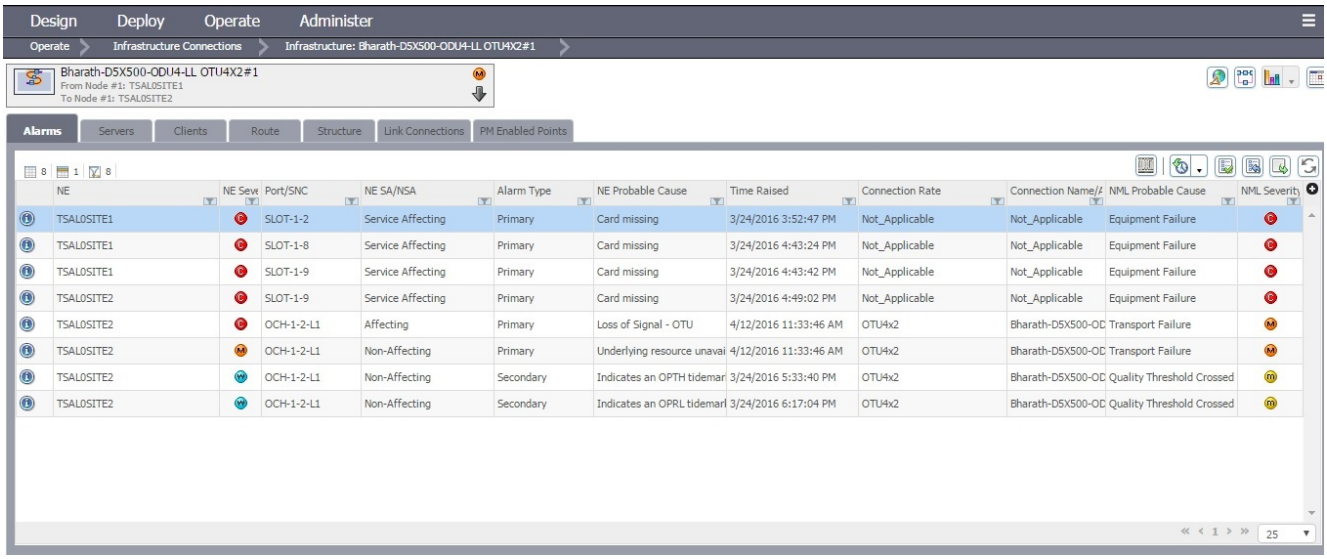
Figure 5-3 Navigation to NFM-T EQM



Navigation to correlated alarms

You can navigate to the correlated alarms on the NFM-T RCA/alarms tab of 360 view on a connection from theNFM-P Fault Management Application. See 5.4 “Enabling cross-launch from the FM application to NFM-T for classic OIM with HIP users” (p. 64) and 5.5 “To cross-launch the NFM-T web GUI from the NFM-P FM application” (p. 66) for more information.

Figure 5-4 Navigation to NFM-T correlated alarms



5.4 Enabling cross-launch from the FM application to NFM-T for classic OIM with HIP users

5.4.1 Purpose

Perform this procedure on an NFM-P server to enable navigation from the NSP Fault Management application to the NFM-T web client for alarms on optical NEs that are managed by the NFM-P.

The configuration described in this procedure applies only to classic OIM with HIP protocol.

NOTICE

Service Disruption

The procedure changes NFM-P system configuration. A configuration change may have serious consequences such as service disruption.

Contact technical support before you attempt to modify NFM-P system configuration.

Note: You must perform this procedure on each main server in the NFM-P system.

5.4.2 Steps

1

Log in to the main server station as the nsp user.

2

Open a console window.

3

Enter the following:

```
bash$ cd /opt/nsp/nfmp/server/nms/config
```

4

Create a backup copy of the nms-server.xml file.

5

Open the nms-server.xml file using a plain-text editor such as vi.

6

Locate the section that begins with the following tag:

```
<integration
```

7

Edit the following line in the section to read:

```
navigationEnabled="true"
```

8

Save and close the nms-server.xml file.

9

Enter the following in the console window:

```
bash$ cd ../bin
```

10

Enter the following:

```
bash$ ./nmsserver.bash read_config ↵
```

The main server reads the updated configuration and puts the change into effect.

11

Close the console window.

END OF STEPS

5.5 To cross-launch the NFM-T web GUI from the NFM-P FM application

5.5.1 Steps

1

Log in to the NFM-P FM application.

2

Click on the Alarm List tab. The alarm list appears.

3

Click on the More button (...) and choose Show Affected Object. The details of the chosen alarm opens on the NFM-T web GUI in the default browser.

END OF STEPS

6 Troubleshooting

6.1 Overview

6.1.1 Purpose

This chapter describes how to troubleshoot problems when you are working on the OIM.

6.1.2 Contents

6.2 Troubleshooting

6.2.1 Introduction

The *NSP NFM-P Troubleshooting Guide* provides information about NFM-P and troubleshooting using alarms, OAM tools for service troubleshooting, and network management domain troubleshooting for NFM-P software and platforms.

6.2.2 Acknowledge alarms

When you acknowledge the alarms in NFM-P, the alarms are acknowledged also in NFM-T. See 6.3 “To acknowledge alarms” (p. 69) for more information about how to acknowledge alarms.

6.2.3 Unacknowledge alarms

You can unacknowledge NFM-T alarms only from the NFM-P FM application, but not from the NFM-P client GUI. See 6.4 “To unacknowledge alarms” (p. 70) for more information about how to unacknowledge alarms.

6.3 To acknowledge alarms

6.3.1 Purpose

When you select an alarm to investigate the root cause, it is a good practice to acknowledge the alarm to indicate that the problem is under investigation. This ensures that duplicate resources are not applied to the same problem.

6.3.2 Steps

1

To acknowledge the selected alarm:

1. Right-click on the selected alarm in the dynamic alarm list and choose Acknowledge Alarm(s). The Alarm Acknowledgment form opens.

   If required, add text in the Acknowledgment Text box.
2. Select the Acknowledgement check box and click OK.
3. Click OK. A check mark appears for the selected alarm under the Acknowledged column in the dynamic alarm list.

2

To acknowledge multiple, correlated alarms:

1. Right-click on the selected alarm in the dynamic alarm list and choose Show Affected Object. The Properties form for the object opens.
2. Click on the Faults tab, then click on the Object Alarms, Alarms on Related Objects, or Affected Objects tab to display the alarms related to the affected object.
3. Choose all the alarms listed.
4. Right-click on the alarm list, then choose Acknowledge Alarm(s). The Alarm Acknowledgement form opens and lists all of the selected alarms. If required, add text in the Acknowledgement Text box.
5. Click OK to continue. A check mark appears for each of the selected alarms under the Ack. column in the dynamic alarm list.

END OF STEPS

6.4 To unacknowledge alarms

6.4.1 Steps

1

Log in to NFM-P FM application.

2

Click on the Alarm List tab. The alarm list appears.

3

Right-click on one or more alarm entries and choose Acknowledge Alarm(s). The Alarm Acknowledgement form opens.

4

Deselect the Acknowledge check box and click OK.

END OF STEPS

6.5 Problem: Client not receiving server heartbeat messages

6.5.1 Purpose

Perform this procedure when NFM-P client is not receiving heartbeat messages.

6.5.2 Steps

1

Verify the network connectivity between NFM-P and NFM-T.

2

Verify that NFM-P server and client clocks are synchronized. To set the date and time for NFM-P server and client clocks, see the *NSP NFM-P System Administrator Guide* for more information.

END OF STEPS

6.6 Problem: EMS is unreachable

6.6.1 Purpose

Perform this procedure when an EMS is unreachable.

6.6.2 Steps

1

Verify that the Administrative State parameter on the EM System (Edit) form is set to Up.

END OF STEPS