Lucent Technologies
Bell Labs Innovations

Navis™ Optical Element Management System (EMS)

Provisioning Guide

Release 7.0

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Contents

About this information product

Purpose xvii

Reason for reissue xvii

Safety labels xvii

Intended audience xvii

How to use this information product xviii

Conventions used xx

Related documentation xx

How to comment xxi

How to order xxi

1 System Introduction

Overview 1-1

System Overview 1-2

Features 1-4

Hardware Architecture 1-8

Software Architecture 1-14

Supported Network Elements 1-15

System Interfaces 1-16

2 Getting Started

Overview 2-1

Log Into the Navis™ Optical EMS 2-3

Log Out of the Navis™ Optical EMS 2-7

Select an Item in the Subnetwork Explorer 2-9

Expand or Collapse an Item in the Subnetwork Explorer 2-10

Select an Item in the Map Pane 2-11

Move an Item on the Map Pane 2-12

Expand or Collapse an Aggregate on the Map Window 2-13

Zoom the Map View 2-15

Find a Network Element 2-16

Clear Status Messages 2-17

Modify User Preferences 2-18

Save Preferences/Map Positions 2-21

Restore Preferences/Map Positions 2-22

Copy Preferences/Map Positions 2-23

Perform Cut-Through Commands 2-25

Build TL1 Commands 2-27

Broadcast TL1 Commands 2-29

View NE Equipment 2-31

View NE Equipment Lists 2-34

View NE Equipment Details 2-37

Display the Cross-Connection Window 2-39

Display Ports on the Cross-Connection Window 2-41

View NE Cross-Connections—Textual 2-42

View Port/Tributary Aliases 2-44

Download Alias Files 2-49

3 Management Communications Setup

Overview 3-1

Add a Network Element—X.25 Communications Via a Gateway Network Element 3-4

Add a Network Element—OSI Communications 3-8

Add a Network Element—TCP/IP Communications 3-16

Add a Gateway Network Element—X.25 Communications 3-22

Modify a Network Element 3-28

Delete a Network Element 3-30

Add a Subnetwork Name/Alias 3-32

Modify a Subnetwork Alias 3-34

Delete a Subnetwork Name/Alias 3-36

Associate Remote Network Elements with Gateway Network Elements 3-38

Add a Secondary (Backup) Gateway Network Element Association 3-41

Switch Primary/Secondary Gateway Network Elements 3-43

Delete a Gateway Network Element Association 3-45

Manage Transport Bridges 3-47

Manually Initiate DNO 3-49

Schedule DNO 3-53

Modify a Scheduled Task 3-56

Delete a Scheduled Task 3-58

Provision DSA 3-59

Add a DIB Prefix 3-61

Modify a DIB Prefix 3-63

Delete a DIB Prefix 3-65

Add an Network Element to the Directory Information Base (DIB) 3-66

Modify a Network Element in the Directory Information Base (DIB) 3-70

Delete a Network Element from the Directory Information Base (DIB) 3-72

Reset a Network Element (for WaveStar® OLS 1.6T NEs) 3-73

Update System (for WaveStar® OLS 1.6T NEs) 3-75

Display the Communication State of the Network Element 3-76

Provision DCC Configuration 3-79

Provision DCC Terminations 3-86

View DCC Terminations 3-90

Provision an IP Gateway Network Element (for IP Tunneling) 3-92

Provision IP Tunnel Parameters 3-96

Manually Provision IP Tunnel Routes 3-100

Modify IP Tunnel Route Entries 3-104

Delete an IP Tunnel Route Entry 3-107

Provision a Virtual Switch 3-110

Modify a Virtual Switch 3-115

Delete a Virtual Switch 3-119

View Virtual Switch Details 3-122

Provision an Ethernet Connection (IEEE.1Q Tagging Mode) 3-125

Provision an Ethernet Connection (Transparent Tagging Mode) 3-128

Add a Spanning Tree Group 3-132

View Spanning Tree Groups 3-135

Delete a Spanning Tree Group 3-138

4 Equipment Provisioning

Overview 4-1

Provision System Parameters 4-2

Provision NE Ports 4-4

Provision NE Equipment Information 4-13

Establish WaveStar® Equipment 4-14

Remove WaveStar® Equipment 4-17

5 Topology Management

Overview 5-1

Add a Trail 5-2

Delete a Trail 5-4

Add an Aggregate 5-6

Modify an Aggregate 5-9

Delete an Aggregate 5-11

6 Timing Provisioning

Overview 6-1

Configure External Timing Port Parameters for NE Timing Synchronization 6-3

View External Timing Port Parameters for NE Timing Synchronization 6-5

Operate an External Timing Reference/Timing Mode Switch 6-7

Release an External Timing Reference/Clock Mode Protection Switch 6-10

Set Network and NE Delay Threshold 6-12

Set Network Element Date/Time Synchronization 6-14

Enable Fall Back and Spring Forward 6-17

Set Drift Threshold for Date/Time Synchronization 6-20

Enable/Disable Automatic Date/Time Synchronization 6-22

Schedule Network Element Date/Time Synchronization 6-24

Modify a Scheduled Task 6-27

Delete a Scheduled Task 6-29

7 Traffic Provisioning

Overview 7-1

Add an Optical Association or Connection 7-3

Delete an Optical Association 7-7

Add a Single NE Cross-Connection 7-9

Roll a One-Way Cross-Connection 7-17

Roll a Two-Way Cross-Connection 7-21

Add a Path-Protected Cross-Connection 7-25

Add an Adjunct Path-Protected Cross-Connection 7-31

Add an NE Multi-Cast Cross-Connection 7-36

Add Compound Cross-Connections (via the Cross Connect Template) 7-39

Add a One-Way Merge Cross-Connection (for LambdaRouter™ 128/256 AOS NEs) 7-47

Add a One-Way Bridge Cross-Connection (for LambdaRouter™ 128/256 AOS NEs) 7-54

Add a Two-Way Cross-Connection (for LambdaRouter™ 128/256 AOS NEs) 7-61

Delete an NE Cross-Connection—Graphical 7-67

Delete an NE Cross-Connection—Textual 7-70

Delete Multiple NE Cross-Connections—Textual 7-73

Modify an NE Cross-Connection—Graphical 7-76

Modify an NE Cross-Connection—Textual 7-79

Add a Loopback 7-82

View Loopbacks 7-88

Delete a Loopback 7-90

8 Traffic Maintenance

Overview 8-1

Add Network Element Protection Groups 8-3

View Network Element Protection Groups 8-9

Modify Network Element Protection Groups 8-11

Delete Network Element Protection Groups 8-14

Operate Protection Switch (from the Manage Protection Groups Window) 8-16

Display Protection Switching Status 8-22

Operate Protection Switch (from the Protection Status Management Window) 8-24

Create a Test Access Connection 8-30

List Test Access Connections 8-34

Modify a Test Access Connection 8-37

Delete a Test Access Connection 8-40

Provision a Ring Map 8-42

Enable a Ring Map 8-46

View a Ring Map 8-48

Provision Nonpreemptible Unprotected Traffic (NUT) Status (NPPA/NUT Provisioning) 8-51

9 Software Upgrade

Overview 9-1

Import Software to the Navis™ Optical EMS 9-3

Download NE Software 9-7

Copy Software from NE to NE 9-9

Activate NE Software 9-12

Delete NE Software 9-14

Back Up NE Data 9-16

Restore NE Data 9-18

In Service Upgrade of WaveStar® OLS 1.6T Software from Release 3.0 or Release 5.0 CMISE Mode to Release 6.0 TL1 Mode 9-22

Schedule NE Data Backup 9-29

Schedule NE Software Download 9-32

Schedule NE Software Copy 9-35

Schedule NE Software Activation 9-37

Modify a Scheduled Task 9-40

Delete a Scheduled Task 9-42

10 Getting Started Concepts

Overview 10-1

The Navis™ Optical EMS Graphical User Interface 10-3

Using the Mouse 10-4

Manipulating Fields and Text 10-5

Logging Into the Navis™ Optical EMS 10-6

Logging Out of the Navis™ Optical EMS 10-11

The Navis™ Optical EMS Map Window 10-12

Selecting NEs and Aggregates 10-32

Moving NEs and Aggegates 10-33

Finding a Network Element or Aggregate 10-34

Network Element Explorer 10-35

Window Buttons 10-37

Using Lists 10-41

Sorting Tables 10-47

Cut-Through 10-50

Equipment Display 10-52

11 Management Communications Setup Concepts

Overview 11-1

Network Element Administration 11-3

Data Communications Interfaces 11-5

Dynamic Network Operations 11-51

12 Equipment Provisioning Concepts

Overview 12-1

Equipment Provisioning 12-2

Port Provisioning 12-4

13 Topology Management Concepts

Overview 13-1

Aggregates 13-2

Trails 13-4

14 Timing Provisioning Concepts

Overview 14-1

Network Element Timing Synchronization 14-2

Date/Time Synchronization 14-6

15 Traffic Provisioning Concepts

Overview 15-1

Optical Associations 15-2

Cross-Connections 15-5

Entering cross-connections 15-25

Deleting cross-connections 15-27

16 Traffic Maintenance Concepts

Overview 16-1

Protection Groups 16-2

Protection Switch Management 16-11

Test Access 16-13

17 Software Upgrade Concepts

Overview 17-1

Software Management 17-3

Scheduling Tasks 17-15

IN Index IN-1

List of Figures

1 System Introduction

1-1 EMS Basic Host Standalone Configuration 1-10

1-2 EMS Local Redundancy Configuration 1-11

1-3 EMS Geographic Redundancy Configuration 1-12

10 Getting Started Concepts

10-1 Mouse Buttons 10-4

10-2 The Map Window 10-12

10-3 Equipment Hierarchy on Network Element Explorer 10-35

10-4 Example of Exclusive Choice Button Selection 10-38

10-5 Example of Push Buttons on Window 10-40

10-6 Example of Filter/Sort Window 10-45

10-7 Example of Alarm Summary Window 10-47

17 Software Upgrade Concepts

17-1 WaveStar NE Software Download/Activation Process 17-6

17-2 Software Upgrade Process: 32 Node Open Ring Configuration 17-8

17-3 The WaveStar® NEs Memory Backup and Restore Process 17-12

List of Tables

1 System Introduction

1-1 Network Elements Supported by Navis™ Optical EMS 1-15

10 Getting Started Concepts

10-1 Default System Colors for Alarm Severity Levels and Communication Status of NEs 10-21

10-2 Standard Window Buttons 10-37

10-3 Push Buttons on List Windows 10-39

11 Management Communications Setup Concepts

11-1 Required Information for Adding an NE 11-47

11-2 Modify NE Fields 11-49

15 Traffic Provisioning Concepts

15-1 Color Conventions for Cross Connection and Tributary Properties 15-16

17 Software Upgrade Concepts

17-1 Methods of Performing Software Management Function 17-4

About this information product

Purpose

This chapter is a preface that provides an overview of this information product.

The purpose of this Provisioning Guide is to instruct users how to provision network elements managed by the Navis™ Optical EMS. It provides users with the information and procedures necessary to configure or re-configure network elements after local installation and to set up the traffic network.

Reason for reissue

This Provisioning Guide is a revised document that supports the Navis™ Optical EMS, Release 7.0. This document has been reissued to provide information on Release 7.0 features.

Safety labels

N/A

Intended audience

This guide is written primarily for operations personnel who will be using the Navis™ Optical EMS to provision network element (NE) subnetworks and NE equipment.

How to use this information product

This section provides information to assist users of this information product.

The following table describes the structure and content of each chapter in this Guide.

Section	Title	Description
Preface	About This Information Product	Describes this document's purpose and intended audience, how to use the document, and how to comment on it
Chapter 1	Chapter 1, "System Introduction"	Provides an general introduction to Navis™ Optical EMS and its functions/features
Chapter2	Chapter 2, "Getting Started"	Describes tasks related to logging into and logging out of Navis™ Optical EMS, and common functions of the Navis™ Optical EMS Graphical User Interface (GUI)
Chapter 3	Chapter 3, "Management Communications Setup"	Describes tasks performed to set up communications with managed network elements
Chapter 4	Chapter 4, "Equipment Provisioning"	Describes tasks performed to provision network element equipment
Chapter 5	Chapter 5, "Topology Management"	Describes tasks performed to manage the network topology in the Navis™ Optical EMS

Section	Title	Description
Chapter 6	Chapter 6, “Timing Provisioning”	Describes tasks performed for date/time synchronization of managed network elements with the Navis™ Optical EMS host
Chapter 7	Chapter 7, “Traffic Provisioning”	Describes tasks performed to provision network element traffic
Chapter 8	Chapter 8, “Traffic Maintenance”	Describes tasks performed to maintain network element traffic
Chapter 9	Chapter 9, “Software Upgrade”	Describes tasks performed to manage and upgrade network element software
Chapter 10	Chapter 10, “Getting Started Concepts”	Describes the Navis™ Optical EMS Graphical User Interface (GUI)
Chapter 11	Chapter 11, “Management Communications Setup Concepts”	Describes communications setup with network elements managed by the Navis™ Optical EMS
Chapter 12	Chapter 12, “Equipment Provisioning Concepts”	Describes equipment provisioning in the Navis™ Optical EMS
Chapter 13	Chapter 13, “Topology Management Concepts”	Describes topology management in theNavis™ Optical EMS
Chapter 14	Chapter 14, “Timing Provisioning Concepts”	Describes timing provisioning in the Navis™ Optical EMS
Chapter 15	Chapter 15, “Traffic Provisioning Concepts”	Describes traffic provisioning in the Navis™ Optical EMS

Section	Title	Description
Chapter 16	Chapter 16, “Traffic Maintenance Concepts”	Describes traffic maintenance in theNavis™ Optical EMS
Chapter 17	Chapter 17, “Software Upgrade Concepts”	Describes software management and upgrade in theNavis™ Optical EMS

Conventions used

Menu and submenu selections from the Navis™ Optical EMS Map window are shown in boldface type.

The terms “choose” and “select” are used interchangeably throughout this Guide. Both terms represent the following operations:

- Activating a button, such as OK, Cancel, or Help
- Activating a menu, such as a pull-down menu on the menu bar
- Selecting an item from a menu
- Selecting an NE/aggregate symbol on the Map window
- Selecting an item from a scroll list
- Moving window focus to a text field to type an entry in the field

Related documentation

This information product is part of a set of documents that supports Navis™ Optical EMS.

List of documents

The document set that supports the Navis™ Optical EMS includes:

- *Navis™ Optical EMS Maintenance Guide*—this document instructs users on how to maintain network elements managed by the Navis™ Optical EMS
- *Navis™ Optical EMS Administration Guide*—this document instructs users on how to administer the Navis™ Optical EMS and the managed network elements
- *Navis™ Optical EMS Provisioning Guide*—this document instructs users how to use the Navis™ Optical EMS to provision the managed network elements
- *Navis™ Optical EMS Installation Guide*—this document instructs system administrators and other operations personnel how to install the Navis™ Optical EMS

- *Navis™ Optical EMS Applications and Planning Guide*—this document provides users with information used to understand the applications for Navis™ Optical EMS, plan their use of the Navis™ Optical EMS, and understand what components must be ordered for the Navis™ Optical EMS application
- *Navis™ Optical EMS Terminology Guide*—this document is a comprehensive glossary of terms and acronyms related to the Navis™ Optical EMS and its managed network elements

On-line documentation

The online versions of the Navis™ Optical EMS documents (except for the *Navis™ Optical EMS Terminology Guide*) are available through the Help menu option on the Map window main menu in the Navis™ Optical EMS Graphical User Interface (GUI). For more information about the Help feature, see the Getting Started Concepts chapter in the *Provisioning Guide*.

On-line help

The Navis™ Optical EMS software includes on-line help for each window with a Help button. Each window has an associated help screen that describes the purpose of the window, basic window navigation, field descriptions, and button functions.

How to comment

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1 System Introduction

Overview

Purpose

This chapter provides a general system overview of Navis™ Optical EMS.

Objectives

This chapter explains how to do the following:

- List the features available on the Navis™ Optical EMS and briefly describe each feature
- Identify the basic hardware components of Navis™ Optical EMS
- Identify the basic software components of the Navis™ Optical EMS
- Identify the network element types and releases supported by the Navis™ Optical EMS
- Identify the system interfaces of the Navis™ Optical EMS

Contents

System Overview	1-2
Features	1-4
Hardware Architecture	1-8
Software Architecture	1-14
Supported Network Elements	1-15
System Interfaces	1-16

System Overview

Description

The Lucent Technologies' *Navis*™ Optical Element Management System (EMS) supports the new generation of Lucent Technologies' transmission products: the Lucent Technologies' WaveStar®product family. The WaveStar®products are intelligent Network Elements (NEs) which can discover and report their configuration (including physical equipage) and connectivity within the network.

The Navis™ Optical EMS operates as an enhanced graphical tool and as a general configuration management aid. It is designed to take advantage of the capabilities of the WaveStar® NEs, and to optimize the role of the NEs in management functions to create an intelligent operations environment.

Just as the WaveStar® network elements are the solution to your transport network needs, the Navis™ Optical EMS is the answer to the corresponding operations needs to efficiently manage the network. The following details some of the ways that the Navis™ Optical EMSachieves this:

- Navis™ Optical EMS provides centralized, secure, remote administration of Synchronous Optical Networks (SONET) and Dense Wavelength Division Multiplexing (DWDM) subnetworks. From a single work center, a Navis™ Optical EMS user can remotely manage SONET and DWDM NEs. Lucent Technologies patented Dynamic Network Operations (DNO) process gathers network configuration information from the NEs, providing accurate, hands-off population of the Navis™ Optical EMSdatabase, and ensures that the Navis™ Optical EMS management functions operate using the actual network configuration.
- Navis™ Optical EMS provides fault, performance, configuration, security, and log management functions via the GUI.
- Navis™ Optical EMS supports 7-layer OSI as well as OSI over Transmission Control Protocol/Internet Protocol (TCP/IP) communication protocols over LAN physical interfaces.
- Navis™ Optical EMS supports X.25-based protocol layer for Lucent Technologies' FT-2000 Large Capacity Terminal (LCT).
- Navis™ Optical EMS supports CMISE and TL1 application protocols.

- Navis™ Optical EMS supports communication multiplexing or concentration to provide network security and to record all database changes.
- Navis™ Optical EMS provides a TL1 cut-through capability, allowing the user to access an NE through a native command set.

Graphical user interface

Navis™ Optical EMS incorporates a platform independent, Java-based Graphical User Interface (GUI) that allows for the use of PCs running Windows NT as the user's terminals. The Navis™ Optical EMS GUI is a common interface to all NEs, regardless of type, and provides a powerful, flexible, and user friendly interface to execute the most frequently used actions. The GUI also supports numerous customization options so that users may tailor the displays in accordance with their own preferences.

The GUI provides graphical features such as multilevel displays of the network, an automatically generated map of the overall managed domain, hierarchically arranged equipment displays down to the shelf level, a graphical representation of the cross connection configuration with point and click provisioning, and form and menu-based provisioning for viewing and setting provisional parameters. The GUI also provides the ability to initiate a cut-through session to directly send TL1 commands to NEs.

Year 2000 compliance

Navis™ Optical EMS and the underlying software platforms are designed to comply with the Year-2000 initiative to ensure correct date representation and date/time calculation for the year 2000 and beyond. Navis™ Optical EMS Release 4.2 and UNIX Release 11.0 are Year-2000 compliant only when the required Year-2000 patch set (Y2K-1020S800) is installed. This includes data that is received by the Navis™ Optical EMS from the supported NEs.

□

Features

Overview

Navis™ Optical EMS provides a set of standard and value-added features used to administer the WaveStar®NEs. These are grouped into the following categories:

- Fault Management
- Performance Management
- Configuration Management
- Security Management
- Log Management
- NE Event Handler
- Cut-Through Capability

Fault management

Fault Management monitors alarms and conditions in the subnetwork. Navis™ Optical EMS receives autonomous alarm messages from NEs when alarm states are set or cleared. These alarm messages are processed and made available to the user through the GUI, or to other network surveillance systems. Navis™ Optical EMS supports the following Fault Management tasks:

- Alarm status indication on the network map for equipment, facility failures, and updates
- Hierarchical alarm status indication at NE, bay, shelf, and circuit pack levels
- Textual alarm summary report
- Alarm provisioning at the NE level (via TL1 cut-through)
- Alarm provisioning at the EMS level
- Alarm synchronization
- Autonomous alarm handling
- Alarm correlation
- Alarm aging

Performance management

Navis™ Optical EMS collects Performance Monitoring (PM) data from NEs that have PM data collection activated. It stores collected PM data for a retention period set by the user (up to 30 days). Navis™ Optical EMS allows the user to view unprocessed PM data, or the data can be exported to an off-line system for more sophisticated analysis and reporting purposes.

Configuration management

Navis™ Optical EMS has a Dynamic Network Operations (DNO) feature that retrieves the internal configurations of NEs and external connectivity relationships. This feature enables the system to discover, without manual intervention, the topology of subnetworks consisting of Lucent Technologies' NEs.

The GUI supports the following configuration management tasks:

Subnetwork configuration management

- Network Element/trail discovery/update/display
- Aggregate management/display

NE configuration management

- Equipage discovery/update/display
- Equipment provisioning and pre-provisioning
- Cross-connection provisioning/display
- Tributary reservation
- Manual path provisioning
- Protection switch management
- Port provisioning

Software management

- Software download to NEs
- Software copy from one NE to another
- Software install (activate) on NE
- NE data backup and restore

Security management

Navis™ Optical EMS maintains a set of connections to the NEs that are shared by all users. Administration of individual user logins and passwords is centralized on Navis™ Optical EMS rather than distributed across the large number of managed NEs.

All users are required to have a login and password to communicate with the system. The system administrator assigns users to the NEs

they can use (Target Groups) and the actions they can perform (Command Groups). Target Groups and Command Groups can be set up according to the type of tasks users are performing, such as maintenance, provisioning, or monitoring.

Navis™ Optical EMS provides two levels of security management:

- EMS security management
  - defines EMS users (user id and password)
  - partitions the network into user-defined target groups
  - defines command groups
  - assigns EMS user to target groups and command groups
- NE security management
  - provides services to manage NE user id and password

Log management

Log Management provides services to various system modules including:

- Writing log messages to database tables
- Retrieving log messages from database tables
- Displaying information on selected activities

These log messages are helpful for keeping track of information regarding system performance and actions. The information can be filtered to suit the user's needs.

NE event handler

The NE Event Handler process is a passive distributor of non-alarm autonomous messages emitted by the NEs. It registers with the Southbound interface for database change messages from TL1 NEs and with Q3 gateway for CMISE NEs.

The main functions of the NE Event Handler (NEH) are the following:

- Receive non-alarm autonomous messages (TL1 from Southbound and CMISE from Q3 gateway)
- Distribute the received messages to the user
- Log by invoking the Log Manager

Cut-through capability

In order for the user to execute NE TL1 commands that may not be explicitly supported, a cut-through capability is available. Navis™ Optical EMS allows the user access only to the NEs and associated commands defined by the Target and Command Groups for which the user is assigned.

□

Hardware Architecture

Overview

Navis™ Optical EMS consists of a Hewlett-Packard (HP) host processor, and GUI workstations (PC/Sun) connected via an Ethernet LAN, with the option to interface via a Wide Area Network (WAN).

A WAN/PSN is recommended for large, geographically dispersed configurations to concentrate access from the Navis™ Optical EMS to the managed subnetworks. The same WAN/PSN can also be used to access other network management systems or other hosts. Every Navis™ Optical EMS installation requires data connections to each managed subnetwork.The southbound WAN from the Navis™ Optical EMS to the NEs must support an OSI/LAN interface and/or an IP/LAN interface. If FT-2000 LCT NEs are to be managed, an X.25 PSN is required.

Host platform

The system hardware architecture consists of two main components:

- HP K-class, L-class, or N-class server running HP-UX version 11.0 (Nov. 1999) with associated peripherals (console, terminals, and printers)
- PC running *Windows NT*® 4.0 (ServicePack 4) or Windows 2000
- Sun Solaris workstation Version 2.6 or 2.7.

GUI workstation

The recommended platform for the Java GUI client is a personal computer running Windows NT 4.0 with ServicePack 4 or Windows 2000. The Java GUI software is installed on the PC as a standalone application. Transaction requests are issued by the GUI software to the EMS host. The host returns responses associated with these transactions back to the PC. The interface to the PC is via an 802.3 LAN link. The GUI application messages and GUI cut-through data traffic are transported using this interface.

System redundancy options

The Navis™ Optical EMS system redundancy option provides multiple levels of application and host redundancy for backup support and disaster recovery in the event of failure. The local and geographic redundancy configurations require two similarly equipped hosts that operate in an active/standby arrangement. The two host computers are linked via a TCP/IP WAN segment and employ data replication to provide near real-time database synchronization of the standby host with the currently active host.

Under normal operating conditions, the Navis™ Optical EMS application is running on the active host, with that host actively monitoring all network elements in the management domain. The backup host is in a hot-standby state, maintaining data connections to the network, and using data replication from the active host to keep its database current. In the event of a primary host failure, an administrator can switch manually to the standby host or a switchover can be set up to be performed automatically through the cluster adminstration GUI. Upon switch-over, the standby host assumes active control of the network.

For details about the cluster administration GUI, refer to the *Navis™ Optical EMS Administration Guide.*

The Navis™ Optical EMS redundancy options include:

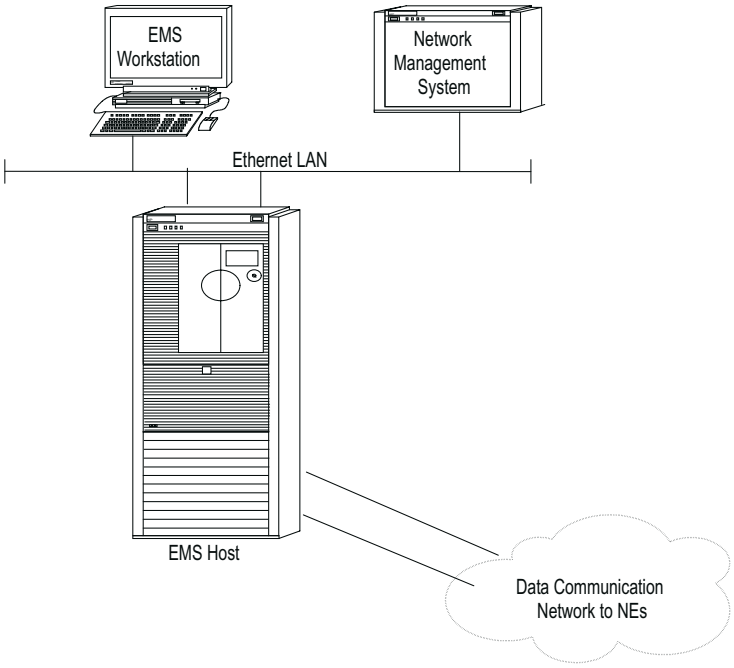
- host redundancy
- local redundancy
- geographic redundancy

Host redundancy

Host redundancy provides component redundancy within a single host where there is no backup host available (Figure 1-1, “EMS Basic Host Standalone Configuration” (1-10)). Recovery relies on switching

control to another resource on the same host such as a backup LAN card or mirrored disk.

Figure 1-1 EMS Basic Host Standalone Configuration

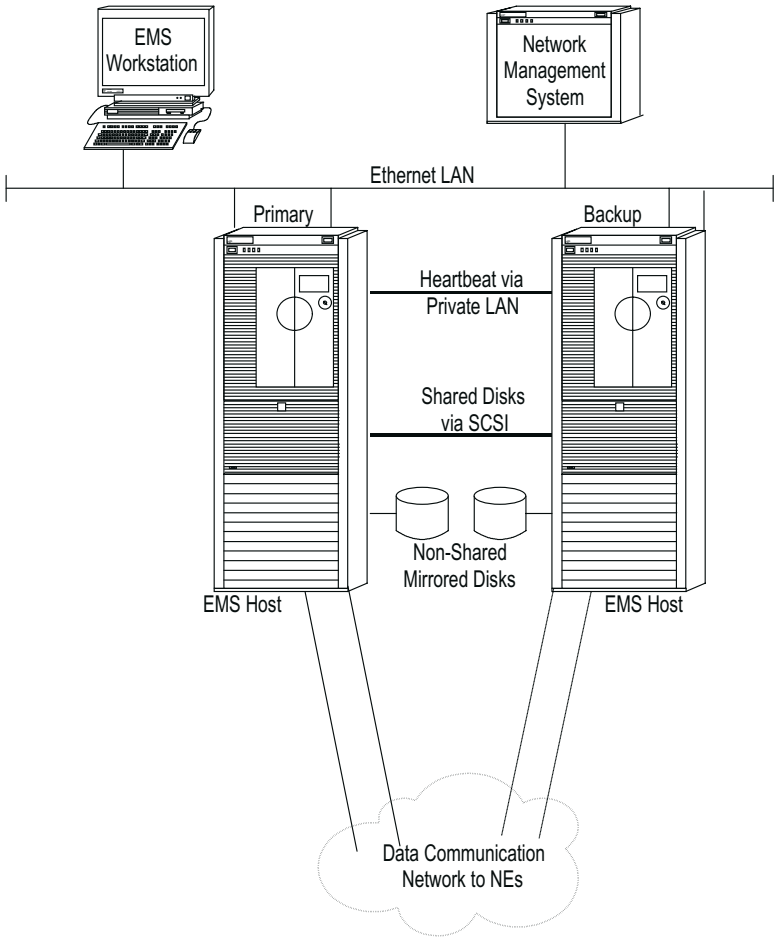


Local redundancy

Local redundancy employs two similarly equipped hosts located in the same building (Figure 1-2, “EMS Local Redundancy Configuration” (1-11)). Each host is configured with redundant hardware components.

Should the primary host fail, the backup host is activated automatically without user intervention.

Figure 1-2 EMS Local Redundancy Configuration



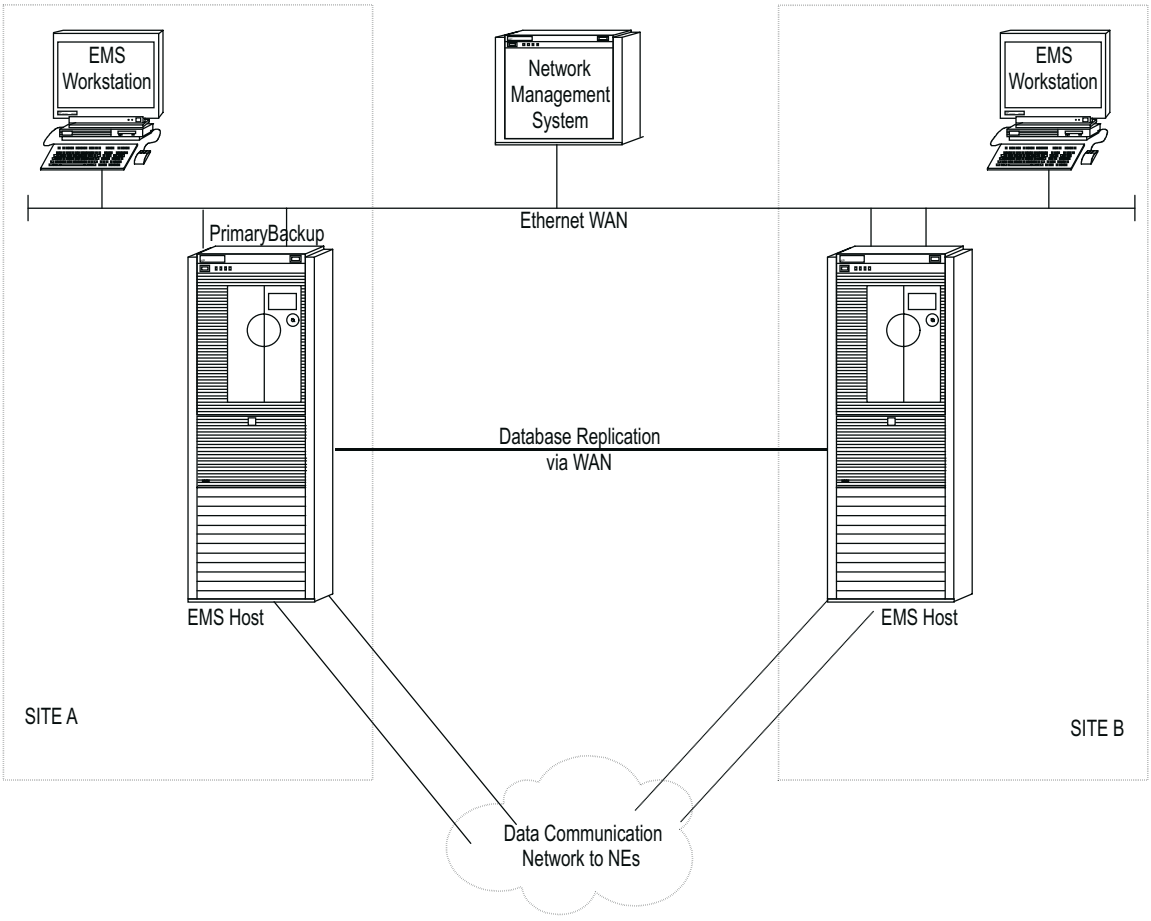
Under normal operating conditions, the Navis™ Optical EMS Host is in service (or “active”) on the primary host monitoring all network elements in the database. The backup host exists in a passive (or “standby”) mode. This configuration uses a “floating” IP address shared by both servers. Although the “standby” host is logged into all network elements, it does not initiate any event to the network or react to any notifications from the network. Database synchronization is handled using Informix Enterprise Replication, FTP file transfer, and event forwarding from the “active” host. In the event of a primary host failure, control is automatically switched from the primary to the backup host, changing the Navis™ Optical EMS application from

"standby" to "active" service without user intervention. Once the primary host failure is repaired, it can be quickly and easily configured to act as the new standby host with no interruption in service.

Geographic redundancy

Geographic redundancy employs two similarly equipped hosts located in different geographical locations (like Atlanta, GA, and Denver, CO (Figure 1-3, "EMS Geographic Redundancy Configuration" (1-12)). Each host is configured with redundant hardware components, and resides on a TCP/IP WAN segment. Data replication and event forwarding via ***ftp*** over a WAN are used to maintain EMS database and UNIX file system synchronization.

Figure 1-3 EMS Geographic Redundancy Configuration



Under normal operating conditions, the Navis™ Optical EMS application is in service (or “active”) on the primary host monitoring all network elements in the database. The backup host exists in a passive (or “standby”) mode with the Navis™ Optical EMS application running in a “read only” mode. Although the “standby” host is logged into all networks, it does not initiate any event to the network or react to any notification from the network. Database synchronization is handled using Informix Enterprise Replication, FTP file transfer, and event forwarding from the “active” host. In the event of a primary host failure, control can be manually or automatically switched from the primary to the backup host changing the Navis™ Optical EMS application from “standby” to “active” service.

In a geographic redundant server configuration, switchover from the primary to the backup server can be performed either manually or by using the automatic switchover feature which can be set up through the cluster Administration GUI. Once the primary host failure is repaired, it can be quickly and easily configured to act as the new standby host with no interruption in service.

For details about the cluster administration GUI, refer to the *Navis™ Optical EMS Administration Guide.*

□

Software Architecture

Overview

The software architecture can be divided into the following major subsystems:

- Configuration Management
- Fault Management
- NE Event Handler
- EMS Security Management
- Southbound Management Interface
  - X.25-based protocol layer
  - OSI-based protocol layer
  - OSI over TCP/IP-based protocol layer
  - TL1 Manager
  - Connection Manager
  - Gateway process
  - QA process (CMISE only)
  - SONET Directory Service (SDS)
- Log Management
- Operation, Administration, and Maintenance
  - Log and trace
  - Scheduler
- JAVA-based GUI

□

Supported Network Elements

Overview

Navis™ Optical EMS provides element management support for the following NEs and their software releases. The information is the best available at the time of publication of this document and is subject to change based on the availability of the NE releases.

Table 1-1 Network Elements Supported by Navis™ Optical EMS

Managed NEs	Supported Releases
WaveStar®Bandwidth Manager (BWM)	R1.2, R1.3, R2.0, R3.0, R3.1, R4.0, R4.1
WaveStar ®OLS 1.6T	R2.0, R3.0, R4.0, R5.0, R6.0, R6.1
WaveStar®Network Communications Controller (NCC)	R3.0, R3.1, R3.2
WaveStar TDM 2.5G (OC-48 2F)/WaveStar®TDM 10G(OC-192 2F)	R2.0, R3.0, R4.0, R5.0 (10G shelf option available beginning in R3.0), R5.0.2, R5.1.2, R5.1.5, R6.1.5
WaveStar TDM 10G (OC-192 2F)	R1.0, R1.1, R2.0, R2.1
WaveStar*WaveStar*TDM 10G (STM-64)	R1.0, R1.1, R2.0, R2.1, R2.2, R3.0, R4.0.5
FT-2000 LCT	R4.0
LambdaRouter™All Optical Switch (AOS)	R2.0
Metropolis™ DMX Access Multiplexer	R1.1, R2.0
Metropolis Enhanced Optical Networking (EON)	R7.0, R7.5, R8.0, R8.1
Metropolis DMX***press***Access Multiplexer	R1.0
LambdaUnite™ MultiService Switch (MSS)	R2.0

System Interfaces

Overview

The Navis™ Optical EMS southbound communication interface connects with NEs, and supports OSI and OSI over TCP/IP communications with the NEs.

- WaveStar™ OLS 1.6T supports both an OSI and OSI over TCP/IP interface.
- WaveStar®BWM and WaveStar® TDM 2.5G only support an OSI interface. However, since the NCC acts as a transport bridge, the Navis™ Optical EMS also supports an OSI over TCP/IP interface to WaveStar® BWM and WaveStar®TDM 2.5G NEs via a transport bridge.
- WaveStar® NCCs support both OSI and OSI over TCP/IP interfaces, much like the WaveStar™ OLS 1.6T.

Configuration management

The Configuration Management subsystem (CF) provides the following functions for the Navis™ Optical EMS:

- discovers the network and its elements that are in an EMS domain
- maintains an information model of the network and its elements concerning configuration management
- provides the cross connection service
- provides protection switching management service
- derives the provisionable subnetworks
- provides the path provisioning services on these subnetworks
- provides NE parameter provisioning
- provides NE Synchronization Management

The Configuration Management Functional Area (MFA) CF is designed as an Navis™ Optical EMS network configuration management server. It provides services to accomplish configuration management tasks. Configuration Management, in turn, uses the services of other Navis™ Optical EMS subsystems to handle user requests.

Fault management

The Fault Management subsystem (FM) serves the following functions for Navis™ Optical EMS:

- Alarm collection and storage
- Alarm processing: (Aging, Event Per Time, Alarm correlation and suppression)
- Alarm broadcast
- Alarm severity assignment profile management
- Alarm database synchronization
- Alarm log synchronization

FM does not have any direct interface to external systems. FM has interfaces to a number of other Navis™ Optical EMS application subsystems.

NE event handler

The main functions of the NE Event Handler (NEH) are:

- receiving non-alarm autonomous messages
- distributing the messages received to clients.
- Logging messages by invoking the Log manager.
- Performing Security Log resynchronization upon re-establishment of an NE communications link.

The NE Event Handler process is a passive distributor of non-alarm autonomous messages emitted by the NEs. It receives non-alarm autonomous messages regarding TL1 NEs from the southbound TL1 processes (CS_Southbound and CS_SbOsi), and receives notifications regarding CMISE NEs from southbound Q3 gateway. The messages received from southbound TL1 processes are TL1 message strings as received from the NE while the CMISE notifications are in MFA structures.

Southbound interface

The Navis™ Optical EMS Southbound interface contains the required functionality to connect to the NEs, to manage these connections, and to forward and receive the messages between the NEs and Navis™ Optical EMS, for all supported communication protocols.

Connection Manager Process

The Connection Manager (CM) process centralizes the functions of sending, receiving, routing, and processing the connections needed for responses and autonomous messages going in, and coming from, the

CMISE and TL1 Southbound subsystems. CM handles the following functions:

- At start-up, load external configurative parameters from a configuration file.
- Create and terminate associations to all NEs.
- Perform association requests in a staggered manner to minimize the impact of the connection processes on the network.
- Implement association recovery mechanisms.
- Receive connection-related indication messages from TL1 and CMISE Southbound subsystems, update association status in memory, and forward notifications to Navis™ Optical EMS.
- Create/modify/delete NEs, store and forward related information.
- Send notification to Navis™ Optical EMS for any incorrect NE types.

CMISE Southbound

The CMISE Southbound subsystem is made of two processes for the support of Lucent Technologies' WaveStar™ OLS 1.6T NEs.

- Gateway (GW) process
  - serves as a bridge process between the Management Functional Area (MFA) and the Q3 Manager
  - receives requests from MFA and the Connection Manager, and sends them down to the Q3 Manager through a socket interface
  - receives responses and autonomous notifications coming from NE via socket. Sends them to MFA or the Connection Manager as required.
  - logs Command and Responses, via the Log Server and Log library.
- Q3 Adaptor process
  The Q-Adaptor maintains a representation of the manged object instances of the managed object classes defined in the information model and converts Common Management Information Service Element (CMISE) requests into the non-TMN format of the underlying OS or NE. It also converts the non-TMN notifications received from a non-TMN OS or NE and converts them to CMISE notifications.

TL1 Southbound

TL1 Southbound is supported by the TL1-Manager process, which is responsible for command/response handling.

SONET Directory Services

The SONET Directory Services (SDS) subsystem resides in the Southbound of the system. All system applications access the shared memory contained in SDS to retrieve information. The shared memory contains the status, last update time, and various directory information. Navis™ Optical EMS employs two agents to manage this information: the Directory Services Agent (DSA) and the Directory User Agent (DUA). The DSA maintains the Directory Information Base and the DUA retrieves and gives information to and from it.

The DSA organizes network elements into a structure known as the Directory Information Base (DIB). The DUA accesses the DSA for any new NEs registered in the MIT and notifies other Navis™ Optical EMS processes of the existence of the new NE. Navis™ Optical EMS then logs into the new NE and via the Dynamic Network Operations (DNO) process gathers the internal configuration and external connectivity relationships from the NE. This ensures that the Navis™ Optical EMS management functions operate using the actual network configuration.

Northbound interface to Navis™ Optical NMS

Navis™ Optical EMS supports a northbound interface to the Navis ™ Network Management System (Navis™ Optical NMS). Navis™ Optical NMS is a part of a telecommunications management network that provides comprehensive and integrated management of an entire transport network. Navis™ Optical NMS manages network elements through an interface with Navis™ Optical NMS. The Navis™ Optical EMSexchanges NE alarm information, configuration information, and performance monitoring data with Navis™ Optical NMS, through a standard CORBA interface.

There are two Navis™ Optical NMS interfaces supported by the Navis™ Optical EMS. The first interface is a server to server interface and the other interface is a GUI to GUI interface.

The server to server interface is responsible for passing NE information from the Navis™ Optical EMS to the Navis™ Optical NMS. The northbound interface to the Navis™ Optical NMS is called the Telecommunications Management Forum (TMF) CORBA Northbound Interface.

The GUI to GUI cut-through allows the Navis™ Optical NMS to invoke the Navis™ Optical EMS GUI screens from the Navis™ Optical NMS GUI. This feature is called the F-interface in both the Navis™ Optical NMS and the Navis™ Optical EMS terminology. Both GUIs must be installed on an NT Terminal Server and be properly configured to talk to one another. The interface supports a one-to-many configuration where one Navis™ Optical NMS GUI can talk to many Navis™ Optical EMS GUIs of different versions.

□

2 Getting Started

Overview

Purpose

This chapter describes procedures for getting started with Navis™ Optical EMS. Procedures are included for logging into and logging out of Navis™ Optical EMS, using the Map window, issuing TL1 commands in Cut-Through mode, and viewing information about NE equipment.

Before you begin

Read Chapter 1, "System Introduction" and Chapter 10, "Getting Started Concepts" to acquire basic knowledge of Navis™ Optical EMS and general information about the design and functions of the Map window.

Contents

Log Into the Navis™ Optical EMS	2-3
Log Out of the Navis™ Optical EMS	2-7
Select an Item in the Subnetwork Explorer	2-9
Expand or Collapse an Item in the Subnetwork Explorer	2-10
Select an Item in the Map Pane	2-11
Move an Item on the Map Pane	2-12
Expand or Collapse an Aggregate on the Map Window	2-13

Zoom the Map View	2-15
Find a Network Element	2-16
Clear Status Messages	2-17
Modify User Preferences	2-18
Save Preferences/Map Positions	2-21
Restore Preferences/Map Positions	2-22
Copy Preferences/Map Positions	2-23
Perform Cut-Through Commands	2-25
Build TL1 Commands	2-27
Broadcast TL1 Commands	2-29
View NE Equipment	2-31
View NE Equipment Lists	2-34
View NE Equipment Details	2-37
Display the Cross-Connection Window	2-39
Display Ports on the Cross-Connection Window	2-41
View NE Cross-Connections—Textual	2-42
View Port/Tributary Aliases	2-44
Download Alias Files	2-49

Log Into the Navis™ Optical EMS

Purpose

Use this procedure to log into the Navis™ Optical EMS Graphical User Interface (GUI).

Before you begin

Before you begin this task for the first time, you must have obtained a user ID and initial password from your system administrator.

When you log into Navis™ Optical EMS for the first time with a new user login, you must change your password from the default password given for the login. A pop-up window is displayed, indicating that you must change your password before being allowed to log into the Navis™ Optical EMS. You are given the option of continuing the session or exiting the system at this point. If you choose to continue the login session, the Change Password window is displayed, prompting you to change your password from the default password. The system validates your new password. If it is valid, the system re-displays the Login window to re-enter your user ID and your new password.

Task

Complete the following steps to start up and log into the Navis™ Optical EMS

1 Start an instance of the GUI.

Result:

This displays the Login window.

2 If you are logging into Navis™ Optical EMS for the first time with a new user ID, use the sub-procedure "SE 2-1: Logging Into the Navis™ Optical EMSfor the First Time" (2-4) immediately following this procedure.

If not, skip to step 3.

Reference:

"SE 2-1: Logging Into the Navis™ Optical EMSfor the First Time" (2-4)

3 Enter your User ID. Press the Tab key.

4 Enter your password.

5 Click the Login button.

Result:

A dialog window is displayed, indicating authorization.

6 Close the dialog window by clicking the Close button.

Result:

The Map window is displayed.

END OF STEPS

SE 2-1: Logging Into the Navis™ Optical EMSfor the First Time

Use the following procedure when you log into Navis™ Optical EMS for the first time:

1 Start an instance of the GUI.

Result:

This displays the Login window.

2 Type in your user ID (which you must initially obtain from your system administrator).

3 Press the Tab key and type in the password initially obtained from your system administrator (this is the default password).

4 Click the Login button. The system verifies your user ID and password.

A pop-up window is displayed, advising that you must change your password before continuing with the session and asking if you want to change your password at this point to continue.

To change your password from the default one and continue with the session, choose Yes.

To stop at this point, choose No.

5 Choose Yes.

Result:

The Change EMS Password window is displayed.

6 Enter your old password in the Old Password field and enter your new password in the New Password field.

Important! Your new password must differ from the old password by at least three characters. A valid password is 6-10 characters. A password must include at least two alphabetic characters, at least one numeric character, and at least one special character (!#$%^&*()-+_=?). The following special characters are not permitted (:,;). The new password cannot contain the login ID as a sub-string. For example, a user ID “john” cannot have a password “john+123”, “johnny+1”, or “iamjohn+1”.

7 Re-enter your new password in the Confirm Password field.

8 After entering your new password, click the OK button on the Change EMS Password window.

If the new password is invalid or a mismatch for your user ID, a message is displayed, indicating that the new password entered is invalid.

Click the OK button on the warning message box and enter a different password in the Password field on the Change EMS Password window. After entering a new password on the Change EMS Password window, click the OK button again.

If your new password is valid and accepted by the system, a message is displayed, indicating that password change is successful. Click the OK button again.

Result:

The Login window is re-displayed.

9 Enter your user ID and the new password.

10 Click the Login button.

Result:

A dialog window is displayed, indicating authorization.

11 Close the dialog window by clicking the Close button.

Result:

The Map window is displayed.

END OF STEPS

□

Log Out of the Navis™ Optical EMS

Purpose Use this procedure to log out of the Navis™ Optical EMS.

Before you begin Before you begin this task, make sure any processes you have been performing on the system have finished running. Otherwise, results of these processes may be uncertain.

Task Complete the following steps to log out of the Navis™ Optical EMS.

1 Select **File** from the main menu bar on the Map window.

Result:

A sub-menu is displayed.

2 Select **Exit** from the File menu.

Result:

If you have modified preferences for Map items, node positions, or both during the session, a pop-up dialog box is displayed, asking if you want to save the changes made to preferences.

3

IF...	THEN...
You want to save the changes to preferences	Choose Yes
You do not want to save the changes to preferences	Choose No **Result:** A second pop-up question dialog box is displayed, asking if you are sure that you want to log off.

4

IF...	THEN...
You want to log off now	Click the Exit button. **Result:** The GUI session is terminated.
You do not want to log off now	Click the Cancel button.

END OF STEPS

□

Select an Item in the Subnetwork Explorer

Purpose Use this procedure to select an item on the Subnetwork Explorer portion of the Map window.

Before you begin Before you begin this task, locate the item (NE, aggregate, DSA, or non-managed device) to be selected on the Subnetwork Explorer portion of the Map window.

Task Complete the following steps to select an item on the Subnetwork Explorer portion of the Map window.

1 Position the mouse pointer on the item to be selected in the Subnetwork Explorer portion of the Map window.

2 Click the left (select) mouse button.

Result:

The selected item is highlighted.

END OF STEPS

□

Expand or Collapse an Item in the Subnetwork Explorer

Purpose Use this procedure to expand or collapse an item (such as an aggregate) in the Subnetwork Explorer portion of the Map window.

Before you begin Before you begin this task, locate the item to be expanded or collapsed in the Subnetwork Explorer portion of the Map window.

Task Complete the following steps to expand or collapse an item in the Subnetwork Explorer portion of the Map window.

1 Position the mouse pointer over the item to be expanded or collapsed in the Subnetwork Explorer portion of the Map window.

2 Click the left (select) mouse button on the plus ("+") or minus ("-") sign next to the item to expand ("+") to show the lower levels of the equipment hierarchy, or to collapse ("-") and revert back to the display of the item itself.

END OF STEPS

□

Select an Item in the Map Pane

Purpose Use this procedure to select an item or group of items on the Map pane display portion of the Map window.

Before you begin Before you begin this task, locate the item(s) to be selected on the Map pane portion of the Map window.

Task Complete the following steps to select a single item or group of items on the Map pane portion of the Map window.

1

TO:	POSITION THE MOUSE POINTER:
Select a single NE or aggregate on the Map pane.	On the NE or aggregate and click the left (select) mouse button. The selected item is highlighted.
Select a group of NEs or aggregates on the Map pane.	Over a portion of the background adjacent to the items to be selected. Click the select (left) mouse button, hold the button, and drag the mouse pointer over the items to be selected. An outlined box appears over the selected area. As items are selected, they change color. Release the mouse button. The items are selected.

2 To deselect a selected item in the Map pane, position the mouse pointer over the label of the selected item and click the select (left) mouse button, or simply position the mouse cursor in another area of the Map pane and click the select (left) mouse button. The selected item is deselected. To deselect a group of items, position the mouse pointer within the boxed region (but not on the aggregate or NEs in the boxed region) and single-click the select (left) mouse button. Any item that is already selected in the box becomes deselected.

END OF STEPS

□

Move an Item on the Map Pane

Purpose Use this procedure to move a single item (NE or aggregate) or group of items on the Map pane portion of the Map window.

Before you begin Before you begin this task, locate the item(s) to be moved on the Map pane.

Task Complete the following steps to move a single item or group of items on the Map pane portion of the Map window.

1

TO:	DO THIS:
Move a single item (NE or aggregate) on the Map pane display.	Position the mouse pointer over the item you want to move. Press and hold the select (left) mouse button. Drag the item to the new position. Release the select (left) mouse button.
Move a group of items on the Map pane display.	Select a group of items by positioning the mouse pointer in a area of the background adjacent to the items, clicking and holding the select (left) mouse button while dragging the mouse pointer over the items to select them, and releasing the left mouse button. Position the mouse pointer over one of the selected icons, press and hold the select (left) mouse button, and drag the items to their new position. Release the select (left) mouse button.

END OF STEPS

□

Expand or Collapse an Aggregate on the Map Window

Purpose Use this procedure to expand or collapse an aggregate on the Map window.

Before you begin Before you begin this task, locate the aggregate to be expanded or collapsed on the Map window.

Task Complete the following steps to expand or collapse an aggregate on the Map pane portion of the Map window.

1

TO ...	DO THIS ...
Expand the aggregate and show its member NEs.	Position the mouse pointer over the aggregate icon in the Map pane. Click the right (menu) mouse button. A pop-up menu is displayed. Choose **Expand** from the pop-up menu. The aggregate is expanded to show the member NEs on the Map pane and the aggregate symbol disappears. ***OR*** Double-click on the aggregate icon in the Map pane, or click on the plus sign next to the aggegate icon in the subnetwork explorer. If you expand it on the Map pane, the aggregate is expanded to show the member NEs in the Map pane and the aggregate symbol disappears. if you expand it on the subnetwork explorer, the member NEs appear under the aggregate symbol.**Important!** click the left mouse button anywhere else on the Map pane to deselect an aggregate icon or member NE.

TO ...	DO THIS ...
Collapse an expanded aggregate	In the Map pane portion of the window, position the mouse cursor on one of the member NE icons and double-click the select (left) mouse button. The aggregate is collapsed and the aggregate symbol replaces the member NEs on the Map pane display. ***OR*** Select one of the member NE icons in the Map pane portion of the window and click the right (menu) mouse button. A pop-up menu is displayed. Choose **Collapse** from the pop-up menu. The aggregate is collapsed and the aggregate symbol replaces the member NEs on the Map pane display. ***OR*** In the subnetwork explorer portion of the Map window, click the minus (-) sign next to the expanded aggregate symbol. The aggregate collapses and the minus (-) sign is replaced by a plus (+) sign.

END OF STEPS

Zoom the Map View

Purpose Use this procedure to zoom in or zoom out on the Map window.

Before you begin Before you begin this task, display the Map window.

Task Complete the following steps to zoom the Map window view.

1 Select **View** from the main menu bar on the Map window. This displays a pull-down menu.

2

To...	Then..
make the Map pane show fewer map items in the same size space,	single click on Zoom In on the pull-down menu.
make the Map pane show ***more*** in the same size space,	single click on Zoom Out on the pull-down menu.

3 To reset the Zoom level to zero (which is the default), single click on Zoom Reset on the pull-down menu.

You can also zoom in, zoom out, and reset the zoom by using the Zoom In, Zoom Out, and Zoom Reset buttons on the Map window toolbar, or by clicking the right (menu) mouse button anywhere in the Map pane (not on a particular item) to display a pop-up menu of choices: Zoom In, Zoom Out, Zoom Reset.

END OF STEPS

□

Find a Network Element

Purpose Use this procedure to find an NE on the Map pane or Subnetwork Explorer portion of the Map window.

Before you begin Before you begin this task, access the Map window.

Task Complete the following steps to find an NE in the Map pane or Subnetwork Explorer portion of the Map window.

1 Select **View** from the main menu bar on the Map window.

Result:

The View sub-menu is displayed.

2 Select **Find an NE** from the View sub-menu.

Result:

The Find an NE window is displayed.

3 Enter the TID and/or Alias of the NE in the appropriate field(s).

Important! An asterisk(*) can be used as a wildcard character to represent 0 or more characters of the TID/Alias.

4 Click the OK or Apply button.

Result:

The Map pane display is repositioned to show the NE and the NE is highlighted in the Map pane and Subnetwork Explorer portions of the Map window. If more than one match is found,a list of network elements is displayed in a list. If you select one of the network elements from the list, the NE is highlighted in the Subnetwork Explorer and the Map pane. If the NE is contained in an unexpanded aggregate, the aggregate is expanded and the NE is highlighted on the Map pane.

END OF STEPS

□

Clear Status Messages

Purpose Use this procedure to clear status messages that are displayed in the status bar on the Map window.

Before you begin Before you begin this task, access the Map window.

Task Complete the following steps to clear status messages from the status bar in the Map window.

1 Select **View** from the main menu bar on the Map window.

Result:

The View menu is displayed.

2 Select **Clear Status Line** from the View menu.

Important! The status bar message can also be cleared by clicking the Clear Message Line button on the Map window toolbar.

Result:

The message in the status bar area of the Map window is cleared.

END OF STEPS

□

Modify User Preferences

Purpose Use this procedure to change the characteristics of the Map window display, such as NE (node) size, NE labels, trail lines, and alarm color display.

Before you begin Before you begin this task, view the Map pane display to see the current characteristics of the Map view before changing any of them. Be aware that preferences are saved on a per-user basis.

Task Complete the following steps to modify user preferences.

1 Select **View** from the main menu bar on the Map window.

Result:

The View menu is displayed.

2 Select **Preferences** from the View menu.

Result:

The View Preferences window is displayed.

3

TO CHANGE THE...	SELECT THE TAB...
NE size or thickness of trail lines between NEs and the size/thickness of aggregates	Nodes & Lines
Size, content, or alignment of map item labels	Labels
Colors associated with alarms and/or cross-connections	Colors
Shapes used to represent NEs, aggregates, EMS host, DSA, and non-managed devices on the Map window	Shapes

TO CHANGE THE...	SELECT THE TAB...
Background geographic display on the Map window	Background
Alarm severity level displayed in the Map and Alarm Notification windows(Critical/Major/ Minor/Not Alarmed for SONET, Prompt/Deferred/ Informational for SDH)	Fault
tooltips help on/off setting	Other
date format for items on the Map window, alarm lists, and tallies	Other
display of Bidirectional Line Switched Ring (BLSR) Protected Port Groups on the Cross-Connect View window (***Note: the BLSR display option is currently not supported***).	Other
display of NE port/tributary aliases enabled/disabled	Other

4 When the selected panel of options is displayed on the View Preferences window, change the display characteristics as needed.

- To change the shape for an item in the Shapes panel, double-click on the current shape in the scroll list. A pop-up window is displayed, showing the shapes available for selection. Click on the desired shape. The changed shape is displayed next to the Map item in the scroll list.
- To change the color indications for alarms and cross-connections on the Map window through the Colors panel, double-click on the item in the Colors scroll-bar list to display a palette of colors. Click on the desired color box in the palette to select it. The color selected is applied to the item.

5 Click one of the following buttons to adjust your preference settings:

- Save—saves the changes made to user preferences on each panel in the Navis™ Optical EMSdatabase for the user, to be applied each time the Map window is brought up by the user
- Restore—restores the saved values for the user for the current GUI session (works with the OK or Apply button)
- Get Defaults—retrieves and displays the system defaults for the preferences category, overriding the displayed settings

6 Click the Apply button to apply the changes to the Map window preferences to the current GUI session and leave the View Preferences window open, or click the OK button to apply the changes to the Map window preferences to the current GUI session and close the View Preferences window.

END OF STEPS

□

Save Preferences/Map Positions

Purpose Use this procedure to save user preferences for the Map pane display and/or positions of map items on the Map pane display for the next time you log onto the system and access the Map window.

Before you begin Before you begin this task, you should use the Preferences option to select the appearance or position of Map items on the display or accept the system defaults.

Task Complete the following steps to save user preferences and/or map item positions.

1 Select **File** from the main menu bar on the Map window.

Result:

The File menu is displayed.

2 Select **Save** from the File menu.

Result:

A sub-menu is displayed.

3

TO SAVE...	CHOOSE...
User preferences	Save Preferences
Map item positions	Save Positions
User preferences and Map item positions	Save Preferences and Positions

4 A message is displayed in the status bar area, indicating that your selections have been saved.

END OF STEPS

□

Restore Preferences/Map Positions

Purpose Use this procedure to restore previously saved user preferences and/or Map item positions or to restore the system defaults for user preferences and/or Map item positions..

Before you begin Before you begin this task, access the Map window.

Task Complete the following steps to restore user preferences and/or map item positions.

1 Select **File** from the main menu bar on the Map window.

Result:

The File menu is displayed.

2 Select **Restore** from the File menu. A sub-menu is displayed.

3

TO RESTORE...	CHOOSE...
Previously saved user preferences	Restore Saved Preferences
Previously saved Map item positions	Restore Saved Positions
Previously saved user preferences and map item positions	Restore Saved Preferences and Positions
Default user preferences	Restore Default Preferences
Default Map item positions	Restore Default Positions
Default user preferences and Map item positions	Restore Default Preferences and Positions

4 A message is displayed in the status bar area, indicating that the previously saved or system default settings have been restored.

END OF STEPS

□

Copy Preferences/Map Positions

Purpose Use this procedure to copy the user preferences and/or Map item positions saved by another user.

Before you begin Before you begin this task, be aware that map item positions can only be copied from a user who shares the same Target Group of NEs.

Task Complete the following steps to copy another user's preferences and/or Map item positions.

1 Select **File** from the main menu bar on the Map window.

Result:

The File menu is displayed.

2 Select **Copy** from the File menu.

Result:

A sub-menu is displayed.

3

TO COPY A USER'S...	CHOOSE...
Preferences	Copy Preferences
Map item positions	Copy Positions
Preferences and Map item positions	Copy Preferences and Positions

4 The Choose a User window is displayed.

5 Choose a user and click the OK button.

If you are copying map item positions, the new positions are applied to your Map pane display once a user is chosen.

If you are copying another user's preferences, the View Preferences window is displayed. Make any changes as necessary to the other

user's preferences before applying them. When you are finished making necessary changes, click the OK button.

Reference:

"Modify User Preferences" (2-18)

6 A message is displayed in the status bar area, indicating that the copy from another user is completed.

END OF STEPS

□

Perform Cut-Through Commands

Purpose Use this procedure to initiate a TL1 cut-through session from the Map window and perform enhanced cut-through commands via the Cut-Through window.

Before you begin Before you begin this task, you must have already displayed the Map window and determined the NE for which you want to initiate a cut-through session.

Task Complete the following steps to initiate and perform cut-through.

1 Position the mouse pointer over the NE to which a cut-through is required and press the right (menu) mouse button.

Result:

A pop-up menu appears.

2 Select Cut-Through from the pop-up menu.

Result:

The Cut-Through window and the Cut-Through Output window are displayed. (If the NE is unavailable for any reason, a message identifying the cause of the error is displayed in a pop-up window.)

3 At the Cut-Through window, type the appropriate TL1 command into the Cut-Through Command field. If desired, select the displayed Command by double-clicking on the command and the desired AID from the list by single-clicking on it to save typing time. See your NE documentation for detailed command information. (You can select the Clear Command Area button any time to clear the Cut-Through Command field and start over.)

The Clear Command Line button clears the command and AID input from the command field.

Important! The AID list for an NE displayed in the AID scroll list may not be complete. You may have to select a similar AID from the list to populate the Cut-Through Command field and then manually edit the AID to make it the correct one.

4 After completing your entry in the Cut-Through Command field, select the Send Command Now button.

Result:

The command is echoed to the Cut-Through Output window and the command output appears there.

END OF STEPS

□

Build TL1 Commands

Purpose Use this procedure to create a TL1 command file to assist in performing maintenance and provisioning activities on one or more NEs (such as download of standard configuration), without having to manually enter a set of TL1 command strings. This feature both reduces the amount of manual entry needed to create TL1 command strings and allows for the reuse, at a later time, of the commands built on the same NE or other NEs of the same type.

Before you begin Before you begin this task, you must have already determined the TL1 commands you wish to build.

Task Complete the following steps to build TL1 commands.

1 On the Map window, select **File** from the main menu bar.

Result:

This displays a pull-down menu.

2 Select **TL1 Macro Scripts** from the displayed pull-down menu.

Result:

This displays a sub-menu.

3 Select **TL1 Macro Builder** from the displayed sub-menu. This displays the Macro Builder/Broadcaster window. Select the Macro Builder tab if it is not already selected.

4 TL1 command files can only be built for one NE type at a time, so first specify the NE type by clicking the down arrow adjacent to the NE Type field (directly below the Manage TL1 Macro Files heading) and select an NE.

5 Next type the appropriate TL1 command(s) into the Macro File Commands area at the lower left of the window. Press the Return key between commands, typing each new command on the next available line in the Macro File Commands area. If desired, select from the

displayed Command List by double-clicking on the command and from the AID List by single-clicking on the AID to save typing time. To enter multiple commands from the Command List, click on the end of a command string and press the Return key before entering the next command. This will access the next available command line. See your NE documentation for detailed TL1 command information.

6 When you have completed your macro file commands, select Save/Save As.

Result:

This displays the Save As window.

7 In the Save As window, save the contents of the Macro File Command lines as a new macro file (by typing the new macro file name into the Save As field) or to an existing macro file name, overwriting the contents of the file (by selecting one from the displayed list). Don't forget to use the radio buttons to indicate whether the file should be **Accessible by all** or **Accessible by owner only**.

8 The following list shows how to use remaining items on the TL1 Macro Builder window:

- Clear Command(s)—click this button to clear the current entries in the Macro File Command area.
- Owner—displays the macro file owner's login ID.
- File Properties—indicates whether the displayed macro file is Accessible By All or Accessible by Owner Only. This value can be changed (by owners) via the Save As screen, which is displayed by clicking the Save/Save As button.
- Put Into Command Area—select this button to put the contents of the selected macro file into the command line text area.
- View Macro—use this button to view the contents of the selected macro file.
- Delete Macro—click this button to delete the selected macro file (for owners only).

END OF STEPS

□

Broadcast TL1 Commands

Purpose

The broadcast TL1 commands feature allows you to perform maintenance and provisioning activities (such as download of standard configuration) on one or more NEs, utilizing the TL1 command files created by the TL1 macro builder feature, and broadcasting those files to multiple NEs of the same type. This feature saves you time by performing similar tasks on multiple NEs in one step, and by reducing the manual entry required in the creation of TL1 command strings.

Before you begin

Before you begin this task, you must have already determined the TL1 commands you wish to broadcast, or know the name of the TL1 macro file you are going to use.

Task

Complete the following steps to broadcast TL1 commands.

1 On the Map window, select **File** from the main menu bar.

Result:

This displays a pull-down menu.

2 Select **TL1 Macro Scripts** from the displayed pull-down menu.

Result:

This displays a sub-menu.

3 Select **TL1 Macro Broadcaster** from the displayed sub-menu.

Result:

This displays the Macro Builder/Broadcaster window.

4 Specify the NE type for the broadcast; select All NEs, NEs by Type, or NEs by TID from the **Where to Broadcast** block at the top middle of the Broadcaster window. Specify the parameters of the broadcast further by highlighting NEs in the Available Network Elements list (on the left side of the window) and clicking the single right arrow (>) to move them to the Chosen Network Elements list (on the right side). ***The NEs placed in the Chosen Network Elements list on the***

right will be the ones to receive the broadcast. (You can use the double arrows to move all current choices between the two lists.)

5 Next type the name of the macro file (to be broadcast to the NEs selected in the Chosen Network Element list) into the field in the Macro File to Broadcast block (or simply select a macro file from the displayed list by double clicking on it).

6 Select the Broadcast Macro button to ask the system to perform the broadcast. The following list shows how to use the remaining buttons on the Broadcaster window:

- View Macro - use this button to view the macro file, which you may want to do before executing it.
- Abort Broadcast - use this button to stop the execution of the TL1 commands at any time while the broadcast window is active. When this button is chosen, the system stops sending out the next command in the macro file to the NE(s) currently being broadcast to. Once the abort is completed, the system displays a message.
- Close - click this button any time before clicking the Broadcast Macro button to remove the Broadcast window from your screen

END OF STEPS

□

View NE Equipment

Purpose

Use this procedure to display and view NE equipment on the Equipment View window.

Navis™ Optical EMS indicates whether an alarm has been generated by a bay, shelf, or circuit pack in the NE on the graphical display of equipment, and what level of alarm it is.

The status of slot, circuit pack, and port alarms is updated dynamically in the Equipment View window. The status of circuit pack alarms is propagated to the higher equipment levels in the equipment hierarchy, so the indication of the alarm status graphically on the slot/circuit pack level is also reflected at the bay/shelf level in the Equipment View. On the Equipment View window, a round dot is displayed on the circuit pack with the color indicating the alarm state. One or more small squares at the bottom of the circuit pack represent the quantity of ports. The color of the dot (bay, shelf, circuit pack) or small square (port) indicates the level of alarm that has been issued by the selected equipment component, or if there have been no alarms issued.

The default colors for the alarm levels are:

Alarm Color (default)	Alarm Severity Level (SONET)	Alarm Severity Level (SDH)
Red	Critical	Prompt
Yellow	Major	Deferred
Cyan	Minor	
Green	No Active Alarms	No Active Alarms

The default Alarm display colors shown in the above table can be modified through the Preferences option of the View menu on the Map window main menu bar. For more details, see "Modify User Preferences" (2-18).

Before you begin

Before you begin this task, determine the equipment you want to view.

Task Complete the following steps to display and view various NE equipment components on the Equipment Configuration window.

1 Select the NE in the Map pane portion of the Map window.

2 Select **Configuration** from the main menu bar on the Map window.

Result:

This displays a sub-menu.

3 Select **Equipment** from the displayed sub-menu.

Result:

This displays the Equipment View window, containing equipment information for the selected NE.

The Equipment View window allows you to view and/or "drill down" through a network element to view its various constituent parts via the graphical representation (the network element view panel), or to select a component (shelf, bay, slot) for viewing via the hierarchical representation (the network explorer panel). In addition, you can access certain features via a pop-up menu that is available in both panels.

When the equipment hierarchy is expanded for a LambdaRouter to the Switching shelf level, no Switching Interface Points (SWIPs) are shown in the explorer tree. When you select the Switching shelf for display in the Equipment View from the explorer, the shelf display indicates the number of SWIPs contained in the Switching shelf.

Following are the navigational conventions to use to view equipment information for the selected NE.

- View Panel
  - ***Single Left Click***—selects the component both here and in the explorer.
  - ***Double Left Click***—shows the contents of the component in the view panel, and indicates that it is selected. Shows the component as selected in the explorer and its subtending components (if there are any).
  - ***Single Right Click***—indicates that the component is selected, and shows the pop-up menu.
- Explorer List Item
  - ***Single Left Click***—selects the explorer component and the view component. If the component selected has contents, it shows the content in the view panel. Does not show/hide subtending explorer components.
  - ***Double Left Click***—same as single left click on explorer list item, but does show/hide subtending components in the explorer.
  - ***Single Right Click***—indicates that the component is selected, and shows the pop-up menu.
- Explorer plus or minus sign
  - ***Single Left Click***—shows/hides subtending components.

4 Positioning the mouse cursor on the graphical representation of the equipment component in the Main part of the Equipment View window and clicking on it highlights its corresponding AID in the Network Element Explorer portion of the window.

END OF STEPS

□

View NE Equipment Lists

Purpose Use this procedure to access the list of a given component's subtending equipment. You can obtain the equipment list of a bay, shelf, circuit pack, or port. When you request an equipment item from either the drop-down or pop-up menu, the Navis™ Optical EMSprovides a list of equipment for the selected item and its subtending equipment. The lists can be saved and printed.

Before you begin Before you begin this task, determine the equipment for which you want to display equipment lists.

Task Complete the following steps to view NE equipment lists.

1 Select the NE in the Map pane portion of the Map window.

2 Select **Configuration** from the main menu bar on the Map window.

Result:

This displays a sub-menu.

3 Select **Equipment** from the displayed sub-menu.

Result:

This displays the Equipment View window, containing equipment information for the selected NE.

The Equipment View window allows you to view and/or "drill down" through a network element to view its various constituent parts via the graphical representation (the network element view panel), or to select a component (shelf, bay, slot) for viewing via the hierarchical representation (the network explorer panel). In addition, you can access certain features via a pop-up menu that is available in both panels.

When the equipment hierarchy is expanded for a LambdaRouter to the Switching shelf level, no SWIPs are shown in the explorer tree. When you select the Switching shelf for display in the Equipment View from the explorer, the shelf display indicates the number of SWIPs contained in the Switching shelf.

Following are the navigational conventions to use to view equipment information for the selected NE.

- View Panel
  - ***Single Left Click***—selects the component both here and in the explorer.
  - ***Double Left Click***—shows the contents of the component in the view panel, and indicates that it is selected. Shows the component as selected in the explorer and its subtending components (if there are any).
  - ***Single Right Click***—indicates that the component is selected, and shows the pop-up menu.
- Explorer List Item
  - ***Single Left Click***—selects the explorer component and the view component. If the component selected has contents, it shows the content in the view panel. Does not show/hide subtending explorer components.
  - ***Double Left Click***—same as single left click on explorer list item, but does show/hide subtending components in the explorer.
  - ***Single Right Click***—indicates that the component is selected, and shows the pop-up menu.
- Explorer plus or minus sign
  - ***Single Left Click***—shows/hides subtending components.

4 Select a component in the Network Element Explorer part of the Equipment View Window.

5 Select **View** from the menu bar.

Result:

This displays the View menu.

6 Select **Equipment List** from the View menu.

Important! Right clicking on the graphical representation of the desired component in the main part of the Equipment View window also displays a sub-menu from which Equipment List can be selected.

If the component selected for listing is a populated slot (with a circuit pack installed) then information for both the slot and circuit pack are displayed in the Equipment List.

Result:

This displays the equipment list for the selected component. The list contains information about the NE equipment, at the level you requested. The information is textual and listed in name/value pairs.

END OF STEPS

□

View NE Equipment Details

Purpose Use this procedure to view details of a single component inside a network element. You can obtain equipment details on a bay, shelf, circuit pack, or port.

Before you begin Before you begin this task, determine the NE for which you want to display equipment details.

Task Complete the following steps to display NE equipment details.

1 Choose **Configuration** from the main menu on the Map window.

Result:

The Configuration sub-menu is displayed.

2 Choose **Equipment** from the Configuration sub-menu.

Result:

The Choose an NE window is displayed.

3 Select an NE from the displayed list. Click the OK button.

Result:

The Equipment View window is displayed.

4 Select a component in the Network Element Explorer part of the Equipment View Window.

5 Select **View** from the menu bar.

Result:

This displays the View menu.

6 Select **Equipment Details** from the View menu. This displays the Equipment Details window, containing the requested information. Click the Close button on the window to close the window.

Important! Right clicking on the graphical representation of the desired component in the main part of the Equipment View window also displays a sub-menu from which Equipment Details can be selected. If the component selected for details is a populated slot (with a circuit pack installed) then details for both the slot and circuit pack are displayed in Equipment Details.

END OF STEPS

□

Display the Cross-Connection Window

Purpose Use this procedure to display the NE Cross-Connection window. This window provides access to all NE cross-connection features.

Before you begin Before you begin this task, determine the cross-connection types you want to work with.

Task Complete the following steps to display the cross-connection window and gain access to all cross-connection features.

1 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration sub-menu is displayed.

2 Select **Connection Management** from the Configuration sub-menu.

Result:

The Connection Management sub-menu is displayed.

3 Select **Cross-Connection** from the Connection Management sub-menu.

Result:

This displays the Choose an NE window.

4 Choose the network element in the list by double clicking on it in the then click the OK button.

Result:

The Cross-Connection window is displayed.

You can also access the Cross-Connection window by positioning the mouse cursor on an NE in the Map window, clicking the right mouse button to display a pop-up menu, selecting **Connection Management**, and then selecting **Cross Connection**.

The Cross-Connection window consists of a menu bar, a toolbar, a status bar, a subnetwork explorer, and a main view. This window is

used for all cross-connection operations, including viewing, adding, modifying, and deleting cross-connections.

These operations are described in the appropriate tasks in Chapter 7, "Traffic Provisioning".

END OF STEPS

□

Display Ports on the Cross-Connection Window

Purpose Use this procedure to display port information on the Cross-Connection window.

Before you begin Before you begin this task, determine the ports to be displayed and display the Cross-Connect window.

Task Complete the following steps to display port information in the Cross-Connect window.

1 Display the Cross-Connection window as described in the task "Display the Cross-Connection Window" (2-39).

2 In the Network Element Explorer portion of the window, expand an item in the explorer tree (using the mouse) and locate the port group that contains the tributaries/ports to display in the Main View portion of the window.

3 Position the mouse cursor on the port group in the explorer and click the right mouse button to display a pop-up menu for the selected tributary.

4 Choose either top, bottom, left, or right to expand and display the selected tributary in the the top, bottom, left, or right portion of the Main View of the window.

5 If necessary, click the arrow keys located next to the tributary block in the Main View of the window to scroll and locate the tributary you want to use. When you position the cursor on a tributary block, the status bar displays the tributary address and indicates whether the tributary is available to be used as source, destination, or both.

Important! To remove a tributary block from the Main View, position the mouse cursor on the tributary block and click the left mouse button. Then click the right mouse button to display a small window with the word "Clear". Select "Clear" to clear the block from the window.

END OF STEPS

View NE Cross-Connections—Textual

Purpose Use this procedure to view a textual version list of existing cross-connections.

Before you begin Before you begin this task, display the Cross-Connection window.

Task Complete the following steps to display a textual version list of existing cross-connections.

1 Display the Cross-Connection window as described in the task "Display the Cross-Connection Window" (2-39).

2 In the explorer area of the Cross-Connection window, use your mouse to select the NE TID, a bay, a shelf, a circuit pack, or a port group.

3

TO....	DO THIS...
List all cross-connections for a particular bay, shelf, circuit pack, or port group	Position the mouse cursor on the particular entity in the Explorer portion of the Cross-Connection window and click the select (left) mouse button to select it.
List all cross-connections for the NE	Position the mouse cursor on the NE's TID in the Explorer portion of the Cross-Connection window and click the select (left) mosue button to select it.

4 Select **View** the main menu at the top of the Cross-Connection window.

Result:

This displays a sub-menu.

5 Select **List Cross-Connections** from the displayed sub-menu.

6 To display all cross-connections for the selected entity, choose **All Cross Connections** from the displayed sub-menu.

For NEs that allow creation of multiple cross-connections from the same associated legs and leg pairs or assignment of a Path Protection Group Name for path-protected cross-connections (such as BWM NEs), you also have the option of displaying/viewing a textual list of cross-connections by Group Number or Group Name.

To list cross-connections related to a specific Group Number, choose **By Group Number**. A Cross-Connection By Group Number window is displayed. Click the arrow next to the Cross Connection Number field to display a pop-up list of group numbers and select one. Click the OK button. To close this window without making a selection, click the Close button.

To list cross-connection related to a specific Group Name, choose **By Group Name**. A Cross Connection By Group Name window is displayed. Click the arrow next to the Group Name field to display a pop-up list of group names and select one. Click the OK button. To close this window without making a selection, click the Close button.

Result:

The Cross-Connection List window is displayed with the selected cross-connection information.

Some general information about this window follows:

- This list shows all the cross-connections and reservations in the selected element.
- Headers displayed above each list differ from NE to NE, but the first three headers are always Source AID (From), Destination AID (To), and Cross-Connection Type.

7 If desired, select another element from the explorer area of the Cross-Connections window to change the information in the Cross-Connection List window for the new selection. Also if desired, select a row in the list and then click the Delete or Modify button to display the windows used to delete and modify cross-connections, respectively.

END OF STEPS

□

View Port/Tributary Aliases

Purpose

Use this procedure to view port and/or tributary labels (aliases) for ports/tributaries, used to represent ports/tributaries on Navis™ Optical EMS GUI windows instead of port AIDs. When you select this option, the window displays a table of port and tributary AIDs with their associated port/tributary label/aliases. It is an optional feature to use port labels/aliases instead of port/tributary AIDs.

Before you begin

Before you begin this task, access the Map window.

To insure that the most recent versions of the alias files have been downloaded by the Navis™ Optical EMS GUI, the Download NE Alias files GUI function can be used to download new or updated alias files from the Navis™ Optical EMS host to the current GUI session.

The port/tributary alias files for an NE are downloaded through the menu sequence **Administration->Network->Download NE Alias files** off the main menu on the Map window. The Download NE Alias files option is only effective if the Display Only option on the Other panel of the Preferences window is enabled to display port aliases.

Accessing other GUI functions from the Customer Alias Mapping window

On the Customer Alias Mapping window, which is accessed in this procedure, you can select a port/tributary alias row on the window and access the Optical Connections window, View PM Data window, Alarm List window, or Port Provisioning window directly.

Refer to for details on how to access other GUI functions from the Customer Alias Mapping window.

For details on the Optical Connections, Alarm List, and View PM Data GUI functions, refer to the appropriate task in the *Navis™ Optical EMS Provisioning Guide*or *Navis™ Optical EMS Maintenance Guide*.

Related task

For related information, see the following:

- “Modify User Preferences” (2-18)
- “Download Alias Files” (2-49)

Task Complete the following steps to view port labels/aliases for port AIDs in an NE.

1 Select an NE on the Map window.

OR

Select no NE at this point.

2 Choose **Administration** from the main menu on the Map window.

Result:

The Administration menu is displayed.

3 Choose **Network** from the Administration menu.

Result:

The Network sub-menu is displayed.

4 Choose **Customer Alias Mapping** from the Network sub-menu.

Result:

If you did not choose an NE in Step 1, the Choose an NE window is displayed. Choose an NE from the displayed list by double-clicking on it and click the OK button.

The Customer Alias Mapping window is displayed. This window shows, in tabular format, the existing port/tributary aliases with their corresponding AIDs for the selected NE.

To find the port/tributary alias for an AID quickly, enter all or part of the port/tributary AID or its alias in the Enter Search String field in the top portion of the window. The system highlights the row(s) on the tabular display that match the characters entered in the field.

If the file /ems/userdb/GUI_Server/Port_Mapping/*<NE TID>* is empty, or is missing, error dialog boxes are displayed, informing you of the file's status. Click the OK button to close the error dialog box(es).

END OF STEPS

SE 2-1: Accessing other GUI function from the Customer Alias Mapping window

Use the following procedure to access other GUI functions (Optical Associations window, View PM Data window, Alarm List window, Provisioning window) directly from the Customer Alias Mapping window.

1 Follow the procedure shown in "View Port/Tributary Aliases" (2-44) to access the Customer Alias Mapping window.

2 Select a port/tributary AID on the window by single-clicking the left mouse button on the row in the EMS AID/Customer Alias Mapping row in the table.

3

TO...	DO THIS...
Access the Optical Associations window for the selected port/tributary AID	Choose **Configuration** from the menu bar, then choose **Connection Management** from the Configuration menu, and then choose **Optical Channel Connections** from the Connection Management sub-menu. If optical associations/connections for the NE type/port exist, the Optical Associations window is displayed with the related information. An alternate way to access the Optical Associations window is to click the right mouse button on the selected row in the Customer Alias Mapping window to display a pop-up menu, and then choose **Optical Channel Connections** from the pop-up menu.

TO...	DO THIS...
Access the View PM Data window for the selected port/tributary AID	Choose **Performance** from the menu bar, then choose **View PM Data** from the Performance menu, then choose **View 15 Min PM...**, **View 1 Day PM...**, or **View Both** (depending on how the PM feature is configured). If there is no PM data available for the selected port/tributary AID, an informational dialog box is displayed, indicating that no PM data is available for the selected port/tributary. An alternate way to access the View PM Data window is to click the right mouse button on the selected row in the Customer Alias Mapping window to display a pop-up menu, then choose **View 15 Min PM...**, **View 1 Day PM...**, or **View Both** (depending on how the PM feature is configured) to access the View PM Data window.
Access the Alarm List for the selected port/tributary AID	Choose **Fault** from the menu bar, then choose **Alarm List**. The Alarm List window is displayed. There may be no available alarm data, in which case the Alarm List window is blank. An alternate way to access the Alarm List window is to click the right mouse button on the selected row in the Customer Alias Mapping window to display a pop-up menu and choose **Alarm List**.

TO...	DO THIS...
Access the Provisioning window for the selected port/tributary AID	Choose **Configuration** from the menu bar, then choose **Provision** from the Configuration menu. The Provision window with provisionable parameters for the selected port/tributary AID on the Customer Alias Mapping window is displayed. An alternate way to access the Provision window is to click the right mosue button on the selected row in the Customer Alias Mapping window to display a pop-up menu, and choose **Provision**.

END OF STEPS

Download Alias Files

Purpose

Use this procedure to download new or updated port/tributary alias files for all NEs in your Target Group from the Navis™ Optical EMS host to the current Navis™ Optical EMS GUI session.

When port/tributary alias files are downloaded, and the "Display only" radio button is selected under the Alias Settings portion on the Other panel of the User Preferences window, port/tributary aliases are used in place of port AIDs on the Network Element Explorer, Provisioning window, and other GUI display windows in the Navis™ Optical EMS.

New or updated NE port/tributary alias files are automatically downloaded onto the Navis™ Optical EMS host when there is a change. An NE's port/tributary alias file is updated when an alias for a port or tributary is entered in the Alias field on the Provisioning window in the Navis™ Optical EMS GUI.

Before you begin

Before you begin this task, access the Map window.

Be aware that the Download NE Alias Files option is only enabled if the "Display only" radio button is selected under the Alias Settings portion on the Other panel of the User Preferences window.

Related task

For related information, see the following:

- "Modify User Preferences" (2-18)
- "View Port/Tributary Aliases" (2-44)

Task

Complete the following steps to download new or updated port/tributary alias files for all NEs in your Target Group.

1 Select an NE on the Map window.

OR

Select no NE at this point.

2 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

3 Select **Network** from the Administration menu.

Result:

The Network sub-menu is displayed.

4 Select **Download NE Alias Files** from the Network sub-menu.

Result:

If you did not choose an NE in Step 1, the Choose an NE window is displayed. Select an NE by double-clicking on it in the list and click the OK button.

The Download NE Alias file window is displayed.

The display portion of the window provides a list of the NE alias files being downloaded. A status bar below the display portion shows the progress of the download taking place as a percentage. When the download of all NE alias files has been completed, the status bar shows 100% as the percentage completed. A text message at the bottom of the display portion also indicates when the loading of all files is completed.

To abort the downloading of alias files at any time during the process, click the Abort button on the window. To close the window, click the Close button.

END OF STEPS

□

3 Management Communications Setup

Overview

Purpose

This chapter describes procedures for setting up communications with the Network Elements (NEs) managed by the Navis™ Optical EMS.

Before you begin

Read Chapter 3, "Management Communications Setup" in this document and the Management Communication of the Navis™ Optical EMS chapter in the *Navis™ Optical EMS Administration Guide* to gain an understanding of the communications protocols supported by the Navis™ Optical EMS and the options for discovering information about NEs in a managed network.

Contents

Add a Network Element—X.25 Communications Via a Gateway Network Element	3-4
Add a Network Element—OSI Communications	3-8
Add a Network Element—TCP/IP Communications	3-16
Add a Gateway Network Element—X.25 Communications	3-22
Modify a Network Element	3-28
Delete a Network Element	3-30
Add a Subnetwork Name/Alias	3-32
Modify a Subnetwork Alias	3-34

Delete a Subnetwork Name/Alias	3-36
Associate Remote Network Elements with Gateway Network Elements	3-38
Add a Secondary (Backup) Gateway Network Element Association	3-41
Switch Primary/Secondary Gateway Network Elements	3-43
Delete a Gateway Network Element Association	3-45
Manage Transport Bridges	3-47
Manually Initiate DNO	3-49
Schedule DNO	3-53
Modify a Scheduled Task	3-56
Delete a Scheduled Task	3-58
Provision DSA	3-59
Add a DIB Prefix	3-61
Modify a DIB Prefix	3-63
Delete a DIB Prefix	3-65
Add an Network Element to the Directory Information Base (DIB)	3-66
Modify a Network Element in the Directory Information Base (DIB)	3-70
Delete a Network Element from the Directory Information Base (DIB)	3-72
Reset a Network Element (for WaveStar® OLS 1.6T NEs)	3-73
Update System (for WaveStar® OLS 1.6T NEs)	3-75
Display the Communication State of the Network Element	3-76
Provision DCC Configuration	3-79
Provision DCC Terminations	3-86
View DCC Terminations	3-90
Provision an IP Gateway Network Element (for IP Tunneling)	3-92
Provision IP Tunnel Parameters	3-96

Manually Provision IP Tunnel Routes	3-100
Modify IP Tunnel Route Entries	3-104
Delete an IP Tunnel Route Entry	3-107
Provision a Virtual Switch	3-110
Modify a Virtual Switch	3-115
Delete a Virtual Switch	3-119
View Virtual Switch Details	3-122
Provision an Ethernet Connection (IEEE.1Q Tagging Mode)	3-125
Provision an Ethernet Connection (Transparent Tagging Mode)	3-128
Add a Spanning Tree Group	3-132
View Spanning Tree Groups	3-135
Delete a Spanning Tree Group	3-138

Add a Network Element—X.25 Communications Via a Gateway Network Element

Purpose

Use this procedure to add an X.25-connected NE such as the FT-2000 LCT NE. X.25-connected NEs are either directly connected to the Navis™ Optical EMS via an X.25 network or use a Gateway Network Element (GNE) for communications with the Navis™ Optical EMS. This procedure describes how to add an X.25-connected NE that communicates with Navis™ Optical EMS via a GNE.

Before you begin

Before you begin this task, verify that the Navis™ Optical EMS host has an available X.25 interface port and that the NE that you are adding communicates with the Navis™ Optical EMS using X.25 protocol. Before adding an NE, you must have a Target Identifier (TID), a valid NE login/password, and a valid backup NE login/password. The GNE(s) that provides the communications link for this NE in the subnetwork must be added first.

Related task

See "Add a Gateway Network Element—X.25 Communications" (3-22) for instructions on how to add an X.25-connected Gateway Network Element (GNE).

Task

Complete the following steps to add an X.25-connected NE to Navis™ Optical EMS.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select Network from the Administration menu.

Result:

A sub-menu is displayed.

3 Select **Network Elements** from the sub-menu.

Result:

The Manage NEs window is displayed, showing the current list of NEs in your Target Group.

4 Click on the **Add** button.

Result:

The Add an NE - General Information panel is displayed.

The Add an NE window for X.25-connected NEs is divided into three panels:

- General NE Information
- NE Communications Details
- NE Security

There are fields on each panel that are required to add an NE. To access a panel, click the mouse select button on the panel's labeled tab.

The General Information panel is displayed initially.

5 Enter the NE's Target Identifier (TID). A TID can be 1-20 alphanumeric characters. Hyphens and slashes ("/") are allowed. This field is required.

6 Enter the NE Alias. An alias can be 1-40 alphanumeric characters. Uppercase and lowercase letters are allowed. Spaces are allowed. This field is optional.

7 Select the NE Type. To do this, click the down arrow to the right of the field to display a drop-down list of choices and select the NE type. This field is required.

8 Select the NE's time zone by clicking the appropriate radio button. If Other is selected, enter the time difference, in minutes, between the NE time and Greenwich Mean Time (GMT). Specify the time difference, "+" (plus) or "-" (minus), up to five characters. Valid values are -11.0 to 13.00 (the plus "+" is implied). This field is

required. If no selection is made, the Time Zone defaults to Same as Host.

9 For the Communicate Via field, click the GNE radio button. This NE is being set up communicate with Navis™ Optical EMS via a GNE. The default for this NE type is GNE. This field is required.

10 Click on the NE Communications Details tab.

Result:

The NE Communications Details panel is displayed, showing the current list of GNEs available to provide communications with Navis™ Optical EMS for the NE being added.

11 Select the GNE for the NE being added. Use the type ahead field and filter/sort function to narrow the listing to the GNE(s) required.

12 Click on the NE Security tab.

Result:

The NE Security panel is displayed.

13 Enter the primary NE login for the NE being added. The login can be 1-10 characters.

14 Enter the primary NE password for the NE login. An NE password must be 6-10 alphanumeric characters, with at least two non-alphabetic characters, of which one character must be one of the following special characters (#,%,+). The password must begin with a letter.

15 Re-enter the primary NE password, in the Re-enter Password field, for checking.

16 Enter the backup login for the NE. The backup login can be 1-10 characters.

17 Enter the backup password for the NE. An NE password must be 6-10 alphanumeric characters, with at least two non-alphabetic characters, of which one character must be one of the following special characters (#,%,+). The password must begin with a letter.

18 Re-enter the backup password, in the Re-enter Backup Pwd field, for checking.

19 Click the Apply button to activate your choices, or click the OK button to activate your choices and close the NE Security panel of the Add/Modify NE window.

Result:

A message is displayed in the status bar, indicating that the NE is being added to Navis™ Optical EMS.

END OF STEPS

□

Add a Network Element—OSI Communications

Purpose

Use this procedure to add an NE that communicates with Navis™ Optical EMS over an OSI/LAN interface or OSI over TCP/IP. The Navis™ Optical EMS IAO-LAN interface provides a higher bandwidth communications path to NEs than possible via X.25. Navis™ Optical EMS establishes and manages OSI associations to NEs. Navis™ Optical EMS supports the OSI standard seven-layer protocol stack. OSI-connected NE types include the WaveStar® BWM, WaveStar® TDM 2.5G, WaveStar® OLS 1.6T, WaveStar® TDM 10G (STM-64) , Metropolis™ DMX, and the WaveStar® NCC. When a WaveStar® NCC is added as a transport bridge, it is set up for OSI over TCP/IP communications with WaveStar® NEs in the subnetwork. When Navis™ Optical EMS communicates with OSI-connected NEs over an IAO-LAN interface, one NE can serve as the point of attachment for the EMS to the subnetwork.

Before you begin

Before you begin this task, you should identify the number and types of OSI associations to be used for NE communications with Navis™ Optical EMS. If a WaveStar® NE has been set up in the Directory Services Agent (DSA) directory services for SDS, the NE's NSAP address may be retrieved from the DSA. If the NSAP address cannot be obtained from the DSA, or is not available through SDS, then the NE's NSAP address has to be manually entered. WaveStar® NCCs that are serving as transport bridges for TCP/IP to OSI protocol conversion for WaveStar® NEs should be added and identified as transport bridges before the WaveStar® BWM NEs are added.

Be aware that any changes to the primary/secondary passwords for NEs will affect logging into the NEs from all EMS and CIT interfaces.

WaveStar® BWM and WaveStar® TDM 10G (STM-64) NEs have a password aging feature that is turned on, by default, for the LUC01 and LUC02 default super user logins. When the Navis™ Optical EMS encounters an expired password, it uses two default alternate passwords, SNC+01 and SNC+02. The first time that the Navis™ Optical EMS encounters an expired password, it changes the expired password to the first default alternate password SNC+01. If the NE password expires again, the Navis™ Optical EMS changes the NE password to the second alternate password SNC+02. It will then change the NE password back to SNC+01 if it expires again. The

expiration and changing of NE passwords may be transparent to the Navis™ Optical EMS user, so you should be aware that an NE password ***may have changed from what it was set to by the user. This may be avoided by turning the NE password aging feature off for the two NE logins that the Navis™ Optical EMS uses.***

The password aging feature for the WaveStar® BWM and WaveStar® TDM 10G (STM-64) NEs can be turned off via the CIT or by issuing the appropriate TL1 command through the Navis™ Optical EMS Cut-Through feature. Refer to the NE hardware documentation for the TL1 command need to turn off the password aging feature.

If a WaveStar® BWM R3.1 NE is communicating via pure OSI, and is being added manually, and hs two DCC circuit packs, both NSAPs must be entered when the NE is added to the Navis™ Optical EMS. But, for all other WaveStar® BWM R3.1 NEs discovered via DNO, the Navis™ Optical EMS uses TARP to find the correct NSAP automatically. If this is an upgrade and only one NSAP has been entered for WaveStar® BWMs that are RT members, you must enter the second NSAP as well. For this communication type, RT members need none or two NSAPs to work correctly.

If a WaveStar® BWM R3.1 NE is communicating via RFC1006 (OSI via TCP/IP) and is being added to the Navis™ Optical EMS, either manually or if it is found by DNO, and it has two DCC circuit packs, you must add both of the NSAPs manually. These NSAPs cannot be found automatically, so they must be added via the Modify a Network Element in the DIB window or if the NE is not in the DSA in the Modify an NE window.

To perform this task, access the Map window.

Adding Metropolis™ EON NEs

When adding an individual Metropolis™ Enhanced Optical Networking (Metropolis™ EON) or one Metropolis™ EON NE per Metropolis™ EON subnetwork and performing subnetwork DNO to discover the other NEs in that subnetwork, the TID is returned by the NE, but it does not return the NSAP information. As a result, when the NE is displayed on the Map, the color of the NE is magenta, because the Navis™ Optical EMS cannot communicate with the newly added NE(s) without the NSAP information. You must use the Modify an NE window to update the NE with the NSAP information for the Navis™ Optical EMS to be able to communicate with the NE(s).

For additional information, refer to Chapter 11, “Management Communications Setup Concepts”.

Task Complete the following steps to add an OSI-connected NE to Navis™ Optical EMS.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Network** from the Administration menu.

Result:

A sub-menu is displayed.

3 Select **Network Elements** from the sub-menu.

Result:

The Manage NEs window is displayed, showing the current list of NEs in your Target Group.

4 Click on the Add button.

Result:

The Add an NE - General Information panel is displayed.

The Add an NE window for OSI-connected NEs is divided into four panels:

- General NE Information
- NE Communications Details (OSI)
- NE Communications Details (OSI) #2
- NE Security

There are fields on each panel that are required to an NE. To access a panel, click the mouse select button on the panel’s labeled tab.

The General Information panel is displayed initially.

5 Enter the NE's Target Identifier (TID). A TID can be 1-20 alphanumeric characters. Hyphens, slashes ("/"), and periods are allowed. This field is required.

6 Enter the NE's Alias. An alias can be 1-40 alphanumeric characters. Uppercase and lowercase letters are allowed. Spaces are allowed. This field is optional.

7 Select the NE Type. To do this, click the down arrow to the right of the field to display a drop-down list of choices and select the NE type. This field is required.

8 Select the NE's time zone by clicking the appropriate radio button. If Other is selected, enter the time difference, in minutes, between the NE time and Greenwich Mean Time (GMT). Specify the time difference, "+" (plus) or "-" (minus), up to five characters. Valid values are -11.0 to 13.00 (the plus "+" is implied). This field is required. If no selection is made, the Time Zone defaults to Same as Host.

9

IF YOU ARE ADDING...	THEN CHOOSE TO COMMUNICATE VIA...
an OSI-connected NE	OSI
a WaveStar® NCC as a DSA for WaveStar® BWM NEs	OSI
a WaveStar® NCC or WaveStar® OLS 1.6T as a transport bridge for NEs	OSI over TCP/IP

10 Click on the NE Communications Details (OSI) tab.

Result:

The Communications Details panel for OSI communications is displayed.

Fill in the following fields, as needed:

- Controller #1 NSAP—If NSAP address information was received from the SDS for this NE type, the NSAP address fields are filled in with known information. If information was not received from the SDS or is unavailable, the NSAP address must be entered manually. The Routing Domain part of the NSAP is used to associate NEs with a transport bridge (this field is editable for the transport bridge). See the "NSAP address entry" (3-14) section immediately following this procedure for a description of the NSAP address fields.
- This is a Transport Bridge NE—If a WaveStar® NCC or WaveStar® OLS 1.6T is being added and is serving as a transport bridge for OSI over TCP/IP protocol conversion for NEs, click on this box to place a check in it. Otherwise, leave this box blank.
- Transport Bridge (Primary and Secondary)—Click on the down arrow next to the Primary Transport field to display a drop down list of nodes available to serve as a transport bridge. Select a node from the list. If a backup transport bridge is needed, click on the arrow next to the Secondary Transport Bridge field, display a drop down list, and select another node.
- IP Address for Transport Bridge —If the WaveStar® NCC or WaveStar® OLS 1.6T being added is a transport bridge, enter the IP address. An entry in this field is required for a transport bridge.

11 Click on the NE Communications Details (OSI) #2 tab.

Result:

The NE Communications (OSI) #2 panel is displayed.

12 Fill in the following fields, as needed:

- Number of OSI Associations—Choose the number of OSI associations for the NE type by clicking the corresponding radio button: **1**, **2**, or **3**. This field is required. The number of available associations varies by NE type:
  - WaveStar® BWM or WaveStar® TDM 2.5G: 3
  - WaveStar® NCC: 2

- WaveStar® OLS 1.6T: 1 (default, no change allowed by user)
- WaveStar® TDM 10G (STM-64): 1
- Metropolis™ DMX: (no change allowed by user)

- Notification Type—For each OSI association chosen, choose the notification type. Only one notification type can be assigned per association. This field is required. The notification types vary by NE type. If the Notification type All is chosen for an NE type, all other association type choices are disabled. If the notification type All is chosen, after you click the OK or Apply button, a pop-up message window is displayed, advising you that other system responses will be received and could affect performance, and asking if you want to change the association type. Choose Yes to continue or No to change the association type.

13 Click on the NE Security tab.

Result:

The NE Security panel is displayed.

14 Enter the primary NE login for the NE/WaveStar® NCC being added. The login can be 1-10 characters.

15 Enter the primary NE password for the NE/WaveStar® NCC login. An NE password must be 6-10 alphanumeric characters, with at least two non-alphabetic characters, of which one character must be one of the following special characters (#,%,+). The password must begin with a letter.

16 Re-enter the primary NE/WaveStar® NCC password, in the the Re-enter Password field, for checking.

17 Enter the backup login for the NE/WaveStar® NCC. The backup login can be 1-10 characters.

Important! The WaveStar® OLS 1.6T R1.0 NE supports only a single super user login via Navis™ Optical EMS, so no backup login/password can be entered.

18 Enter the backup password for the NE/WaveStar® NCC.An NE password must be 6-10 alphanumeric characters, with at least two non-alphabetic characters, of which one character must be one of the following special characters (#,%,+). The password must begin with a letter.

19 Re-enter the backup password, in the Re-enter Backup Pwd field, for checking.

20 Click the Apply button to activate your choices, or click the OK button to activate your choices and close the NE Security panel of the Add/Modify NE window.

Result:

A message is displayed in the status bar, indicating that the NE is being added to Navis™ Optical EMS.

END OF STEPS

NSAP address entry

The following table lists the NSAP address fields, indicates field defaults, character widths, and which fields are editable in the GUI.

Field Name	Notes	NE(s)	Default	Octet Size	Editable?
AFI	Area Format Identifier.	All	0x39	1	Yes
IDI + pad	Initial Domain Part.	All	0x840 0xF	2	Yes
DFI	Domain Format Identifier. Specifies format for rest of address.	All	0x80	1	Yes
Operator ID		All	0x000000	3	Yes

Field Name	Notes	NE(s)	Default	Octet Size	Editable?
Reserved	Currently not used. Reserved for future use.	All	0x0000	2	No
Routing Domain	NSAP unique Routing Domain within an administrative domain.	WaveStar® NCC, WaveStar® BWM, WaveStar® OLS 1.6T, WaveStar® TDM 10G (STM-64), WaveStar® TDM 2.5G_10G	0x0000	2	Yes
Area	NSAP Area Identifier. Identifies NEs in the same area.	All	0x0000	2	Yes
System ID	System Identifier. This field is used to guarantee that NSAP address is globally unique.	All	no default	1	Yes
SEL	NSAP Selector. Used to differentiate multiple NSAP addresses associated with same End System.	All	0x1D*	1	No

Notes:

1. *The value of the SEL field is 1D hex when TP4 is run over CLNP.

The System ID field is not defaulted, but is mandatory.

All of the NSAP address fields, except for the Reserved and SEL fields, are editable on the Add a Network Element to the DIB window in the GUI.

□

Add a Network Element—TCP/IP Communications

Purpose

Use this procedure to add an NE with a direct TCP/IP interface to Navis™ Optical EMS host. NEs with a "pure" direct TCP/IP interface can be set up to communicate directly via TCP/IP with the Navis™ Optical EMS host or through a TCP/IP-connected NE serving as a Gateway Network Element (GNE) for the other NEs in a ring. To provide support in the event of a communications failure, a backup GNE can be assigned to a subnetwork to allow switchover to another GNE.

Before you begin

Before you begin this task, if you are adding a TCP/IP-connected NE as a GNE, the following must be established:

- The GNE's Target Identifier (TID)
- A valid NE login/password, and a valid backup NE login/password
- The GNE's IP address
- The number of associations for exchanging messages between the GNE and the other NEs in a ring

Before adding a TCP/IP GNE, you must first create a compatible subnetwork to which it can be assigned.

Task

Complete the following steps to add a TCP/IP-connected NE.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Network** from the Administration menu.

Result:

A sub-menu is displayed.

3 Select **Network Elements** from the sub-menu.

Result:

The Manage NEs window is displayed, showing the current list of NEs in your Target Group.

4 Click on the Add button.

Result:

The Add an NE - General Information panel is displayed.

The Add an NE window for TCP/IP connected NEs is divided into three panels:

- General NE Information
- NE Communications Details (GNE or TCP/IP)
- NE Security

There are fields on each panel that are required to add an NE. To access a panel, click the mouse select button on the panel's labeled tab.

The General Information panel is displayed initially.

5 Enter the NE's Target Identifier (TID). A TID can be 1-20 alphanumeric characters. Hyphens, slashes ("/"), and periods are allowed. This field is required.

6 Enter the NE's Alias. An alias can be 1-40 alphanumeric characters. Uppercase and lowercase letters are allowed. Spaces are allowed. This field is optional.

7 Select the NE Type. To do this, click the down arrow to the right of the field to display a drop-down list of choices and select the NE type. This field is required.

8 Select the NE's time zone by clicking the appropriate radio button. If Other is selected, enter the time difference, in minutes, between the NE time and Greenwich Mean Time (GMT). Specify the time difference, "+" (plus) or "-" (minus), up to five characters. Valid values are -11.0 to 13.00 (the plus "+" is implied). This field is

required. If no selection is made, the time zone defaults to Same as Host.

9 In the Communicate Via field of the General Information panel:

IF ...	CLICK...
The NE is communicating with the Navis™ Optical EMS host via a GNE	the GNE radio button. Go to step Step 10.
The NE is communicating directly with the Navis™ Optical EMS host via TCP/IP	the TCP/IP radio button. Go to step Step 11.

10 If you selected the Communicate Via GNE option in step Step 9, click on the NE Communications Detail (GNE) panel. Select a GNE from the list on the panel.

Skip to step Step 17.

11 If you selected the Communicate Via TCP/IP option in step Step 9, click on the NE Communications Details (TCP/IP) tab. The NE Communications Details (TCP/IP) panel is displayed. This panel is used to enter information about the interface between this GNE, the Navis™ Optical EMS host and the other NEs in the subnetwork.

Important! You must enter a valid IP address for the NE. Navis™ Optical EMS does not check the validity of the IP address entry.

12 The Communication Type defaults to TL1 Only. The other options are currently not available.

13 Click on the down arrow to the right of the Choose a Subnetwork field to display a list of subnetworks, and select a compatible subnetwork. This field is required.

Important! More than one GNE can be associated with a subnetwork name/alias. This enables the load to be shared among multiple GNEs. However, it is important that all of the GNEs associated with a

subnetwork name/alias truly are in the same physical subnetwork. Incorrect associations of GNEs to subnetworks may result in Navis™ Optical EMS being unable to establish a connection to some remote NEs in the subnetwork.

14 Enter the NE's IP address. The IP address field is divided into four 3-character fields separated by periods.

15 For NEs discovered under the GNE being added (Discovered Remotes), choose one of the following options (by clicking on that option's radio button):

- This GNE—the NE login and password entered for this GNE in the NE Security panel will be used to log into the NEs.
- Navis™ Optical EMS Default for Remote NEs—the system-wide Navis™ Optical EMS default NE login and password for the NE type of the Remote Terminal (RT) being discovered will be used to log into the NEs.
- Navis™ Optical EMS Default for GNE Type—the system-wide Navis™ Optical EMS default NE login and password for the NE type of the GNE being added will be used to log into the NEs.

16 Choose the number of associations for the NE type. This field is required.

Go to step Step 17.

17 Click on the NE Security tab.

Result:

The NE Security panel is displayed.

18 Enter the primary NE login for the NE being added. The login can be 1-10 characters.

19 Enter the primary NE password for the NE login. An NE password must be 6-10 alphanumeric characters, with at least two non-alphabetic characters, of which one character must be one of the

following special characters (#,%,+). The password must begin with a letter.

20 Re-enter the primary NE password, in the Re-enter Password field, for checking.

21 Enter the backup login for the NE. The backup login can be 1-10 characters.

22 Enter the backup password for the NE. An NE password must be 6-10 alphanumeric characters, with at least two non-alphabetic characters, of which one character must be one of the following special characters (#,%,+). The password must begin with a letter.

23 Click the Apply button to activate your choices, or click the OK button to activate your choices and close the NE Security panel of the Add/Modify NE window.

24

IF...	THEN...
You are adding a GNE and the system prompts whether DNO should be run at this time to update the Navis™ Optical EMS database with complete information about the newly added NE.	Choose Yes to run DNO or No to not perform DNO at this time.**Important!** If you are adding more GNEs to the same subnetwork, choose **No** to not perform DNO at this time. A DNO should not be performed until all GNEs in the same subnetwork have been added so new RNEs discovered automatically by Navis™ Optical EMS via a newly added GNE can be reassigned to another GNE in the same subnetwork, if necessary. See "Associate Remote Network Elements with Gateway Network Elements" (3-38) for details on how to reassign RNEs to another GNE in the same subnetwork.

IF...	THEN...
You are not adding a GNE	No DNO prompt is displayed. **Result:** A message in the status bar is displayed, indicating that the NE is being added to Navis™ Optical EMS.

END OF STEPS

Add a Gateway Network Element—X.25 Communications

Purpose

Use this procedure to add an FT-2000 LCT Gateway Network Element (GNE) for X.25-based communications between Navis™ Optical EMS and the NEs in a subnetwork. The GNE establishes communication with the Navis™ Optical EMS host through a synchronous port over a Packet-Switched Network (PSN). To provide support in the event of a communications failure, a backup (secondary) GNE can be assigned to a subnetwork to allow switchover to another GNE.

Related task

See "Add a Network Element—X.25 Communications Via a Gateway Network Element" (3-4) for instructions on how to manually add an X.25-connected NE communicating either directly or via a Gateway Network Element (GNE).

Before you begin

Before you begin this task, the following must be established before adding a FT-2000 LCT GNE:

- The GNE's Target Identifier (TID)
- A valid NE login/password, and a valid backup NE login/password
- The synchronous port that the PSN uses for connectivity to the Navis™ Optical EMS host (the port on the Navis™ Optical EMS host)
- The PVCs and/or SVCs that are being used for command/response messages, autonomous maintenance/alarm messages, and autonomous database change/ provisioning commands/responses

Before adding a GNE, you must first create a subnetwork to which it can be assigned.

Task

Complete the following steps to add an X.25-connected GNE.

1 Select **Administration** from the main menu bar on the Map window.

2 Select **Network** from the Administration menu.

Result:

A sub-menu is displayed.

3 Select **Network Elements** from the sub-menu.

Result:

The Manage NEs window is displayed, showing the current list of NEs in your Target Group.

4 Click on the Add button.

Result:

The Add an NE - General Information panel is displayed.

The Add an NE window for X.25-connected GNEs is divided into three panels:

- General NE Information
- NE Communications Details
- NE Security

There are fields on each panel that are required to add a GNE. To access a panel, click the mouse select button on the panel's labeled tab.

The General Information panel is displayed initially.

5 Enter the GNE's Target Identifier (TID). A TID can be 1-20 alphanumeric characters. Hyphens, slashes ("/"), and periods are allowed. This field is required.

6 Enter the GNE's Alias. An alias can be 1-40 alphanumeric characters. Uppercase and lowercase letters are allowed. Spaces are allowed. This field is optional.

7 Select the NE Type. To do this, click the down arrow to the right of the field to display a drop-down list of choices and select the NE type FT-2000 LCT. This field is required.

8 Select the NE's time zone by clicking the appropriate radio button. If Other is selected, enter the time difference, in minutes, between the NE time and Greenwich Mean Time (GMT). Specify the time difference, "+" (plus) or "-" (minus), up to five characters. Valid values are -11.0 to 13.00 (the plus "+" is implied). This field is required. If no selection is made, the time zone defaults to Same as Host.

9 For the Communicate Via field, click the PSN radio button. As a GNE, this NE is being set up to communicate with Navis™ Optical EMS and other NEs in the subnetwork via a PSN. This field is required.

10 Click on the NE Communications Details (PSN) tab. The NE Communications Detail panel is displayed. This panel is used to enter information about the GNE's X.25 interface.

11 Click on the down arrow to the right of the Choose an X.25 Interface field to display a list of X.25 port names, and select a port. This field is required.

12 Click on the down arrow to the right of the Choose a Subnetwork field to display a list of subnetworks, and select a subnetwork. This field is required.

Important! More than one GNE can be associated with a subnetwork name/alias. This enables the load to be shared among multiple GNEs. However, it is important that all of the GNEs associated with a subnetwork name/alias truly are in the same physical subnetwork. Incorrect associations of GNEs to subnetworks may result in Navis™ Optical EMS being unable to establish a connection to some remote NEs in the subnetwork.

13 For NEs discovered under the GNE being added (Discovered Remotes), choose one of the following options (by clicking on that option's radio button):

- This GNE—the NE login and password entered for this GNE in the NE Security panel will be used to log into the NEs
- EMS Default for Remote NEs—the system-wide Navis™ Optical EMS default NE login and password for the NE type of the Remote Terminal (RT) being discovered will be used to log into the NEs.
- EMS Default for GNE Type—the system-wide Navis™ Optical EMS default NE login and password for the NE type of the GNE being added will be used to log into the NEs.

14 Choose the Number of Virtual Circuits (VCs) for this GNE by clicking the radio button next to the number. The choices are: 1, 2, or 3. Display of the associated VC fields depends on the number of VCs you choose. For example, if you choose 1 VC to be configured, the Command/Response VC field is enabled. The Autonomous Message & Alarms field and Autonomous DB Change/Command Response 2 fields are disabled.

If 1 VC is configured, either or both the Autonomous Message and Autonomous Database Change/Provisoning functions may share the Command/Response VC.

15 For each configured VC, choose whether it is set up as an SVC or a PVC.

16

IF...	THEN...
any VC is set up as an SVC	enter the X.121 SVC address in the SVC X.121 Address field. Only one X.121 address is used. Valid SVC X.121 Address values are 1-15 digits and must be greater than 1.

IF...	THEN...
a VC is set up as a PVC	enter the PVC Logical Channel Number in the related field. Valid PVC logical channel numbers are 1-999.

17 Click on the NE Security tab.

Result:

The NE Security panel is displayed.

18 Enter the primary NE login for the GNE being added. The login can be 1-10 characters.

19 Enter the primary NE password for the GNE login. An NE password can be 1-10 characters.

20 Re-enter the primary NE password, in the Re-enter Password field, for checking.

21 Enter the backup login for the GNE. The backup login can be 1-10 characters.

22 Enter the backup password for the GNE. The backup password can be 1-10 characters.

23 Click the Apply button to activate your choices, or click the OK button to activate your choices and close the NE Security panel of the Add/Modify NE window.

24

IF...	THEN...
You are adding a GNE and the system prompts whether DNO should be run at this time to update the Navis™ Optical EMS database with complete information about the newly added NE.	Choose Yes to run DNO or No to not perform DNO at this time.**Important!** If you are adding more GNEs to the same subnetwork, choose **No** to not perform DNO at this time. A DNO should not be performed until all GNEs in the same subnetwork have been added so new RNEs discovered automatically by Navis™ Optical EMS via a newly added GNE can be reassigned to another GNE in the same subnetwork, if necessary. See "Associate Remote Network Elements with Gateway Network Elements" (3-38) for details on how to reassign RNEs to another GNE in the same subnetwork. **Result:** A message in the status bar is displayed, indicating that the NE is being added to Navis™ Optical EMS.
You are not adding a GNE	

END OF STEPS

Modify a Network Element

Purpose Use this procedure to modify an NE.

Before you begin Before you begin this task, be aware that the TID and Communicate Via fields cannot be modified.

Be aware that you can use the Modify an NE window to define NE passwords for an NE if both passwords were changed through the CIT due to the password aging feature for these NE types.

If both NE passwords have been changed through the CIT, and you do not know what the new NE passwords are, use the Modify an NE window in the Navis™ Optical EMS GUI to change/modify the NE passwords. You do not have to know the existing passwords that were defined through the CIT.

To perform this task, access the Map window.

Task Complete the following steps to modify an NE.

1 Select **Administation** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Network** from the Administration menu.

Result:

A sub-menu is displayed.

3 Select **Network Elements** from the sub-menu.

Result:

The Network Element Manager window is displayed, showing the current list of NEs in your Target Group.

4 Choose the NE to be modified.

5 Click the Modify button.

Result:

The Add/Modify a Network Element - General Information panel is displayed.

6 Click on the tab of the appropriate panel, and change the NE field(s), as needed.

7 Click the Apply button to activate your choices, or click the OK button to activate your choices and close the Add/Modify a Network Element window.

Result:

A message in the status bar is displayed, indicating that the NE is being modified.

END OF STEPS

□

Delete a Network Element

Purpose Use this procedure to delete an NE.

Before you begin **Important!** ***If the Navis™ Optical EMS is connected toNavis™ Optical NMS, do not delete a network element and try to re-add it back to the Navis™ Optical EMS database without contacting the Navis™ Optical NMS administrator. The Navis™ Optical NMS database maintains records of cross-connections/paths related to the NE being deleted. If an NE is deleted in Navis™ Optical EMS, the related path records are not removed from the Navis™ Optical NMS database.If you are deleting an NE that is also in the Navis™ Optical NMS database, do the following:1. From Navis™ Optical EMS host command line, run the command NCI_SPDeleteNeDB $TID to clean up the tmf database. 2. From the Navis™ Optical NMS, do a database resync on the NE. 3. From the Navis™ Optical NMS, delete and re-ad the customer paths associated with the deleted NE.***

Before you begin this task, make sure that if the NE is assigned to an aggregate, that you remove it from the aggregate before deleting it. When an NE is deleted, all information related to that NE is immediately removed from the Navis™ Optical EMS database. Associated trails may also be deleted. Any trail that is deleted as a result of deleting an NE is also removed from any open window that shows the deleted trail (like the Map window pane and the Trail Manager).

If you are deleting a GNE, you must first reassign all RNEs associated with the GNE or delete the RNEs from the Navis™ Optical EMS database.

To perform this task, access the Map window.

Task Complete the following steps to delete an NE.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Network** from the Administration menu.

Result:

A sub-menu is displayed.

3 Select **Network Elements** from the sub-menu.

Result:

The Network Element Manager window is displayed, showing the current list of NEs in your Target Group.

4 Choose the NE to be deleted.

5 Click the Delete button.

6 Click the OK button.

Result:

A pop-up window is displayed, informing you that deletion of this network element may be service affecting to northbound network management systems, and asks if you really want to delete the chosen NE.

7 Choose Yes.

Result:

A message in the status bar is displayed, indicating that the NE is being deleted.

END OF STEPS

□

Add a Subnetwork Name/Alias

Purpose

Use this procedure to add a subnetwork name and subnetwork alias. Once a subnetwork name and alias is created, you can associate one or more active GNEs with that subnetwork. The Remote Network Elements (RNEs) associated with a GNE become grouped under that subnetwork name/alias. RNEs in a subnetwork can be manually reassigned to another GNE in the same subnetwork. The subnetwork must exist before one of the X.25-connected or TCP/IP GNEs can be associated with it.

A subnetwork is defined as a set of interconnected network elements using a common data comunications protocol, generally OSI over a Data Communications Channel (DCC). More than one GNE can be associated with a subnetwork/alias. This enables the communications load to be shared among multiple GNEs. However, it is important that all the GNEs associated in a subnetwork name/alias are in the same physical subnetwork. Incorrect associations of GNEs to subnetworks may result in Navis™ Optical EMS being unable to establish a connection to some remote NEs in the subnetwork.

Before you begin

To perform this task, you must first access the Map window.

Task

Complete the following steps to add a subnetwork name and its alias.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Network** from the Administration menu.

Result:

A sub-menu is displayed.

3 Select **Subnetwork** from the sub-menu.

Result:

The Subnetwork Manager window is displayed.

4 Click the Add button to add a new subnetwork name/alias.

Result:

The Add a Subnetwork window is displayed.

5 Enter the name of the subnetwork in the Subnetwork Name field, 1-20 alphanumeric characters (hyphens are allowed).

6 Enter the name of the subnetwork alias in the Subnetwork Alias field, 1-20 alphanumeric characters (hyphens are allowed). This field is optional.

7 Click the Apply button to add the new information to the Navis™ Optical EMS datebase, or click the OK button to add the new information and close the window.

Result:

The Status Dialog window is displayed, indicating that the subnetwork name/alias has been added to the system.

END OF STEPS

□

Modify a Subnetwork Alias

Purpose Use this procedure to change a subnetwork's alias once it has been created.

Before you begin Before you begin this task, the subnetwork name/alias being modified must exist in Navis™ Optical EMS.

To perform this task, access the Map window.

Task Complete the following steps to change a subnetwork alias.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Network** from the Administration menu.

Result:

A sub-menu is displayed.

3 Select **Subnetwork** from the sub-menu.

Result:

The Subnetwork Manager window is displayed.

4 Select the subnetwork name to be modified from the scroll list.

5 Click the Modify button.

Result:

The Add a Subnetwork window is displayed with the current subnetwork name and alias.

6 Change the subnetwork alias name and click the OK button.

Result:

A warning dialog window is displayed, indicating that the subnetwork alias change has been made in the system.

END OF STEPS

□

Delete a Subnetwork Name/Alias

Purpose Use this procedure to delete a subnetwork name and alias from the Navis™ Optical EMS database.

Before you begin Before you begin this task, the subnetwork name/alias must exist in the Navis™ Optical EMS database. The NE(s) assigned to the subnetwork name being deleted must first be reassigned to another subnetwork by modifying the network element, via the Add/Modify a Network Element window.

To perform this task, access the Map window.

Task Complete the following steps to delete a subnetwork name and alias from the Navis™ Optical EMS database.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Network** from the Administration menu.

Result:

A sub-menu is displayed.

3 Select **Subnetwork** from the sub-menu.

Result:

The Subnetwork Manager window is displayed.

4 Select the subnetwork to be deleted.

5 Click the Delete button.

Result:

A pop-up message window is displayed, asking if you really want to delete the selected subnetwork. Choose **Yes** to delete the subnetwork. The Status Dialog window is displayed,

indicating that the subnetwork name/alias has been deleted. All references to the deleted subnetwork name/alias and subnetwork/NE relationships are updated in Navis™ Optical EMS.

END OF STEPS

□

Associate Remote Network Elements with Gateway Network Elements

Purpose Use this procedure to view the Gateway Network Elements (GNEs) in a subnetwork and associated Remote Network Elements (RNEs) and to reassign RNEs to a different GNE in the same subnetwork, as needed.

Before you begin Before you begin this task, network elements to be reassigned to a different GNE must be initially assigned to a GNE in the subnetwork. The GNEs/RNEs must be given an existing subnetwork name/alias. To perform this task, you must first access the Map window.

Task Complete the following steps to view a GNE and its associated RNEs in a subnetwork and, if needed, to reassign RNEs to a different GNE in the subnetwork.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Network** from the Administration menu.

Result:

The Network sub-menu is displayed.

3 Select **GNE Associations** from the Network sub-menu.

Result:

A sub-menu is displayed.

4 Select **GNE/RNE** from the sub-menu.

Result:

The GNE/RNE Association window is displayed.

This window is divided into two parts. It consists of:

- An explorer tree, which shows the names of all subnetworks in your Target Group (unexpanded)
- A table which displays the TID and type of each RNE

5 To view GNEs in a subnetwork, double-click on a subnetwork name in the explorer tree to select and expand the subnetwork's associations.

6 To view RNEs associated with a GNE, select the GNE.

Result:

The GNE's associated RNEs are displayed in the table.

7 To reassign an RNE from one GNE to another one in the subnetwork, select the RNE by right-clicking on it in the "Remote NEs" part of the window.

Result:

A pop-up window is displayed, with the message "Associate with...".

8 Right-click on the same RNE selected.

Result:

A pop-up window is displayed, with the message "Associate with...".

9 Click the select (left) mouse button on the "Associate with.." message that is displayed.

Result:

A message is displayed in the status bar "Select a GNE within the same subnet to associate this RNE with".

10 Double-click on a GNE under the same subnetwork in the explorer tree to select it for reassignment of the RNE.

Result:

The GNE/RNE reassignment is processed. Messages are displayed in the status bar of the window, indicating the progress of the reassignment and when it is completed.

11 Continue making reassignments as needed.

12 When you are finished, click the Close button to close the window.

END OF STEPS

□

Add a Secondary (Backup) Gateway Network Element Association

Purpose Use this procedure to add a GNE association. A GNE association is a pair of GNEs in the same subnetwork that serve, respectively, as the Primary GNE and Secondary (backup) GNE for the other NEs in the subnetwork to communicate with Navis™ Optical EMS. The Primary GNE initially serves as the point of communications for the other NEs in a subnetwork with Navis™ Optical EMS. The backup (secondary) GNE is the backup GNE should communications with the Primary GNE fail.

Before you begin Before you begin this task, you must configure both NEs to be GNEs in the same subnetwork. You must also verify that the Secondary GNE does not have a separate set of Remote Network Elements communicating with it.

To perform this task, access the Map window.

Task Complete the following steps to add a GNE association.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Network** from the Administration menu.

Result:

The Network sub-menu is displayed.

3 Select **GNE Associations** from the Network sub-menu.

Result:

A sub-menu is displayed.

4 Select **Primary/Secondary** from the sub-menu.

Result:

The Primary/Secondary GNE Associations window is displayed.

This window shows the current GNE associations (if any exist). An “X” to the left of a GNE in an association indicates that it is the currently active GNE.

5 Click the Add New Association button.

Result:

The Add a Primary/Secondary GNE Association window is displayed.

6 Select the Primary GNE from the Primary GNE scroll list.

Result:

The GNE(s) available to serve as the Secondary GNE in the association is displayed in the Secondary GNE scroll list.

7 Select the Secondary GNE from the Secondary GNE scroll list.

8 Click the Apply button to create the association or click the OK button to create the association and close the Add a Primary/Secondary GNE Association window.

Result:

The GNE association is added to the GNE Associations list. The Primary GNE in the newly created association becomes the currently active GNE.

9 Close the status window by clicking the Close button.

10 Click the Close button to close the Primary/Secondary GNE Association window.

END OF STEPS

□

Switch Primary/Secondary Gateway Network Elements

Purpose Use this procedure to switch the active and standby status of the GNEs in an association. When a switch is made, the Secondary GNE becomes the active GNE.

Before you begin Before you begin this task, be aware that a manual switch of the active and standby GNEs will cause temporary loss of communications with all of the NEs connected via the GNE pair, resulting in generation of alarms and/or loss of alarms.

To perform this task, access the Map window.

Task Complete the following steps to manually switch the active and standby GNE in a GNE association.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Network** from the Administration menu.

Result:

The Network sub-menu is displayed.

3 Select **GNE Associations** from the Network sub-menu.

Result:

A sub-menu is displayed.

4 Select **Primary/Secondary** from the sub-menu.

Result:

The Primary/Secondary Assocations window is displayed.

5 Select the Primary/Secondary GNE association to be switched.

Result:

The Status Dialog window is displayed, indicating that the switch is being made. When the switch is made, the “X” moves to the newly active GNE in the association.

6 Click the Close button to close the window.

END OF STEPS

□

Delete a Gateway Network Element Association

Purpose Use this procedure to delete a GNE association. This procedure is only used to remove the association between two GNEs, not to delete the GNEs from the network. When a GNE association is deleted, NEs in a subnetwork remain connected to the currently active GNE.

Before you begin Before you begin this task, identify the GNE association to be deleted.

To perform this task, access the Map window.

Task Complete the following steps to delete a GNE association.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Network** from the Administration menu.

Result:

The Network sub-menu is displayed.

3 Select **GNE Associations** from the Network sub-menu.

Result:

A sub-menu is displayed.

4 Select **Primary/Secondary** from the sub-menu.

Result:

The Primary/Secondary Association window is displayed.

5 Select the GNE association to be deleted.

6 Click the Delete button.

7 The Status Dialog window is displayed, indicating that the association has been deleted.

8 Click the Close button to close the window.

END OF STEPS

□

Manage Transport Bridges

Purpose Use this procedure to reassign NEs to transport bridges as needed to remove NE associations from transport bridges.

Before you begin Before you begin this task, you must have added WaveStar® NCCs or WaveStar® OLS 1.6T NEs as designated transport bridges and assigned WaveStar® NEs to transport bridges to make changes to assignments. You also must have selected a primary and, if needed, backup transport bridge for each of the WaveStar® NEs in your Target Group that require TCP/IP to OSI protocol conversion.

Be aware that only reassignment of a primary transport bridge will cause the actual switch of the transport bridge. The switch of a primary transport bridge may cause the link from the Navis™ Optical EMS and the target NE to go down and up, which can trigger automatic alarm re-synchronization.

To perform this task, access the Map window.

Task Complete the following steps to view Transport Bridge assignments for NEs, modify the assignments as needed, and to enable/disable automatic assignment of Primary and Secondary (Backup) Transport Bridges.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Communications** from the Administration menu.

Result:

The Communications menu is displayed.

3 Select **Transport Bridges** from the Communications menu.

Result:

The Transport Bridges window is displayed.

The window consists of two parts: an explorer that shows all transport bridges and the NE(s) using that transport bridge (if any), and a scrollable list of NEs (by TID) in your Target Group.

4

IF ...	THEN ...
you want to view the NEs currently assigned to a transport bridge	click on the WaveStar® NCC (transport bridge) in the explorer to expand it, to show the TIDs of NEs assigned to the transport bridge. The letter “B” (in parentheses) after an NE indicates that it is using the transport bridge as a backup.
you want to assign an NE to a transport bridge	click on the appropriate TID in the Network Elements list to display a pop-up menu. The status bar displays a message, asking you to choose the primary or backup transport bridge. To choose one, click on the name of the transport bridge in the explorer.**Important!** No transport bridge can serve as both a primary and backup transport bridge for any NE.
you want to remove an NE from a transport bridge	click on the NE symbol in the explorer to display a pop-up menu and choose the Remove Association option. The NE is automatically removed and appears on the Network Element List.

END OF STEPS

□

Manually Initiate DNO

Purpose

Use this procedure to manually initiate DNO for one or more NEs or an aggregate. For a WaveStar® BWM or WaveStar® OLS 1.6T, you can perform a DNO for all configuration data, or on any single bay or shelf. You can specify that all information be included in the DNO update, or just port, cross-connection, port protection group, subnetwork, NE parameters, or equipment information.

Before you begin

Before you begin this task, you must be logged into Navis™ Optical EMS.

Be aware that for certain NE types, such as the WaveStar® BWM and WaveStar® OLS 1.6T, DNO command requests for some data may result in DENY messages but the DNO process will continue, resulting in a "COMPLETED" status even though all data has not been updated in the database. In this case, your system administrator may have to check the ERRORLOG file in the $Roamlog directory to check the NE responses to the DNO process.

Task

Complete the following steps to manually initiate DNO.

1

IF …	THEN …
you are performing DNO on a single NE, group of NEs, or aggregate	select one or more NEs or an aggregate.
you are performing DNO on a single bay or shelf	select the bay or shelf on the Network Element Explorer

2 Access the DNO function (as appropriate) through:

- The Map window Configuration menu—select **DNO** from the Configuration menu on the main menu bar of the Map window. The Choose an NE/Aggregate window is displayed. Double-click on the NE(s)/aggregate(s) for which you want to perform DNO. Click the OK button.
- The NE's or aggregate's pop-up menu—position the mouse cursor over the NE/aggregate icon on the Map pane or Subnetwork Explorer, and click the menu (right) mouse button. A pop-up menu is displayed. Select **DNO** from the pop-up menu.
- The Equipment View window (for the chosen NE/aggregate)—Select **Configuration** from the main menu. A sub-menu is displayed. Select **DNO** from the sub-menu.
- The Cross-Connection window (for the chosen NE/aggregate)—select **Configuration** from the main menu. A sub-menu is displayed. Select DNO from the sub-menu.

Important! If the DNO channel is down, a message is displayed in the status bar of the window, indicating that you cannot perform a DNO at this time. Click the Close button to close the window.

Result:

The Manual DNO window is displayed.

3

IF ARE INITIATING DNO FOR…	THEN …
all data at the NE level	with the NE TID highlighted in the explorer, click on the radio button labeled "All Information".
all configuration data	click on the radio button labeled "All Information" .**Important!** If you choose "All Information' for a bay or shelf, Navis™ Optical EMS performs DNO for ports, port protection groups, cross-connections, and equipment.

IF ARE INITIATING DNO FOR…	THEN …
you are initiating DNO for a selected data type	click on the radio button labeled 'Only the following...” and choose one of the following data types: • Port Parameters • Cross Connections/Reservations • Port Protection Group • NE Parameters • Equipment • Subnetwork • Optical Associations **Important!** For a single bay or shelf, DNO can be performed for just Port Parameters, Cross-Connections, or Equipment. When you perform DNO the first time on an NE, the system does database synchronization on all data types, even if you choose only one data type.

4 Click the Apply button to initiate DNO and select the next data type for update, or click the OK button to initiate DNO and close the window.

Result:

The DNO process is started.

To obtain DNO status for an NE before or after initiating DNO, click on the GetStatus button.

5

IF...	THEN...
DNO cannot be performed for the selected NE(s)	The system issues a message informing you of this

IF...	THEN...
You choose to perform DNO on all NEs in your Target Group	A pop-up window is displayed, informing you that DNO may take a long time and affect system performance and asks if you want to proceed. Choose **Yes** to perform DNO anyway or **No** to stop the DNO process. **Result:** When the DNO process is completed, a message is displayed on the window's status bar, indicating whether the DNO is successful or if there are any errors.

END OF STEPS

Schedule DNO

Purpose Use this procedure to schedule a Dynamic Network Operations (DNO) database update for an NE.

Before you begin Before you begin this task, be aware that DNO cannot be scheduled for a bay or shelf in a WaveStar® BWM NE. Unless you are scheduling a DNO for all NE data, you can only specify a database update for one data type. The first time that a DNO is scheduled for an NE, the system does database synchronization for all data types, even if you select only one type for database synchronization.

To perform this task, access the Map window.

Task Complete the following steps to schedule DNO for an NE.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Schedule** from the Administration menu.

Result:

A sub-menu is displayed.

3 Select **DNO** from the sub-menu.

Result:

The Schedule Manager window is displayed, showing a list of currently scheduled DNOs.

4 Click the Add button.

Result:

The Add a Scheduled DNO window is displayed.

5 Choose an NE (by TID) from the Choose an NE scroll bar list by double-clicking on the item. Use the type ahead field and/or filter/sort functions to narrow the list, if necessary.

6

TO SCHEDULE A DNO FOR...	CLICK...
all data types	The All Information radio button under the DNO Type portion of the window.
a specific data type	Click the "Only the following..." button and then click one of the following radio buttons: • Port Parameters • Subnetwork • Equipment • Cross Connections • NE Parameters • Port Protection Groups • Optical Associations **Important!** One or more data type buttons may be disabled for a specific NE type. When you perform DNO the first time on an NE, the system does database synchronization on all data types, even if you choose only one data type.

7 Choose the following Scheduling Options, as needed:

- Weekly on...—click on this radio button if you want the task to be done on a weekly basis. If you schedule the task to be done weekly, choose the day of the week by using the spinner field list next to this option.
- Once every...—click on this radio button if you want the task to be done periodically. If you schedule the task to be done periodically, choose the frequency (every x month(s) and the day of the month it will be done using the spinner field lists next to this option or click the Last Day of the Month checkbox.

- Schedule Time—click the up and down arrows on this spinner field to select the time of day for the scheduled task. The schedule time is in 24-hour format, in hours:minutes. You can also type the time into this field. The time must be input in 24-hour format as hh:mm in 15 minute increments (for example, 11:15 P.M. is entered as 23:15). If the time entry is invalid, the color of the field changes to yellow, and you must re-enter a valid time in the proper format.
- Number of Retries—click the up and down arrows on this spinner field to specify the number of retries for the scheduled task.
- Retry Interval—If the Number of Retries selected is greater than 1, specify the retry interval, in minutes. Click the up and down arrows on the spinner field to select the time interval.

8 Click the Apply button to activate your choices, or click the OK button to activate your choices and close the window.

END OF STEPS

□

Modify a Scheduled Task

Purpose

Use this procedure to change the parameters of a task for any function that can be scheduled.

Before you begin

Before you begin this task, be aware that you cannot modify a scheduled task that is already in progress. You cannot modify another user's scheduled tasks unless you are the system administrator or have a privileged login.

To perform this task, access the Map window.

Task

Complete the following steps to modify a scheduled task.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Schedule** from the Administration menu.

Result:

The Schedule sub-menu is displayed.

3 Select the function of the task to be modified.

Result:

The Scheduler Manager window for the selected function is displayed, showing a list of currently scheduled tasks.

4 Select a task from the list to be modified.

5 Click the Modify button.

Result:

The appropriate Modify a Scheduled Item window is displayed.

6 Make modifications to the information.

7 Click the Apply button to apply the changes or click the OK button to apply the changes and close the window.

END OF STEPS

□

Delete a Scheduled Task

Purpose

Use this procedure to delete a scheduled task for any function that can be scheduled.

Before you begin

Before you begin this task, be aware that you cannot delete any scheduled DNO that is already in progress. You cannot delete another user's scheduled tasks unless you are the system administrator or have a privileged login.

To perform this task, access the Map window.

Task

Complete the following steps to delete a scheduled task.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Schedule** from the Administration menu.

Result:

The Schedule sub-menu is displayed.

3 Select the function of the task to be deleted.

Result:

The Scheduler Manager window for the selected function is displayed, showing a list of currently scheduled tasks.

4 Choose the item to be deleted, which is identified by TID, from the list.

5 Click the Delete button.

Result:

A pop-up question dialog window is displayed, asking if you want to delete the selected scheduled task. Choose Yes to delete the selected scheduled task or No to cancel the deletion.

END OF STEPS

Provision DSA

Purpose Use this procedure to select a WaveStar® Network Communication Controller (NCC) or the Navis™ Optical EMS-based DSA (if activated) to serve as the DSA from which the Navis™ Optical EMS can gather directory information about the WaveStar® BWM and the WaveStar® OLS 1.6T NEs in the network.

Before you begin Before you begin this task, make sure that there are existing WaveStar® NCCs added to the Navis™ Optical EMS database with the DSA capability enabled or the Navis™ Optical EMS-based DSA has been activated. The Navis™ Optical EMS-based DSA is activated during installation. The DSA function for a WaveStar® NCC can be enabled through the Craft Interface Terminal (CIT) of the WaveStar® NCC or through the NE parameters function in the GUI. If the Navis™ Optical EMS server is being used as the DSA, make sure the DSA capability has been enabled for the server.

To perform this task, access the Map window.

Task Complete the following steps to choose the WaveStar® NCC/DSA or Navis™ Optical EMS-based DSA through which Navis™ Optical EMS can communicate with the WaveStar® NCC's Directory Information Base (DIB) for NE directory information.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Communications** from the Administration menu.

Result:

The Communications menu is displayed.

3 Select **Provision DSA** from the Communications menu.

Result:

The Provision DSA window is displayed.

4 Click the down arrow to the right of the DSA to Monitor field to display a list of WaveStar® NCCs/server (Navis™ Optical EMS-based DSA is shown as “Local”) with the DSA function enabled. Select a DSA to be used.

Important! If there is no WaveStar® NCC currently in the Navis™ Optical EMS database with the DSA function enabled or the Navis™ Optical EMS-based DSA is not activated, a pop-up message window is displayed, advising you that none exist and that you must manually add a WaveStar® NCC/DSA.

5 Click the Apply button to activate your choice, or click the OK button to activate your choice and close the Provision DSA window.

END OF STEPS

□

Add a DIB Prefix

Purpose

Use this procedure to add a DIB Prefix to a Navis™ Optical EMS-based DSA's T.1245 Directory (DIB) for SONET Directory Services (SDS). NEs that register with the EMS-based DSA are stored in the T1.245 DIB in a tree structure under a DIB Prefix provisioned for the Navis™ Optical EMS-based DSA DIB. The DIB Prefix is used by the DUA process in the Navis™ Optical EMS application to query the DSA for NE directory information contained in the T1.245 DIB. The DIB Prefix consists of a company name, an organization, and zero to six organizational units.

Before you begin

Before you begin this task, make sure that the Navis™ Optical EMS application has the DSA functionality enabled.

Task

Complete the following steps to add a DIB Prefix to the DSA T1.245 DIB for the SDS feature.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **DSA Management** from the Administration menu.

Result:

The DSA Manager window is displayed.

The DSA Manager window consists of an explorer, which allows you to view the current DIB Prefix(es), with the Prefix composite information, in the DSA DIB, the associated NEs under the DIB Prefix, and the application information for each NE.

There is also a text field and a Find button, to do a text string search in the explorer tree.

There are four action buttons to the right of the explorer on the window:

- Add Prefix
- Add NE

- Delete
- Modify

3 Click the Add Prefix button.

Result:

The Add Prefix window is displayed.

4 Fill in the following fields, as needed:

- Country—Click the down arrow next to this field to display a drop-down list of Country Codes. Select a Country Code from thedrop-down list. The default is US. This field is required.
- Organization Name—Enter the Organization name. The Organization name can be 1-40 characters. This field is required.
- Level 1 to Level 6 fields—These fields are optional. Enter from one to six organization unit names. These fields are related to each other. For example, you cannot enter a Level 2 organization unit name until you have entered a Level 1 organizational unit name.

5 Click the OK button. The DIB Prefix is added to the DSA DIB.

END OF STEPS

□

Modify a DIB Prefix

Purpose

Use this procedure to modify a DIB Prefix in the DSA T.1245 DIB for SDS.

You can modify the Organization Name or one to six Organization Unit fields. What you can modify depends on the DIB Prefix information selected for modification in the explorer portion of the DSA Manager window. For example, if you selected the Organization Name under a Country Code to modify on the DSA Manager window, you can change the Organization Name and Organization Unit fields on this window, but you cannot change the Country Code part of the DIB Prefix.

The window displays the current value(s) for the field(s) to be modified. Change the value(s) for the selected field(s) as needed.

Before you begin

Before you begin this task, be sure that there are no NEs registered under the existing DIB Prefix before you modify the prefix information.

Task

Complete the following steps to modify a DIB Prefix in the DSA's T1.245 Directory (DIB).

1 Access the DSA Manager window.

Reference:

"Add a DIB Prefix" (3-61)

2 In the explorer on the window, choose the Organization name or Oganization Unit of the DIB Prefix to be modified.

3 Click the Modify button.

Result:

The Modify a Prefix window is displayed with the prefix information for the current level.

4 Change the Organization name, and/or organizational unit values, as needed.

5 Click the OK button.

Result:

The changes to the DIB Prefix are made in the DSA's DIB.

END OF STEPS

□

Delete a DIB Prefix

Purpose Use this procedure to delete a DIB Prefix from the DSA DIB.

Before you begin Before you begin this task, be sure that there are no NEs or Oganizational units set up under the DIB prefix to be deleted.

Task Complete the following steps to delete a DIB Prefix from the DSA DIB.

1 Access the DSA Manager window.

Reference:

"Add a DIB Prefix" (3-61)

2 In the explorer on the window, choose the Organization name of the DIB Prefix to be deleted.

3 Click the Delete button.

Result:

The DIB Prefix is deleted from the DSA DIB.

END OF STEPS

□

Add an Network Element to the Directory Information Base (DIB)

Purpose Use this procedure to add an NE to the T1.245 DIB of a Navis™ Optical EMS-based DSA for the SONET Directory Services (SDS) feature.

Before you begin Before you begin this task, be sure that the DIB Prefix under which the NE will be contained in the T1.245 DIB has been created.

Task Complete the following steps to add an NE to the DSA's T1.245 DIB.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **DSA Management** from the Administration menu.

Result:

The DSA Manager window is displayed.

The DSA Manager window consists of an explorer, which allows you to view the current DIB Prefix(es), with the Prefix composite information, in the DSA DIB, the associated NEs under the DIB Prefix, and the application information for each NE.

There is also a text field and a Find button, to do a text string search in the explorer tree.

There are four action buttons to the right of the explorer on the window:

- Add Prefix
- Add NE
- Delete
- Modify

3 Click the Add NE button.

Result:

The Add a Network Element to the DIB window is displayed.

4 In the explorer portion of the window, click on the Country Code of the DIB Prefix for the NE. Expand the hierarchy under the selected Country Code until the Organizational Unit under which the NE will be stored is displayed.

5 Click on the Organizational Unit in the explorer to select it.

Result:

The selected Organizational Unit is selected. (The NE can be placed under the Organizational unit; this step is optional.)

6 Fill in the following fields, as needed:

- TID—This is the NE's TID. A TID can be 1-20 characters. This field is required.
- Vendor Name—This field is used to specify the NE's vendor. The default name used in this field is Lucent Technologies. This field is optional.
- NE Type—This field is used to specify the NE type. Click the down arrow next to the field to display a list of NE types and choose an NE type. This field is required.
- IP Address—This field is used to specify the IP address of the NE. The IP address is specified as four groups of 1-3 digit numbers. For octets less than 3 digits, leading zeros must be entered. Each set of numbers is 0-255, inclusive. This field is mandatory if the NE/WaveStar® NCC is serving as a transport bridge; it is optional for all other NE types.
- NSAP—This field is used to specify the NSAP (presentation) address of the NE, for SDS directory/message routing purposes. Refer to the "NSAP address entry" (3-68) section immediately following this procedure for information about NSAP address field widths and values.
  All of the NSAP address fields, except for the Reserved and SEL fields, are editable on this window.

- Application Information—This field is used to select the application service/message type used by the NE. Click the CMISE or TL1 radio button.
- FTAM—Click this box to place a check mark in it if the NE being added is a WaveStar® NCC or WaveStar® OLS 1.6T. This indicates that the File Transfer Access Method (FTAM) will be used for backups/restorals of NE memory and downloads of NE executable software. Otherwise, click in the box to remove the check mark, or leave it blank.

7 Click the OK button.

Result:

The NE is added to the DSA T1.245 DIB.

END OF STEPS

NSAP address entry

The following table lists the NSAP address fields, indicates field defaults, character widths, and which fields are editable in the GUI.

Field Name	Notes	NE(s)	Default	Octet Size	Editable?
AFI	Area Format Identifier.	All	0x39	1	Yes
IDI + pad	Initial Domain Part.	All	0x840 0xF	2	Yes
DFI	Domain Format Identifier. Specifies format for rest of address.	All	0x80	1	Yes
Operator ID		All	0x000000	3	Yes
Reserved	Currently not used. Reserved for future use.	All	0x0000	2	No

Field Name	Notes	NE(s)	Default	Octet Size	Editable?
Routing Domain	NSAP unique Routing Domain within an administrative domain.	WaveStar® NCC, WaveStar® BWM, WaveStar® OLS 1.6T	0x0000	2	Yes
Area	NSAP Area Identifier. Identifies NEs in the same area.	All	0x0000	2	Yes
System ID	System Identifier. This field is used to guarantee that NSAP address is globally unique.	All	no default	1	Yes
SEL	NSAP Selector. Used to differentiate multiple NSAP addresses associated with same End System.	All	0x1D*	1	No

Notes:

1. *The value of the SEL field is 1D hex when TP4 is run over CLNP.

The System ID field is not defaulted, but is mandatory.

All of the NSAP address fields, except for the Reserved and SEL fields, are editable on the Add a Network Element to the DIB window in the GUI.

□

Modify a Network Element in the Directory Information Base (DIB)

Purpose Use this procedure to modify an NE's information that is contained in the Navis™ Optical EMS-based DSA's T1.245 DIB.

Before you begin Before you begin this task, make sure that the NE to be modified has been added to the DSA's DIB.

Task Complete the following steps to modify an NE contained in the DIB.

1 Access the DSA Manager window.

Reference:

"Add a DIB Prefix" (3-61)

2 In the explorer portion of the window, expand the DIB Prefix to locate the NE to be modified.

3 Click on the TID of the NE to be modified in the explorer tree to select it.

Result:

The selected NE (TID) is highlighted.

4 Click the Modify button.

5 Modify the NE information, as needed.

Result:

The Modify a Network Element in the DIB window is displayed with the current NE information.

6 Click the OK button.

Result:

The changes are made to the NE information in the DSA's DIB.

END OF STEPS

Delete a Network Element from the Directory Information Base (DIB)

Purpose

Use this procedure to delete an NE from the Directory Services Agent (DSA) DIB.

When an NE is deleted from the DSA DIB, it still exists in the Navis™ Optical EMS database. When subnetwork discovery is triggered either by performing DNO on the DSA or automatically when the system performs a resynch, the database is updated with the change to the T1.245 DIB.

Before you begin

Before you begin this task, access the Map window.

Task

Complete the following steps to delete an NE from the DSA DIB.

1 Access the DSA Manager window.

Reference:

"Add a DIB Prefix" (3-61)

2 In the explorer portion of the window, select the DIB Prefix under which the NE to be deleted is contained and expand it until the NE is shown in the explorer tree.

3 Click on the TID of the NE to be deleted in the explorer portion of the window.

Result:

The TID is highlighted.

4 Click the Delete button.

Result:

The NE is deleted from the DSA DIB.

END OF STEPS

□

Reset a Network Element (for WaveStar® OLS 1.6T NEs)

Purpose Use this procedure to reset an WaveStar® OLS 1.6T NE. This is, in effect, a reboot of the communications session between the Navis™ Optical EMS and the NE.

Reset NE options You have the option of resetting:

- the entire NE
- the NE's Overhead System Controller
- a selected bay

Before you begin Before you begin this task, access the Map window.

Task Complete the following steps to reset an WaveStar® OLS 1.6T NE.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Network** from the Administration menu.

Result:

A sub-menu is displayed.

3 Select **Reset NE** from the displayed sub-menu.

Result:

The Choose an NE window is displayed.

4 Double-click on the NE in the list to select it.

5

TO...	DO THIS...
Reset the entire NE	Click the NE radio button

TO...	DO THIS...
Reset the NE's overhead system controller	Click the NE Overhead Controller radio button
Reset a selected bay	Click the NE Bay radio button, then click the down arrow for the field to the right of the radio button to display a drop-down list, and select the bay to be reset.

6 After making your reset selection, click the OK button.

Result:

A pop-up window is displayed, explaining that the reset process will cause a disruption of communications between the EMS and NE and is a lengthy process and asks if you want to continue with the reset.

7 Choose Yes to continue with the reset process or choose No to cancel the request.

END OF STEPS

□

Update System (for WaveStar® OLS 1.6T NEs)

Purpose Use this procedure to update the system on WaveStar® OLS 1.6T R2.0 (or later) NEs. This function causes all OTU In ports on the NE to be reset to the Auto State.

Before you begin Before you begin this task, access the Map window.

Task Complete the following steps to update the system on an WaveStar® OLS 1.6T NE.

1 Select an NE in the Map pane portion of the Map window.

OR

Select no NE at this point.

2 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

3 Select **Network** from the Administration menu.

Result:

A sub-menu is displayed.

4 Select **Update System** from the displayed sub-menu.

If you did not select an NE in step 1, the Choose an NE window is displayed. Double-click on the NE in the list and click the OK button.

A pop-up question dialog window is displayed, with the message: "This operation will cause all OTU In ports to reset to the Auto State. Are you sure you wish to continue?"

There are two buttons on the pop-up question dialog box: Yes and No.

5 Click the Yes button to perform the NE system update.

END OF STEPS

□

Display the Communication State of the Network Element

Purpose Use this procedure to obtain details about the current communication state of a specified set of NEs.

Description Navis™ Optical EMS can establish the following types of connections to NEs (see the following table):

Communication Type	Command Language	Protocol	Relationship to Gateway NE (GNE)
TL1/RT	TL1	X.25	connected through GNE
TCP/IP - RT	TL1	TCP/IP	connected through GNE
CMISE/OSI	CMIP	OSI	
CMISE/TCP	CMIP	OSI over TCP/IP	
TL1/TCP	CMIP	TCP/IP	
TL1/GNE	TL1	X.25	NE is a GNE
IP/GNE	TL1	TCP/IP	NE is a GNE

The NE Communications window consists of a table with six columns:

- NE - the display name for the given NE.
- Activated - whether the Navis™ Optical EMS software is configured to communicate with the given NE. The value 'Y' indicates that Navis™ Optical EMS will attempt to establish communication with the NE. The value 'N' indicates that the Navis™ Optical EMS will NOT attempt to establish communication with the NE. The user may request the Navis™ Optical EMS to change the state of this flag via the Activate/Deactivate/Reset buttons on the bottom of the window.
- Channel 1 - indicates whether Navis™ Optical EMS has successfully established a communication pathway to the NE through the first association
- Channel 2 - indicates whether the Navis™ Optical EMS has successfully established a communications pathway to the NE through the second association

- Channel 3 - indicates whether the Navis™ Optical EMS has successfully established a communications pathway to the NE through the third association
- CommType - indicates the type of communications connection between Navis™ Optical EMS and the NE.

Before you begin Before you begin this task, access the Map window.

Task Complete the following steps to obtain the communication status of an NE.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Communications** from the Administration menu.

Result:

A sub-menu is displayed.

3 Select **NE Communications** from the displayed sub-menu.

Result:

The Choose an NE/Aggregate window is displayed.

Check that the NE radio button is selected to display a list of only NEs.

4 Double-click on the NE in the Choose an NE list to select it.

5 Click the OK button.

Result:

The NE Communication window is displayed.

6

TO...	DO THIS...
Reset the connection between the Navis™ Optical EMS and the NE	Select the line of information about the NE in the window and click the Reset button.
Activate communications between Navis™ Optical EMS and the NE	Select the line of information about the NE in the window and click the Activate button.
Force termination of communication between Navis™ Optical EMS and prevent further communication attempts until the NE is reactivated	Click the Deactivate button.
Reactivate the NE	Select the NE and click the Activate button.

7 If you are finished with the display, click the Close button to close the window without performing any further operation.

END OF STEPS

□

Provision DCC Configuration

Purpose Use this procedure to provision the internal and external LAN port settings and protocol properties for the different management layers of the OSI stack for DCC channels on the selected NE's DCC circuit pack(s). The DCC channels are designated overhead bits on SONET/SDH optical ports. These overhead bits can be used by the customer (or NE) as low bandwidth communication channels to the remote NE that terminates the optical fiber. The DCC circuit pack in a shelf controls all DCC channels for fibers terminated by that shelf.

The various areas of the DCC configuration that can be provisioned are:

- LAN Management—The LAN interface provides a higher bandwidth communications path to the element management system. The LAN capability is contained within the Data Link layer of the OSI model. Functions that can be provisioned include enabling/disabling of the internal and external LAN interfaces of the DCC circuit pack in an I/O shelf. Parameters associated with this panel control the physical level properties of the DCC port.
- Network Layer—The Network Layer provides the means to transmit data across a network regardless of network type, topology, or services offered by the underlying network. The Connectionless Network Service (CLNS) and its corresponding Connectionless Network Protocol (CLNP). Parameters associated with NSAP and CLNP protocol provide the following services and functions at the Network Layer: Network Addresses, Quality of Service (QoS) parameters, Error Notification, Segmentation of messages, routing, and relaying of messages through intermediate systems. The Network Service Access Point (NSAP) Address is the access point where the Network Layer services are available to network service users.
- Transport Layer—The Transport level parameters provide the means to transmit data reliably between end NEs across a communications facility. The Transport Layer provides transparent transfer of data between the session entities.

- TCP/IP—The network layer provided for TCP/IP network is strictly a connectionless service. The IP only transfers datagrams on a best effort basis. The Internet Protocol (IP) address and routing information provide the functions necessary for delivering datagrams from a source to a destination over an interconnected system of networks.
- TARP—The TID Resolution Protocol (TARP) is used where there is a need to translate the TID of TL1 messages to the CLNP address (NSAP) of the NE. TARP allows NEs to translate between the TID and NSAP by automatically exchanging mapping information with other NEs.
- TARP Manual Adjacency—The TARP Manual Adjacency causes a TARP request to hop through an NE without TARP capability (like a generic router).

Before you begin

Before you begin this task, if you are performing a LAN reset using this procedure, the LAN interface on the DCC circuit pack must be enabled. Enabling and disabling of internal and external LAN interfaces can only be done on a DCC circuit pack on the I/O shelf, not the Main shelf or System Controller shelf.

Task

Complete the following steps to provision LAN port parameters and protocol properties of the DCC channels.

1 Select an NE on the Map window.

OR

Select no NE at this point.

2 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

3 Select **DCN Management** from the Configuration menu.

Result:

The DCN Management sub-menu is displayed.

4 Select **DCN Provisioning** from the DCN Management sub-menu.

If no NE was chosen in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The DCC Provisioning window for the selected NE is displayed.

5 In the Network Element explorer portion of the window, expand the equipment hierarchy by clicking on the plus (+) sign next to each component level until the desired DCC Controller (ADJCTL) circuit pack is displayed.

6 Select the DCC Controller circuit pack.

Result:

The Configure button at the bottom of the Network Element explorer portion of the window is enabled.

7 Click the Configure button.

Result:

The appropriate provisioning panels of the DCC Provisioning window are displayed:

- LAN Mgmt
- Network Layer
- Transport Layer
- TCP/IP
- TARP Provisioning
- TARP Maj (Manual Adjacency)

8 Click on the LAN Mgmt panel tab.

Result:

The LAN Mgmt provisioning window panel is displayed.

9

TO...	DO THIS...
Reset the LAN interface controller card	Click the RESET button next to the Reset LAN field. A pop-up warning dialog window is displayed, warning that resetting the LAN may cause loss of communication between the EMS or between the NE(s) and asks if you want to do it anyway. Choose Yes to reset the LAN or no to cancel the operation.**Important!** The Reset LAN option is not supported by all NEs
Provision other LAN properties	Skip this step. Go to Step 10.

10

TO...	DO THIS...
Enable the external LAN TARP Storm Suppression parameter	Click the down arrow next to the EXTERNAL LAN TARP Storm Suppression field to display a drop-down list and select Enabled.
Disable the external LAN TARP Storm Suppression parameter	Click the down arrow next to the EXTERNAL LAN TARP Storm Suppression field to display a drop-down list and select Disabled.

11

TO...	DO THIS...
Enable the internal LAN	Click the down arrow next to the INTERNAL LAN CHANNEL field to display a drop-down list and select Enabled.

TO...	DO THIS...
Disable the internal LAN	**CAUTION** *If the internal LAN is disabled, all external management communications with the NE may be lost.* **Click the down arrow next to the INTERNAL LAN CHANNEL field to display a drop-down list and select Disabled.**

12 Provision the other LAN parameters.

13 Click the Network Layer panel tab.

Result:

The Network Layer panel is displayed. This panel shows the current NSAP and the other Network Layer parameters:

- CLNP PDU LIFETIME HOPS (2-255) (This parameter is not applicable to WaveStar® OLS 1.6T NEs.)
- Intermediate System Configuration Timer

14 Provision the Network Layer parameters, as needed.

15 Click the Transport Layer panel tab.

Result:

The Transport Layer panel is displayed. The Transport Layer parameters are:

- Window Timer—the maximum time to wait before transmitting window information
- Transport Credit - PDUs—the maximum number of outstanding/unacknowledged transport of PDUs allowed

16 Provision the Trasnsport Layer parameters, as needed.

17 Click on the TCP/IP panel tab.

Result:

The TCP/IP panel is displayed. The TCP/IP parameters are:

- IP Address
- Default Router Address
- IP Subnet Mask

18 Provision the TCP/IP parameters, as needed.

19 Click the TARP Provisioning panel tab.

Result:

The TARP Provisioning panel is displayed.

20 Provision the TARP parameters, as needed.

21 Click the TARP MAJ (Manual Adjacency) panel tab.

Result:

The TARP MAJ panel is displayed.

22

TO...	DO THIS...
Modify the current adjacent NE	Click the select current existing manual adjacency radio button and click the down arrow to the right of this field to display a drop-down list. Select the NSAP address of the current adjacent NE. Click the Modify Adjacency button. Enter the NSAP address of the new adjacent NE in the Enter New Value for selected adjacency field.

TO...	DO THIS...
Delete the current adjacent NE	Click the select current existing manual adjacency radio button and click the down arrow to the right of this field to display a drop-down list. Select the NSAP address of the current adjacent NE. Click the Delete Adjacency button. Click the Apply button.Do not click Apply if you have not provisioned all DCC parameters for this window.

23 If you have provisioned all the DCC channel parameters, click the Apply button.

Result:

A pop-up dialog window is displayed, informing you that this action may cause loss of communication with the NE(s) and asks if you want to continue. Choose Yes to process the request or No to cancel the change.

24 Choose Yes to process the changes for the NE..

25 Click the Close button to close the window.

END OF STEPS

□

Provision DCC Terminations

Purpose

Use this procedure to provision parameters for the Section and Line termination points of the DCC optical ports. This function allows you to enable or disable the port as a DCC termination and define the LAPD role as User Side (the default) or Network Side.

Enabling the DCC Termination function on a DCC circuit pack optical port manually associates it with a DCC channel and that DCC channel becomes active.

Disabling the DCC Termination function on a DCC circuit pack optical port removes the DCC channel association.

The LAPD role of an existing and active DCC channel can be modified.

Before you begin

Before you begin this task, be aware that disabling the DCC port may result in loss of communications with the NE(s).

Task

Complete the following step to provision parameters for the Section and Line termination points of the DCC optical ports..

1 Select an NE on the Map window.

OR

Select no NE at this point.

2 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

3 Select **DCN Management** from the Configuration menu.

Result:

The DCN Management sub-menu is displayed.

4 Select **DCC Provisioning** from the DCN Management sub-menu.

If no NE was chosen in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The DCC Terminations window for the selected NE is displayed.

5 In the Network Element explorer portion of the window, expand the equipment hierarchy by clicking on the plus (+) sign next to each component level until the desired DCC Controller (ADJCTL) circuit pack is displayed.

6 Select the DCC Controller circuit pack.

Result:

The Configure button at the bottom of the Network Element explorer portion of the window is enabled.

7 Click the Configure button.

Result:

The provisioning panels of the DCC Terminations window are displayed:

- Line
- Section

The Line panel is displayed initially.

8 Select a port AID by clicking the down arrow next to the Port AID field to display a drop-down list and select the AID of the port.

9

TO...	DO THIS...
Enable the DCC termination for the port	Click the down arrow to the right of the DCC Termination Status field, under the Chosen Values label to display a drop-down list and select Enabled.
Disable the DCC termination for the port	Click the down arrow next to the DCC Terminiation Status field, under the Chosen Values label to display a drop-down list and select Disabled.

10

TO...	DO THIS...
Change the LAPD role of the port	Click the down arrow to the right of the LAPD Role, under the Chosen Values label to display a drop-down list and select either User Side or Network Side (User Side is the default).

11 Click on the Line panel tab.

Result:

The Line panel of the window is displayed.

12 Select a port AID by clicking the down arrow next to the Port AID field to display a drop-down list and select the AID of the port.

13

TO...	DO THIS...
Enable the DCC termination for the port	Click the down arrow to the right of the DCC Terminations field, under the Chosen Values label to display a drop-down list and select Enabled.

TO...	DO THIS...
Disable the DCC termination for the port	Click the down arrow next to the DCC Terminations field, under the Chosen Values label to display a drop-down list and select Disabled.

14

TO...	DO THIS...
Change the LAPD role of the port	Click the down arrow to the right of the LAPD Role, under the Chosen Values label to display a drop-down list and select either User Side or Network Side (User Side is the default).

15 After provisioning the desired port parameters, click the Apply button.

Result:

A pop-up question dialog window is displayed, advising you that the requested parameter changes may reset the NE or cause loss of communication to the NE(s) and asks if you want to proceed.

16 Choose Yes to initiate the parameter changes in the DCC optical ports.

17 Click the Close button to close the window.

END OF STEPS

□

View DCC Terminations

Purpose Use this procedure to view details about the optical ports provisioned as DCC termination points. The result of this procedure is a window displaying a table that can contain the following data:

- The port AID
- The port type—working or protection
- The DCC channel type—line or section
- The protection type
- The operational status of the DCC channel
- The LAPD role—Network side or User side
- Access state

The NE type determines the columns of data that are displayed. The rows in the table refer to the related DCC optical ports.

Some NEs display information on all ports. Other NEs only display information on enabled DCC ports.

Related task See "Provision DCC Terminations" (3-86).

Task Complete the following steps to view details about the optical ports provisioned as DCC termination points.

1 Select an NE on the Map window.

OR

Select no NE at this point.

2 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

3 Select **DCN Management** from the Administration menu.

Result:

The DCN Management sub-menu is displayed.

4 Select **DCC Provisioning** from the Network sub-menu.

If no NE was chosen in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The DCC Terminations window for the selected NE is displayed.

5 In the Network Element explorer portion of the window, expand the equipment hierarchy by clicking on the plus (+) sign next to each component level until the desired DCC Controller (ADJCTL) circuit pack is displayed.

6 Select the DCC Controller circuit pack.

Result:

The Configure button at the bottom of the Network Element explorer portion of the window is enabled.

7 Click the View button.

Result:

The View DCC Terminations window panel is displayed. This panel shows in table row format, for each optical port provisioned as a DCC termination point:

- The port AID
- The port type—working or protection
- The DCC channel type—line or section
- The protection type
- The operational status of the DCC channel
- The LAPD role—Network side or User side
- The DCC pack—DCC circuit pack AID

8 Click the Close button to close the window.

END OF STEPS

□

Provision an IP Gateway Network Element (for IP Tunneling)

Purpose

Use this procedure to provision an IP Gateway for IP tunneling. The IP Gateway NE:

- creates and hold entries in the TCP/IP subnetwork application context map. This map lists the IP addresses or host names of operations systems (OSs) and maps them to an OS application service/context (such as TL1 MAINTENANCE, TL1 MEMORY ADMINISTRATION) and allows these OS application services to be forwarded over a TCP/IP LAN connection through the IP Gateway NE to the OSI network of NEs to IP-connected managed devices in an IP subnetwork.
- To support the above function, the IP Gateway NE function is enabled on the selected IP Gateway NE, to allow pure TCP/IP to OSI conversion.

The IP Gateway NE has an IP router entity with an additional port configured on the IP router entity (set up on the DCC controller circuit pack) to add the tunneling capability. In effect, the OSI subnetwork is provisioned with IP routing tables and set up to function as an IP subnetwork.

Before you begin

Before you begin this task, make sure that the selected NE has a Dual Stack configuration (can handle OSI and TCP/IP traffic) and has the IP Tunneling capability enabled.

This function can be accessed by any user with an administrative or privileged login.

Task

Complete the following steps to select and provision the IP Gateway NE.

1 Select an NE on the Map window.

OR

Select no NE at this point.

2 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

3 Select **DCN Management** from the Configuration menu.

Result:

The DCN Management sub-menu is displayed.

4 Select **IP Gateway/Tunneling** from the Network sub-menu.

If no NE was chosen in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The IP Gateway/Tunneling window for the selected NE is displayed.

5 In the Network Element explorer portion of the window, expand the equipment hierarchy by clicking on the plus (+) sign next to each component level until the desired DCC Controller (ADJCTL) circuit pack is displayed.

6 Select the DCC Controller circuit pack.

Result:

The Provision button at the bottom of the Network Element explorer portion of the window is enabled.

7 Click the Provision button.

Result:

The two provisioning panels of the IP Gateway/Tunneling window are displayed:

- IP Tunneling
- IP Gateway

8 Click on the IP Gateway panel tab.

Result:

The IP Gateway provisioning window panel is displayed.

The IP Gateway provisioning window panel is divided into two provisioning sections:

- IP Parameters—this consists of a display area showing the current OS IP host addresses and Application Context IDs in the OS Application Context Map, with two functional buttons which allow you to add and delete entries in the Application Context Map. There are also two radio buttons for enabling or disabling the IP Gateway functionality on the selected NE.
- Tap Properties—this is the area for entering the TT-TD port numbers for allowing IP tunneling of encapsulated IP packets to IP-connected managed devices via the OSI network. You can enter a separate port number to access by each coding method: Length Value Encoding, Raw Encoding, Telnet Encoding.

9

TO...	DO THIS...
Add an entry to the TCP/IP subnetwork Application Context Map	Click the Add button next to the Application Context Map display. A secondary Add an IP window is displayed. Enter the OS host's IP address and Application Context ID (examples are TL1 MAINTENANCE and TL1 MEMORY ADMINISTRATION). Click the Apply button to apply your entries and leave the window open or click the OK button to apply your entries and close the window.
Delete an entry in the TCP/IP subnetwork Application Context Map	Select a line entry in the display area showing current IP entries/Application Context IDs and click the Delete button to the right of the display area. The selected entry is deleted.

10

TO...	CLICK...
Enable the IP Gateway function for the selected NE	The Enabled radio button to the right of the TCP/IP Gateway label.
Disable the IP Gateway function for the selected NE	The Disabled radio button to the right of the TCP/IP Gateway label.

11

TO...	DO THIS...
Enter the T-TD LENGTH VALUE PORT	Enter the port number in the T-TD Length Value Port field.
Enter the T-TD RAW PORT	Enter the port number in the T-TD Raw Port field.
Enter the T-TD Telnet Port	Enter the port number in the T-TD Telnet Port field. **Important!** Click the Retrieve button to retrieve previously stored values for each field.

12 Click the Apply button to apply your selections.

Result:

The IP Gateway NE is provisioned for IP tunneling.

END OF STEPS

□

Provision IP Tunnel Parameters

Purpose Use this procedure to set the tunnel-related parameters for each NE associated with the IP tunnel. This function allows you to enable or disable whether the selected NE has the IP tunneling feature enabled and selection of Tunnel Automated Provisioning (TAP) properties for the participating NEs.

Before you begin Before you begin this task, make sure that the selected NE has a Dual Stack configuration (can handle OSI and TCP/IP traffic).

This function can be accessed by any user with an administrative or privileged login.

Task Complete the following steps to provision IP tunnel parameters for an NE.

1 Select an NE on the Map window.

OR

Select no NE at this point.

2 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

3 Select **DCN Management** from the Configuration menu.

Result:

The DCN Management sub-menu is displayed.

4 Select **IP Gateway/Tunneling** from the DCN Management sub-menu.

If no NE was chosen in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The IP Gateway/Tunneling window for the selected NE is displayed.

5 In the Network Element explorer portion of the window, expand the equipment hierarchy by clicking on the plus (+) sign next to each component level until the desired DCC Controller (ADJCTL) circuit pack is displayed.

6 Select the DCC Controller circuit pack.

Result:

The Provision button at the bottom of the Network Element explorer portion of the window is enabled.

7 Click the Provision button.

Result:

The two provisioning panels of the IP Gateway/Tunneling window are displayed:

- IP Tunneling
- IP Gateway

8 Click on the IP Tunneling panel tab.

Result:

The IP Tunneling provisioning window panel is displayed.

9 Click the Edit button in the IP Parameters portion of the window panel.

Result:

A secondary IP Tunnel Provisioning parameters window is displayed.

This window is divided into two main parts:

- IP Parameters
- Tap Properties

10

TO...	CLICK...
Enable IP Tunneling for the selected NE	The Enabled radio button to the right of the IP Tunnel Status label.
Disable the IP Gateway function for the selected NE	The Disabled radio button to the right of the IP Tunnel Status label.

11

TO...	DO THIS...
Advertise the IP routing table information to other Dual Stack with Tunneling (DSwT) NEs to insert into their own IP route tables	Click the Enabled radio button to the right of the Tap Advertise label.
Disallow advertising of the IP routing table information	Click the Disabled radio button to the right of the Tap Advertise label.

12

TO...	DO THIS...
Enable learning of the IP routing table information by the selected NE	Click the Enabled radio button to the right of the Tap Learn label.
Disable learning of the IP routing table information by the selected NE	Click the Disabled radio button to the right of the Tap Learn label.

13

TO...	DO THIS...
Enter the TAP group to which the NE belongs	Enter the TAP group information in the Tap Group field.

14 Click the Apply button to apply your selections and leave the window open or click the OK button to apply your selections and close the window.

Result:

The IP tunnel parameters for the selected NE are provisioned.

END OF STEPS

□

Manually Provision IP Tunnel Routes

Purpose

Use this procedure to manually provision IP routing table entries for IP tunneling. The IP router entity in Dual Stack with Tunneling (DSwT) NEs can be manually updated with routing data about IP-connected NEs at the edge of an OSI subnetwork of NEs involved in IP tunneling. Manual IP tunnel routes can be defined to link DSwT NEs in different OSI areas or within the same OSI area. Through the Tunnel Automated Provisioning (TAP) feature, these manually defined IP routes and parameters can be advertised to the other DSwT NEs involved in delivering encapsulated IP data across the OSI subnetwork to IP-connected NEs.

This IP routing table data includes:

- The TID of the destination NE where the tunnel route ends
- the IP address and subnetwork mask (read-only) of the destination NE
- the IP tunnel status of the NE (enabled or disabled)
- the TID of the next hop NE
- the type of subnetwork between the originating NE and the next hop NE (LAN/IP or CLNP/OSI)
- the address of the destination NE (either IP address for LAN connected NEs or NSAP address for OSI/CLNP NEs)
- option to advertise the manually defined route to all NEs in the IP tunnel
- the TAP cost value

Before you begin

Before you begin this task, make sure that the selected NE has a Dual Stack configuration (can handle OSI and TCP/IP traffic).

This function can only be accessed by the Navis™ Optical EMS administrator.

Task

Complete the following steps to manually provision IP tunnel routing entries.

1 Select an NE on the Map window.

OR

Select no NE at this point.

2 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

3 Select **DCN Management** from the Configuration menu.

Result:

The DCN Management sub-menu is displayed.

4 Select **IP Gateway/Tunneling** from the DCN Management sub-menu.

If no NE was chosen in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The IP Gateway/Tunneling window for the selected NE is displayed.

5 In the Network Element explorer portion of the window, expand the equipment hierarchy by clicking on the plus (+) sign next to each component level until the desired DCC Controller (ADJCTL) circuit pack is displayed.

6 Select the DCC Controller circuit pack.

Result:

The Provision button at the bottom of the Network Element explorer portion of the window is enabled.

7 Click the Provision button.

Result:

The two provisioning panels of the IP Gateway/Tunneling window are displayed:

- IP Tunneling
- IP Gateway

8 Click on the IP Tunneling panel tab.

Result:

The IP Tunneling provisioning window panel is displayed.

The bottom portion of this window panel has a display section that shows current IP route entries. Each line in this display is a separate entry. Each IP route entry shows:

- The TID of the destination NE
- The subnetwork mask of the destination NE
- The IP address or NSAP address of the next hop NE
- The owner NE of this IP routing table data
- the TAP advertise status of the IP table routing entry
- the TAP cost of the IP route

9 Click on the Add button below the display section showing the IP route entries.

Result:

The IP Tunnel Manual Route Provisioning window is displayed.

There are two main sections of the window:

- Destination NE
- Next Hop NE

10 Select the destination NE of the route. To select the destination NE, click the Choose TID button next to the TID field in the Destination NE section.

Result:

The Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button. The system returns to the IP Tunnel Manual Route Provisioning window. The TID of the selected NE appears in the TID field.

11 Enter the remaining information about the destination NE, including the IP address, subnetwork mask, and IP Tunnel Status. Click the Enabled button to enable IP tunneling for the destination NE.

12 Select the next hop NE (the intermediate NE between the originating NE and th destination NE in the route). To select the next hop NE, click the Choose TID button next to the TID field in the Next Hop NE section.

Result:

The Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button. The system returns to the IP Tunnel Manual Route Provisioning window. The TID of the selected NE appears in the TID field.

13 Choose the Subnetwork Type of the next hop NE, LAN or CLNP-Tunnel, by clicking the appropriate radio button.

14

IF...	THEN...
The subnetwork type of the next hop NE is LAN	Enter the IP address of the next hop NE.
The subnetwork type of the next hope NE is CLNP-Tunnel	Enter the NSAP address of the next hop NE.

15 To advertise this IP routing table entry, click the Advertise checkbox to place a check in it.

16 Enter the Tap cost information in the Tap Cost field (if applicable).

17 After entering all of the IP tunnel routing data, click the OK button.

Result:

The system returns to the IP Tunneling window panel. The newly created IP tunnel route entry is displayed in the information display portion of the window.

END OF STEPS

□

Modify IP Tunnel Route Entries

Purpose Use this procedure to modify the fields of any IP tunnel route entry manually provisioned through the IP Tunnel Manual Route Provisioning window.

The following fields in an IP tunnel route can be modified:

- The destination NE (TID, subnetwork mask)
- The IP tunnel status of the destination NE (enabled, disabled)
- The TID of the next hop NE
- The subnetwork type of the next hop NE
- The IP address or NSAP address of the next hop NE
- The TAP advertise status of this IP tunnel route entry
- the TAP cost of the IP route

Related task See "Manually Provision IP Tunnel Routes" (3-100).

Task Complete the following steps to modify an IP Tunnel route entry.

1 Select an NE on the Map window.

OR

Select no NE at this point.

2 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

3 Select **DCN Management** from the Configuration menu.

Result:

The DCN Management sub-menu is displayed.

4 Select **IP Gateway/Tunneling** from the DCN Management sub-menu.

If no NE was chosen in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The IP Tunneling window for the selected NE is displayed.

5 In the Network Element explorer portion of the window, expand the equipment hierarchy by clicking on the plus (+) sign next to each component level until the desired DCC Controller (ADJCTL) circuit pack is displayed.

6 Select the DCC Controller circuit pack.

Result:

The Provision button at the bottom of the Network Element explorer portion of the window is enabled.

7 Click the Provision button.

Result:

The two provisioning panels of the IP Gateway/Tunneling window are displayed:

- IP Tunneling
- IP Gateway

8 Click on the IP Tunneling panel tab.

Result:

Result: The IP Tunneling provisioning window panel is displayed.

The bottom portion of this window panel has a display section that shows current IP route entries. Each line in this display is a separate entry.

Each IP route entry shows:

- The TID of the destination NE
- The subnetwork mask of the destination NE

- The IP address of NSAP address of the next hop NE
- The owner NE of this IP routing table data
- the TAP advertise status of the IP table routing entry
- the TAP cost of the IP route

9 Select an IP tunnel route entry in the display section by clicking on it.

Result:

The selected IP tunnel route entry is highlighted and the Edit and Delete buttons below the display section are enabled.

10 Click the Edit button below the display section.

Result:

The IP Tunneling Manual Route Provisioning window is displayed with the current IP tunnel route field entries.

11 Change the editable fields, as needed.

12 After making the necessary changes, click the OK button.

Result:

The system returns to the IP Tunneling window panel. The modified IP route entry is displayed in the display section of the window.

END OF STEPS

□

Delete an IP Tunnel Route Entry

Purpose Use this procedure to delete an IP tunnel route entry manually provisioned through the IP Tunnel Manual Route Provisioning window.

Before you begin Before you begin this task, be aware that this function can be accessed by any user with an administrative or privileged login.

Task Complete the following steps to delete an IP tunnel route entry.

1 Select an NE on the Map window.

OR

Select no NE at this point.

2 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

3 Select **DCN Management** from the Configuration menu.

Result:

The DCN Management sub-menu.

4 Select **IP Gateway/Tunneling** from the DCN Management sub-menu.

If no NE was chosen in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The IP Tunneling window for the selected NE is displayed.

5 In the Network Element explorer portion of the window, expand the equipment hierarchy by clicking on the plus (+) sign next to each component level until the desired DCC Controller (ADJCTL) circuit pack is displayed.

6 Select the DCC Controller circuit pack.

Result:

The Provision button at the bottom of the Network Element explorer portion of the window is enabled.

7 Click the Provision button.

Result:

The two provisioning panels of the IP Gateway/Tunneling window are displayed:

- IP Tunneling
- IP Gateway

8 Click on the IP Tunneling panel tab.

Result:

Result: The IP Tunneling provisioning window panel is displayed.

The bottom portion of this window panel has a display section that shows current IP route entries. Each line in this display is a separate entry.

Each IP route entry shows:

- The TID of the destination NE
- The subnetwork mask of the destination NE
- The IP address of NSAP address of the next hop NE
- The owner NE of this IP routing table data
- the TAP advertise status of the IP table routing entry
- the TAP cost of the IP route

9 Select an IP tunnel route entry in the display section by clicking on it.

Result:

The selected IP tunnel route entry is highlighted and the Edit and Delete buttons below the display section are enabled.

10 Click the Delete button below the display section.

Result:

A pop-up question dialog window is displayed, asking if you are sure that you want to delete the selected IP tunnel route.

11 Choose Yes.

Result:

The system returns to the IP Tunneling provisioning window panel. The display section of the window shows that the selected IP tunnel route entry has been deleted.

END OF STEPS

□

Provision a Virtual Switch

Purpose

Use this procedure to provision a virtual switch. A virtual switch defines the LAN/WAN usage of the subnetwork for Ethernet traffic.

In NEs that contain Ethernet circuit packs (Gigabit Ethernet or Fast Ethernet), such as the Metropolis™ DMX and Metropolis™ DMX***press***, a virtual switch is used to partition (logically group) the Ethernet ports on a circuit pack so that there is connectivity only between ports within a virtual switch and no connectivity between ports in different virtual switches.

Ethernet circuit packs have two types of ports: Ethernet (LAN) ports (EPORTS) and Virtual Concatenation Groups (VCGs), which are used in combination to receive and transport Ethernet data packets across the SONET/SDH data network.

EPORTS and VCGs can only be in one virtual switch.

A VCG must be assigned to a virtual switch before it can be assigned to a Virtual LAN ID (VLAN), Spanning Tree Group, or Port Tag.

An EPORT must be assigned to a virtual switch before it can be assigned to a VLAN or Port Tag.

In SONET/SDH data transport, an Ethernet data frame is received by an EPORT as the NE's interface to the data network. A VLAN (IEE802.1q tagging mode) or Port Tag (Transparent tagging mode) is a tag embedded in the data frame that provides routing information about which VCGs can accept this data and transport it via cross-connections through the SONET/SDH network.

Before you begin

Before you begin this task, be aware that this function only supports NEs with Ethernet circuit packs.

Related information

For related information, see the following:

- "Provision an Ethernet Connection (IEEE.1Q Tagging Mode)" (3-125)
- "Add a Spanning Tree Group" (3-132)

Task Complete the following steps to provision a virtual switch.

1 Select an NE on the Map window.

OR

Select no NE at this point.

2 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

3 Select **Connection Management** from the Configuration menu.

Result:

The Connection Management sub-menu is displayed.

4 Select **Ethernet Virtual Switch Provisioning** from the Connection Management sub-menu.

If no NE was chosen in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The Virtual Switch Provisioning window for the selected NE is displayed.

The left portion of the Virtual Switch Provisioning window is a Network Element Explorer, which allows you to expand the equipment hierarchy and select the equipment component, down to the circuit pack level.

The right portion of the window has the virtual switch functions for assignment of EPORTS or VCGs to the selected virtual switch.

The right portion of the window has a scroll list that shows a list of virtual switch IDs. There is also a series of buttons:

- Create
- Modify

- Delete
- View

5 In the Network Element explorer portion of the window, expand the equipment hierarchy by clicking on the plus (+) sign next to each component level until the desired Ethernet circuit pack is displayed.

6 Select the circuit pack in the Explorer and click the Provision button at the bottom of the Explorer.

Result:

The AID of the selected circuit pack is displayed in the AID field at the top of the window.

7 Click the Create button at the ***top*** portion of the window.

Result:

The entry fields in the Create Virtual Switch portion of the window are enabled.

8 Enter a virtual switch ID for the new virtual switch in the Virtual Switch ID field. Valid values are 1-4095.

9

TO...	DO THIS...
Assign VCGs to the virtual switch	Click the down arrow next to the Port Type field to display a drop-down list and select **VCG**

TO...	DO THIS...
Assign EPORTs to the virtual switch	Click the down arrow next to the Port Type field to display a drop-down list and select **EPORT** **Result:** If **VCG** is selected, the bottom portion of the window shows a list of VCGs available for assignment. If **EPORT** is selected, the bottom portion of the window shows a list of EPORTs available for assignment.

10

IF...	THEN...
If **VCG** is selected and a list of VCGs Available for assignment is displayed	Move the VCG(s) from the VCGs Available List to the VCGs in VS list, using the arrow push buttons.**Important!** To select more than item in the Available list, position the mouse cursor over each item while clicking the left mouse button and pressing the Shift key on the keyboard.
If **EPORT** is select and a list of EPORTs Available for assignment is displayed	Move the EPORT(s) from the EPORTs Available List to the EPORTs in VS list, using the arrow push buttons.**Important!** To remove your selection(s) and start over, click the Refresh button.

11 After making your selections for the new virtual switch, click the Create button.

Result:

A question dialog box is displayed, asking if you want to proceed with creation of the virtual switch.

12 Choose Yes.

Result:

A request is sent to the NE to add the newly created virtual switch.

If the request is successfully completed, the bottom portion of the window shows information about the newly created virtual switch.

13 Click the Close button to close the window.

END OF STEPS

□

Modify a Virtual Switch

Purpose

Use this procedure to modify a virtual switch. The VCGs and/or EPORTs assigned to a virtual switch can be changed.

Before you begin

Before you begin this task, be aware that this function only supports NEs with Ethernet circuit packs.

Be aware that when an EPORT or VCG is deleted from a virtual switch, all VLAN information associated with the EPORT/VCG is removed. If the EPORT/VCG are the only member pair of the VLAN, the VLAN is also deleted.

If a VCG is deleted from a virtual switch, all VCG-level spanning tree parameters are reset to their default values and the VCG is deleted from the spanning tree group. The affected spanning tree automatically reconfigures its pathways across the network. If that VCG is the only member of the spanning tree, the spanning tree group is also deleted.

Related information

For related information, see the following:

- "Provision a Virtual Switch" (3-110)

Task

Complete the following steps to modify a virtual switch.

1 Select an NE on the Map window.

OR

Select no NE at this point.

2 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

3 Select **Connection Management** from the Configuration menu.

Result:

The Connection Management sub-menu is displayed.

4 Select **Ethernet Virtual Switch Provisioning** from the Connection Management sub-menu.

If no NE was chosen in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The Virtual Switch Provisioning window for the selected NE is displayed.

The left portion of the Virtual Switch Provisioning window is a Network Element Explorer, which allows you to expand the equipment hierarchy and select the equipment component, down to the circuit pack level.

The right portion of the window has the virtual switch functions for assignment of EPORTS or VCGs to the selected virtual switch.

The right portion of the window has a scroll list that shows a list of virtual switch IDs. There is also a series of buttons:

- Create
- Modify
- Delete
- View

5 In the Network Element explorer portion of the window, expand the equipment hierarchy by clicking on the plus (+) sign next to each component level until the desired Ethernet circuit pack is displayed.

6 Select the circuit pack in the Explorer and click the Provision button at the bottom of the Explorer.

Result:

The AID of the selected circuit pack is displayed in the AID field at the top of the window.

7 Select the virtual switch ID to be modified from the Virtual Switches scroll list at the top of the window.

8 Click the Modify button at the ***top*** portion of the window.

9

TO...	DO THIS...
Modify VCGs in the virtual switch	Click the down arrow next to the Port Type field to display a drop-down list and select **VCG**
Modify EPORTs in the virtual switch	Click the down arrow next to the Port Type field to display a drop-down list and select **EPORT** **Result:** If **VCG** is selected, the bottom portion of the window shows a list of VCGs currently in the virtual switch. If **EPORT** is selected, the bottom portion of the window shows a list of EPORTs currently in the virtual switch.

10

IF...	THEN...
If **VCG** is selected and a list of VCGs Available for assignment is displayed	Move the VCG(s) from the VCGs Available List to the VCGs in VS list, using the arrow push buttons.**Important!** To select more than item in the Available list, position the mouse cursor over each item while clicking the left mouse button and pressing the Shift key on the keyboard.
If **EPORT** is select and a list of EPORTs Available for assignment is displayed	Move the EPORT(s) from the EPORTs Available List to the EPORTs in VS list, using the arrow push buttons.**Important!** To remove your selection(s) and start over, click the Refresh button.

11 After making your changes in the virtual switch, click the Modify button at the ***bottom*** of the window.

Result:

A question dialog box is displayed, asking if you want to proceed with modification of the virtual switch.

12 Choose Yes.

Result:

A request is sent to the NE to modify the virtual switch.

If the request is successfully completed, the bottom portion of the window shows the updated information about the virtual switch.

13 Click the Close button to close the window.

END OF STEPS

□

Delete a Virtual Switch

Purpose

Use this procedure to delete a virtual switch. The VCGs and/or EPORTs assigned to a virtual switch can be changed.

Before you begin

Before you begin this task, be aware that this function only supports NEs with Ethernet circuit packs.

Be aware that when a virtual switch is deleted, all VLAN parameters for all ports (EPORTs and VCGs) associated with the virtual switch are deleted (which, in turn, deletes all associated VLANs and spanning tree groups).

Related information

For related information, see the following:

- "Provision a Virtual Switch" (3-110)

Task

Complete the following steps to delete a virtual switch.

1 Select an NE on the Map window.

OR

Select no NE at this point.

2 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

3 Select **Connection Management** from the Configuration menu.

Result:

The Connection Management sub-menu is displayed.

4 Select **Ethernet Virtual Switch Provisioning** from the Connection Management sub-menu.

If no NE was chosen in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The Virtual Switch Provisioning window for the selected NE is displayed.

The left portion of the Virtual Switch Provisioning window is a Network Element Explorer, which allows you to expand the equipment hierarchy and select the equipment component, down to the circuit pack level.

The right portion of the window has the virtual switch functions for assignment of EPORTS or VCGs to the selected virtual switch.

The right portion of the window has a scroll list that shows a list of virtual switch IDs. There is also a series of buttons:

- Create
- Modify
- Delete
- View

5 In the Network Element explorer portion of the window, expand the equipment hierarchy by clicking on the plus (+) sign next to each component level until the desired Ethernet circuit pack is displayed.

6 Select the circuit pack in the Explorer and click the Provison button at the bottom of the Explorer.

Result:

The AID of the selected circuit pack is displayed in the AID field at the top of the window.

7 Select the virtual switch ID to be deleted from the Virtual Switches scroll list at the top of the window.

8 Click the Delete button at the ***top*** portion of the window.

Result:

Information about the virtual switch to be deleted, including the VLANs/Port Tags assignments of the VCGs/EPORTs in the virtual switch and spanning tree group associations of the VCGs.

9 Click the Delete button at the ***bottom*** of the window.

Result:

The request to delete the virtual switch is sent to the NE. A status message is displayed indicating the success or failure of the deletion.

10 Click the Close button to close the window.

END OF STEPS

□

View Virtual Switch Details

Purpose

Use this procedure to view information about a selected virtual switch.

Details shown about the virtual switch are:

- The VLANs/Port Tags assignments of the VCGs/EPORTs in the virtual switch
- Spanning tree group assignments of the VCGs in the virtual switch
- VCGs in the virtual switch
- EPORTs in the virtual switch

Before you begin

Before you begin this task, be aware that this function only supports NEs with Ethernet circuit packs.

Related information

For related information, see the following:

- "Provision a Virtual Switch" (3-110)
- "Provision an Ethernet Connection (IEEE.1Q Tagging Mode)" (3-125)
- "Add a Spanning Tree Group" (3-132)

Task

Complete the following steps to modify a virtual switch.

1 Select an NE on the Map window.

OR

Select no NE at this point.

2 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

3 Select **Connection Management** from the Configuration menu.

Result:

The Connection Management sub-menu is displayed.

4 Select **Ethernet Virtual Switch Provisioning** from the Connection Management sub-menu.

If no NE was chosen in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The Virtual Switch Provisioning window for the selected NE is displayed.

The left portion of the Virtual Switch Provisioning window is a Network Element Explorer, which allows you to expand the equipment hierarchy and select the equipment component, down to the circuit pack level.

The right portion of the window has the virtual switch functions for assignment of EPORTS or VCGs to the selected virtual switch.

The right portion of the window has a scroll list that shows a list of virtual switch IDs. There is also a series of buttons:

- Create
- Modify
- Delete
- View

5 In the Network Element explorer portion of the window, expand the equipment hierarchy by clicking on the plus (+) sign next to each component level until the desired Ethernet circuit pack is displayed.

Result:

The AID of the selected circuit pack is displayed in the AID field at the top of the window.

6 Select the circuit pack of the virtual switch in the Explorer and click the Provision button at the bottom of the Explorer.

7 Select the virtual switch ID to be viewed from the Virtual Switches scroll list at the top of the window.

8 Click the View button at the ***top*** portion of the window.

Result:

The details about the selected virtual switch are displayed in the View Virtual Switch portion of the window.

9 Click the Close button to close the window.

END OF STEPS

□

Provision an Ethernet Connection (IEEE.1Q Tagging Mode)

Purpose

The Ethernet Connection Provisioning window is used to associate an Ethernet port (EPORT) or Virtual Concatenation Group (VCG) with the appropriate addressing/routing data information "tag" to determine the path of each Ethernet data frame through the network.

The version of the provisioning panel displayed in the right portion of the Ethernet Connection Provisioning window depends on the Tagging Mode that is set for the selected Ethernet circuit pack.

If the Tagging Mode is IEEE.1Q, the provisioning panel displayed in the right portion of the window allows you to assign one or more Virtual LAN IDs (VLANs) to the EPORT or VCG selected in the explorer portion of the window.

If the Tagging Mode is Transparent, the provisioning panel displayed in the right portion of the window allows you to select the Port Tag(s) for the EPORT or VCG selected in the explorer portion of the window.

Use this procedure to associate an Ethernet port with one or more VLANs (IEEE.1Q Tagging Mode).

Before you begin

Before you begin this task, be aware that this function only supports NEs with Ethernet circuit packs.

Task

Complete the following steps to associate an EPORT or VCG with one or more VLANs (IEEE.1Q Tagging Mode).

1 Select an NE on the Map window.

OR

Select no NE at this point.

2 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

3 Select **Connection Management** from the Configuration menu.

Result:

The Connection Managment sub-menu is displayed.

4 Select **Ethernet Connection Provisioning** from the Network sub-menu.

If no NE was chosen in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The VLAN Provisioning window for the selected NE is displayed.

An alternate method to access this window is to position the mouse cursor over the NE on the Map pane or subnetwork explorer portion of the Map window, click the right mouse button to display a pop-up menu, select **Connection Managment** from the pop-up menu, and then select **Ethernet Connection Provisioning**.

The left portion of the VLAN Provisioning window is a Network Element Explorer, which allows you to expand the equipment hierarchy and select the equipment component, down to the port level or VCG level.

The right portion of the window has the VLAN Provisioning functions for assignment of one or more VLANs to the selected Ethernet port. The current VLAN assignments for the port/VCG are shown in the Assigned VLAN display part of the window.

5 In the Network Element explorer portion of the window, expand the equipment hierarchy by clicking on the plus (+) sign next to each component level until the desired Ethernet port or VCG is displayed.

6 Select the desired Ethernet port or VCG.

Result:

The Provisioning button at the bottom of the Network Element Explorer portion of the window is enabled.

7 Click the Provision button.

Result:

The AID of the selected Ethernet port/VCG is displayed in the AID field of the VLAN Provisioning portion of the window. If a port alias exists in the Navis™ Optical EMS for the selected port, it is displayed in the Alias field in the VLAN Provisioning portion of the window.

The current VLAN assignments for the selected port/VCG are displayed in the Assigned VLAN portion of the window.

8

TO...	DO THIS...
Add a VLAN to the selected Ethernet port	Enter the VLAN ID (1 to 511) in the VLANS to Add or Delete field and click the Add radio button below the field.
Delete a VLAN in the selected Ethernet port	Enter the VLAN ID (1 to 511) in the VLANs to Add or Delete field and click the Delete radio button below the field.**Important!** To retrieve the previously stored VLAN information for the port/VCG, click the Retrieve button.

9 After making your selections, click the Apply button.

Result:

The VLAN/EPORT or VLAN/VCG mappings made are sent to the NE.

10 Click the Close button to close the window.

END OF STEPS

□

Provision an Ethernet Connection (Transparent Tagging Mode)

Purpose

The Ethernet Connection Provisioning window is used to associate an Ethernet port (EPORT) or Virtual Concatenation Group (VCG) with the appropriate addressing/routing data information "tag" to determine the path of each Ethernet data frame through the network.

The version of the provisioning panel displayed in the right portion of the Ethernet Connection Provisioning window depends on the Tagging Mode that is set for the selected Ethernet circuit pack.

If the Tagging Mode is IEEE.1Q, the provisioning panel displayed in the right portion of the window allows you to assign one or more Virtual LAN IDs (VLANs) to the EPORT or VCG selected in the explorer portion of the window.

If the Tagging Mode is Transparent, the provisioning panel displayed in the right portion of the window allows you to select the Port Tag(s) for the EPORT or VCG selected in the explorer portion of the window.

Use this procedure to assign Port Tag(s) for the selected EPORT or VCG (Transparent Tagging Mode).

Before you begin

Before you begin this task, be aware that this function only supports NEs with Ethernet circuit packs.

Task

Complete the following steps to assign Port Tag(s) for the selected EPORT or VCG (Transparent Tagging Mode).

1 Select an NE on the Map window.

OR

Select no NE at this point.

2 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

3 Select **Connection Management** from the Configuration menu.

Result:

The Connection Managmen sub-menu is displayed.

---

4 Select **Ethernet Connection Provisioning** from the Network sub-menu.

If no NE was chosen in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The Ethernet Connection Provisioning window for the selected NE is displayed.

An alternate method to access this window is to position the mouse cursor over the NE on the Map pane or subnetwork explorer portion of the Map window, click the right mouse button to display a pop-up menu, select **Connection Managment** from the pop-up menu, and then select **Ethernet Connection Provisioning**.

The left portion of the Ethernet Connection Provisioning window is a Network Element Explorer, which allows you to expand the equipment hierarchy and select the equipment component, down to the port level or VCG level.

---

5 In the Network Element explorer portion of the window, expand the equipment hierarchy by clicking on the plus (+) sign next to each component level until the desired Ethernet port or VCG is displayed.

---

6 Select the desired Ethernet port or VCG.

Result:

The Provisioning button at the bottom of the Network Element Explorer portion of the window is enabled.

---

7 Click the Provision button.

Result:

If an EPORT is selected for provisioning, the right panel of the window displays the AID of the EPORT, the EPORT alias (if one exists), and the Default Port Tag for the selected EPORT.

If a VCG is selected for provisioning, the right panel of the window displays the AID of the VCG, the VCG alias (if one exists), the default port tag, which is displayed in the Default Port Tag field, and the current port tag assignments, which are displayed in a scrollable list field below the Default Port Tag field.

8

IF...	DO THIS...
You have selected an EPORT for provisioning and want to change the Default Port Tag value	Enter a new value in the Default Port Tag field
You have selected a VCG for provisioning and want to change the default port tag or add port tags to the selected VCG	To change the default port tag, enter a new value in the Default Port Tag field. To add port tags to the selected VCG, enter one or more port tags values (4-digit numbers) in the Port Tags field (for multiple port tag entries, separate each entry with a comma). After entering the new port tag value(s), click the Add radio button. To delete port tag(s) from the VCG, enter the port tag(s) to be deleted in the Port Tags field (for multiple entries, separate each entry with a comma) and click the Delete radio button.

Important! To retrieve the previously stored values prior to clicking the Apply button, click the Retrieve button.

9 After making your selections, click the Apply button.

Result:

The EPORT/Port Tag or VCG/Port Tag mapping(s) request are sent to the NE.

A Status window is displayed, showing the requested operation is “Working” (not yet completed). When the request is completed, the Status field changes to “Completed”. If there is, for some reason, a failed or incomplete request, the Status field

shows the request as “Failed” or “Incomplete”. Click the Close button to close the Status window.

10 When you have finished provisioning for EPORT(s) or VCG(s), click the Close button to close the Ethernet Connection Provisioning window.

END OF STEPS

□

Add a Spanning Tree Group

Purpose

Use this procedure to add a Spanning Tree Group for multipoint service on NEs that support Ethernet services. In an NE equipped with an Ethernet circuit pack, Spanning Tree Groups employ an automatic routing algorithm in multipoint services to provide redundant paths for broadcasting data while prohibiting traffic over specified cross-connection points, to avoid undesirable loops in the network.

Traffic routing is defined in a Spanning Tree Group by selecting the Virtual Concatenation Group(s) (VCGs) through which the data can travel.

Before you begin

Before you begin this task, be aware that this function only supports NEs with Ethernet circuit packs.

Member tributaries in a VCG can be enabled or disabled for input or output through the Provisioning window at the VCG tributary level.

Task

Complete the following steps to add a Spanning Tree Group.

1 Select an NE on the Map window.

OR

Select no NE at this point.

2 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

3 Select **Connection Management** from the Configuration menu.

Result:

The Connection Management sub-menu is displayed.

4 Select **Ethernet Spanning Tree Provisioning** from the Network sub-menu.

If no NE was chosen in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The Spanning Tree Provisioning window for the selected NE is displayed.

An alternate method to access this window is to position the mouse cursor over the NE on the Map pane or subnetwork explorer portion of the Map window, click the right mouse button to display a pop-up menu, select **Connection Management** from the pop-up menu, and then select **Ethernet Spanning Tree Provisioning**.

5 In the Network Element explorer portion of the window, expand the equipment hierarchy by clicking on the plus (+) sign next to each component level until the desired Ethernet circuit pack is displayed.

6 Select the Ethernet circuit pack.

Result:

The Provision button at the bottom of the Network Element explorer portion of the window is enabled.

7 Click the Provision button.

Result:

The Spanning Trees Provisioning window panel is displayed.

The AID of the selected circuit pack is displayed in the AID field in the display portion of the window.

The display portion of the window shows a scroll list of the existing Spanning Tree Groups. Each Spanning Tree Group has a 1–4 digit Spanning Tree Group ID.

8 Click the Add button in the top display portion of the window.

9 Enter a Spanning Tree Group ID in the related field in the Add Spanning Tree Group portion of the window.

10 Enter a Spanning Tree Root Priority in the related field in the Add Spanning Tree Group portion of the window.

11

TO...	DO THIS...
Add a single VCG to the Spanning Tree Group	Select the VCG in the VCGs Available scroll list and click the > push button to move it to the VCGs in STG scroll list.
Add all VCGs to the Spanning Tree Group	Click the >> push button to move the VCGs to the VCGs in STG scroll list.**Important!** You can move VCGs between the VCGs Available and VCGs in STG lists as necessary using the arrow push buttons.

12 When all of the Spanning Tree Group data has been entered, , click the Apply button below the VCG scroll lists.

Result:

A question dialog box is displayed, asking if you want to continue with the addition of the Spanning Tree Group.

13 Choose Yes.

Result:

The add request is sent to the NE and the Spanning Tree Group is created.

To update the list of Spanning Tree Groups on the window, click the Refresh button.

14 Click the Close button to close the window.

END OF STEPS

□

View Spanning Tree Groups

Purpose

Use this procedure to view Spanning Tree Groups.

Traffic routing is defined in a Spanning Tree Group by selecting the Virtual Concatenation Group(s) (VCGs) through which the data can travel.

Before you begin

Before you begin this task, be aware that this function only supports NEs with Ethernet circuit packs.

Member tributaries in a VCG can be enabled or disabled for input or output through the Provisioning window at the VCG tributary level.

Related task

For related information, see "Add a Spanning Tree Group" (3-132).

Task

Complete the following steps to view Spanning Tree Groups.

1 Select an NE on the Map window.

OR

Select no NE at this point.

2 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

3 Select **Connection Management** from the Configuration menu.

Result:

The Connection Management sub-menu is displayed.

4 Select **Ethernet Spanning Tree Provisioning** from the Connection Management sub-menu.

If no NE was chosen in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The Spanning Tree Provisioning window for the selected NE is displayed.

An alternate method to access this window is to position the mouse cursor over the NE on the Map pane or subnetwork explorer portion of the Map window, click the right mouse button to display a pop-up menu, select **Connection Management** from the pop-up menu, and then select **Ethernet Spanning Tree Provisioning**.

5 In the Network Element explorer portion of the window, expand the equipment hierarchy by clicking on the plus (+) sign next to each component level until the desired Ethernet circuit pack is displayed.

6 Select the Ethernet circuit pack.

Result:

The Provision button at the bottom of the Network Element explorer portion of the window is enabled.

7 Click the Provision button.

Result:

The Spanning Trees Provisioning window panel is displayed.

The AID of the selected circuit pack is displayed in the AID field in the display portion of the window.

The display portion of the window shows a scroll list of the existing Spanning Tree Groups. Each Spanning Tree Group has a 1–4 digit Spanning Tree Group ID.

8 Select the Spanning Group ID of the Spanning Tree Group in the Spanning Tree Groups scroll list in the top portion of the window.

9 Click the View button in the top display portion of the window.

Result:

The selected Spanning Tree Group's ID, Spanning Tree Root Priority, and member VCGs are displayed in the bottom portion of the window.

10 Click the Close button to close the window.

END OF STEPS

□

Delete a Spanning Tree Group

Purpose

Use this procedure to delete a Spanning Tree Group.

Traffic routing is defined in a Spanning Tree Group by selecting the Virtual Concatenation Group(s) (VCGs) through which the data can travel.

Before you begin

Before you begin this task, be aware that this function only supports NEs with Ethernet circuit packs.

Related tasks

For related information, see the following:

-
- "View Spanning Tree Groups" (3-135)

Task

Complete the following steps to delete a Spanning Tree Group.

1 Select an NE on the Map window.

OR

Select no NE at this point.

2 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

3 Select **Connection Managment** from the Configuration menu.

Result:

The Connection Managment sub-menu is displayed.

4 Select **Ethernet Spanning Tree Provisioning** from the Network sub-menu.

If no NE was chosen in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The Spanning Tree Provisioning window for the selected NE is displayed.

An alternate method to access this window is to position the mouse cursor over the NE on the Map pane or subnetwork explorer portion of the Map window, click the right mouse button to display a pop-up menu, select **Connection Management** from the pop-up menu, and then select **Ethernet Spanning Tree Provisioning**.

5 In the Network Element explorer portion of the window, expand the equipment hierarchy by clicking on the plus (+) sign next to each component level until the desired Ethernet circuit pack is displayed.

6 Select the Ethernet circuit pack.

Result:

The Provision button at the bottom of the Network Element explorer portion of the window is enabled.

7 Click the Provision button.

Result:

The Spanning Trees Provisioning window panel is displayed.

The AID of the selected circuit pack is displayed in the AID field in the display portion of the window.

The display portion of the window shows a scroll list of the existing Spanning Tree Groups. Each Spanning Tree Group has a 1–4 digit Spanning Tree Group ID.

8 Select the Spanning Group ID of the Spanning Tree Group to be deleted in the Spanning Tree Groups scroll list in the top portion of the window.

9 Click the Delete button in the top display portion of the window.

Result:

A question dialog box is displayed, asking if you are sure that you want to delete the selected Spanning Tree Group.

10 Choose Yes.

Result:

The selected Spanning Tree Group is deleted.

11 Click the Close button to close the window.

END OF STEPS

□

4 Equipment Provisioning

Overview

Purpose

This chapter describes procedures for provisioning network element equipment using the Graphical User Interface (GUI).

Before you begin

Read Chapter 10, “Getting Started Concepts” to gain a basic familiarity with the Navis™ Optical EMS GUI. Read Chapter 12, “Equipment Provisioning Concepts” to learn about the equipment components that can be provisioned through Navis™ Optical EMS.

Equipment provisioning can also be done by issuing TL1 commands to NEs that do not exchange messages with Navis™ Optical EMS using CMISE services. Instructions about how to issue TL1 commands in Cut-Through mode are available in Chapter 2, “Getting Started”.

Contents

Provision System Parameters	4-2
Provision NE Ports	4-4
Provision NE Equipment Information	4-13
Establish WaveStar® Equipment	4-14
Remove WaveStar® Equipment	4-17

Provision System Parameters

Purpose Use this procedure to display the windows used to provision NE system parameters.

Before you begin Before you begin this task, determine specifically what type of system provisioning you want to accomplish.

Task Complete the following steps to display the windows used to provision system parameters.

1 From the main menu bar on the Map window, select **Configuration**.

Result:

This displays a sub-menu.

2 Select **Provision** from the displayed sub-menu.

Result:

The Choose an NE window is displayed.

3 Use the mouse to select an NE on the Choose an NE window. (Double click on the desired NE and then click the OK button.)

Result:

The Provisioning window is displayed.

The Provisioning window can be displayed in similar fashion from the Alarm Summary, Equipment View, and Cross-Connection windows.

4 Use the mouse to select the TID from the Network Element Explorer portion of the window.

5 Click the Provision button.

Result:

The system parameters for your selection are displayed in the Provisioning area of the window.

6 Parameters that have no value reported for them, and which therefore do not apply to the current operation, are not shown in the provisioning panel.

7 Make your provisioning changes in the Provisioning section of the window using the available fields and your selected values.

8 Click Apply to enter your changes.

END OF STEPS

□

Provision NE Ports

Purpose

Use this procedure to display the windows used to provision NE ports.

This procedure can be applied to provisioning ports or port tributaries in an NE.

Changes made to a port's/tributary's parameters can be applied to the individual selected port/tributary or multiple ports/tributaries of the same type, on the same shelf as the provisioned port/tributary, on the circuit pack as the provisioned port/tributary, or across the entire NE.

Port provisioning can also be accessed from the Equipment View window. Refer to "SE 4-2: Provisioning ports from the Equipment View window" (4-11) following this procedure for instructions on how to access the Port Provisioning window from the Equipment View window.

Before you begin

Before you begin this task, determine specifically what type of port/tributary provisioning you want to accomplish.

The Navis™ Optical EMS has an option which allows you to specify whether port/tributary AIDs or port/tributary labels/aliases are used to represent ports/tributaries on GUI windows in the Navis™ Optical EMS, such as in explorer lists on the Cross-Connection or allowing entry of a port/tributary alias on the Provisioning window. The port label/alias values must be unique for all ports/tributaries within an NE.

Related tasks

"View Port/Tributary Aliases" (2-44) in the Chapter 2, "Getting Started" describes how to define port labels/aliases.

"Modify User Preferences" (2-18) in the Chapter 2, "Getting Started" describes how to enable/disable use of port/tributary aliases on GUI windows in the Navis™ Optical EMS, such as the explorer on the Cross-Connection window or entry of a port or tributary alias on the Provisioning window.

Task

Complete the following steps to display the windows used to provision port/tributary parameters.

1 Choose **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

2 Select **Provision** from the displayed sub-menu.

Result:

The Choose an NE window is displayed.

3 Select an NE from the list by double-clicking on it and click the OK button.

Result:

The Provisioning window is displayed.

The Provisioning window can be displayed in similar fashion from the Alarm Summary, Equipment View, and Cross-Connection windows.

4 Expand the explorer tree if it has not already been expanded.

5 Use the mouse to select the port from the Network Element Explorer portion of the window. (Click on the plus [+] signs to display available circuit packs.) Then click the Provision button. This displays the port attributes (for your selection) in the Provisioning area of the window. Use the tabs to go to the specific port/tributary attribute to provision.

Provisioning of the fixed Tributary Input Signal Rate or Tributary Output Signal Rate, while accessed through the Provisioning window, requires a special sub-procedure that is described in the "SE 4-1: Provisioning Fixed Incoming or Outgoing Signal Rate" (4-8) sub-procedure following this task.

Reference:

"SE 4-1: Provisioning Fixed Incoming or Outgoing Signal Rate" (4-8)

For provisioning the Tributary Input Signal Rate List and/or the Tributary Unequipped/Output Signal Rate List for OC-192/STM-64 ports on a LambdaUnite ™ MSS NE, there is no Details button next to the fields for these port types that bring up a secondary provisioning window for selection of these

values as described in the "SE 4-1: Provisioning Fixed Incoming or Outgoing Signal Rate" (4-8) sub-procedure. You must manually type in the signal rate for OC-192/STM-64 ports for this NE type.

The following table shows, for each port type, the rate value entered in either Tributary Input Signal Rate List or Tributary Unequipped/Output Signal Rate List and what it represents.For OC-192 ports:

- 192I = 192 STS-1 tributaries
- 643 = 64 STS-3 tributaries
- 1612 = 16 STS-12 tributaries
- 448 = 4 STS-48 tributaries
- 1192 = 1 STS-192 tributary For STM-64 ports:
- 1923 = 192 VC-3 tributaries
- 644 = 64 VC-4 tributaries
- 164c = 16 VC-4 tributaries
- 416c = 4 VC-4-16c tributaries
- 1c64 = 1 VC-4-64c tributary

6 Make your provisioning changes in the Provisioning section of the window.

7

TO...	DO THIS...
Apply the port/tributary parameter changes to just the selected port/tributary	Leave the window as is. The Apply Parameters to: field located at the bottom of the Provisioning window already displays the option This Port Only (which is the default). Go to Step 8.

TO...	DO THIS...
Apply the port/tributary parameter changes to multiple ports of the same type	Click the down arrow next to the Apply Parameters to: field located at the bottom of the Provisioning window to display a drop-down list and select Multiple Ports. The Select Ports button is enabled. Click the Select Ports button. **Result:** A secondary Select Ports window is displayed.
Apply the port changes to other ports (of the same type) on the related circuit pack	Click the On This Pack radio button. In the bottom portion of the window, move the desired port(s) from the Ports of This Type column to the Ports to Update in addition column, using the arrow keys. You can move the port(s)/tributary(ies) back and forth between the two columns, as needed.
Apply the port/tributary changes to other ports (of the same type) on the related shelf	Click the On This Shelf radio button. In the bottom portion of the window, move the desired port(s) from the Ports of This Type column to the Ports to Update in addition column, using the arrow keys. You can move the port(s) back and forth between the two columns, as needed.
Apply the port changes to other ports (of the same type) across the entire NE	Click the On This NE radio button. In the bottom portion of the window, move the desired port(s) from the Ports of This Type column to the Ports to Update in addition column, using the arrow keys. You can move the port(s) back and forth between the two columns, as needed. After making your port selections, click the OK button on the Select Ports window.

Result:

The system returns to the Provisioning window.

8 Click the Apply button on the Provisioning window.

Result:

A question dialog box is displayed, informing you that the port parameter change(s) for the selected port(s) made may affect service and asks if you want to make the modification(s) anyway.

9 Choose Yes.

Result:

The requested port parameter change(s) is sent to the NE.

END OF STEPS

SE 4-1: Provisioning Fixed Incoming or Outgoing Signal Rate

Use the following procedure to provision the fixed rate for the Tributary Incoming or Outgoing Signal Rate for a port tributary.

1 Follow Steps 1-5 in the "Provision NE Ports" (4-4) task for selecting the port to be provisioned. Locate the Tributary Incoming Signal Rate or Tributary Outgoing Signal Rate port fields on the right side of the Provisioning window.

Result:

The Tributary Incoming Signal Rate or Tributary Outgoing Signal Rate field shows the current signal rate values for the port tributary group and the chosen values for the port tributary group. For example,in a WaveStar® TDM 2.5G and/or a WaveStar® TDM 10G NE, on an OC-12 port , the current signal rate value may be shown in the Signal Rate field box as "121", representing 12 STS-1 tributaries. You can reconfigure the number and combination of tributary signal rates.

2 Click the Input Details or Output Details button to the right of the Chosen Values field of the Input Signal Rate or Output Signal Rate parameter.

Result:

A secondary provisioning window is displayed, showing the port group and a series of numbers, separated by commas, which represent the current number of tributaries and the signal rate that each can carry. From the example used in Step 1, the window may display the group “sts12-1”, which may be currently configured as 12 STS-1 tributaries, which is represented as “1,1,1,1,1,1,1,1,1,1,1,1” in the Values field on this secondary provisioning window.

3 If there is a single row of numbers in the Group & Values field, it is automatically selected when the secondary provisioning window is displayed. If there are multiple rows of numbers displayed under the Group & Values field (as there would be, for example, for an OC-192 interface), position the mouse cursor on the row of numbers to be reprovisioned in the Group & Values field portion of the window and click the left mouse button to select them.

Once the numbers at the top of the provisioning window are selected (either automatically or manually), the color of the buttons that correspond to the current signal rate of each tributary turns to dark grey.

To configure a different fixed signal rate for one or more tributaries, click on one or more of the buttons of a different signal rate that are located at the bottom of the secondary provisioning window to change the value and combination of signal rates for the tributaries.

From the example used in Step 2: the current value for the STS-12 group shown in the Values field on the secondary Provisioning Input window may be “1,1,1,1,1,1,1,1,1,1,1,1”, representing that this port group may currently be configured as 12 STS-1 tributaries. Suppose you want to change all of the twelve STS-1 tributaries to carry STS-3 signals. You would click all four of the STS-3 provisioning buttons at the bottom of the window. If you wanted to change six of the STS-1 tributaries to carry STS-3 signals, you would click on two of the STS-3 provisioning buttons at the bottom of the window.

4 Once you have selected and configured the tributary rates, click the Apply button at the bottom of the secondary provisioning window to apply your selections.

Result:

The numbers shown in the Values field will change to reflect the selection(s) you have made.

5 After all of your changes are made, click the OK button.

Result:

The system returns to the Provisioning window. The value now shown in the Tributary Input Signal Rate or Tributary Unequipped Output Signal Rate (depending on the field you configured), reflects the new tributary signal configuration.

If, for example, you changed all of the STS-1 tributaries to STS-3 tributaries, the value now shown in the Input Signal Rate or Output Signal Rate field on the Provisioning window would be “43”, representing the configuration change to four STS-3 tributaries.

If, for example, you changed six of the STS-1 tributaries to STS-3 tributaries, the value now shown in the Input Signal Rate or Output Signal Rate (depending on the field you chose to reconfigure) would be “23-61”, representing two STS-3 tributaries and six STS-1 tributaries.

6 Click the Apply button on the primary provisioning window to ensure that all provisioning changes are applied.

Result:

A status window is displayed, showing that the provisioning changes are in progress. When they are completed, the status of the provisioning job changes to “Completed”. Click the Close button to close the status window.

The primary Provisioning window remains displayed.

7 Click the Retrieve button on the primary Provisioning window to verify that the provisioning changes have been made.

8 Click the Close button to close the window.

END OF STEPS

SE 4-2: Provisioning ports from the Equipment View window

Use the following procedure to provision a port directly from the Equipment View window.

1 Select an NE on the Map pane or Subnetwork Explorer portion of the Map window OR select no NE at this point.

2 Choose **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

3 Choose **Equipment** from the Configuration menu.

Result:

If you did not select an NE in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

The Equipment View window is displayed.

4 Expand the equipment hierarchy in the Network Element Explorer portion of the Equipment View window until the port to be provisioned is displayed.

5 Select the port from the explorer by positioning the mouse cursor on the port's AID and clicking the left mouse button.

Result:

The selected port is highlighted in the explorer.

6 Choose **Configuration** from the menu bar on the Equipment View window.

Result:

The Configuration menu is displayed.

7 Choose **Provision** from the Configuration menu.

Result:

The Provisioning window with the provisionable parameters for the selected port is displayed.

You can view or modify any port parameters for the selected port. Refer to "Provision NE Ports" (4-4) for details on how to provision port parameters on the Provisioning window.

END OF STEPS

□

Provision NE Equipment Information

Purpose Use this procedure to display and provision NE equipment parameters on the Provisioning window.

Task Complete the following steps to display and provision equipment parameters.

1 Choose **Configuration** from the main menu on the Map window.

Result:

The Configuration menu is displayed.

2 Select **Provision** from the Configuration menu.

Result:

The Choose an NE window is displayed.

3 Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The Provisioning window is displayed.

4 In the Network Element Explorer part of the Provisioning View window, select the equipment for which you want to provision parameters. Click the plus (+) sign to display circuit packs. Select a slot number. Click the Provision button.

Make the required changes in the Provisioning part of the window. When you are finished making your choices, click the Apply button.

Result:

The provisioning changes are sent to the NE.

5 Click the Close button to close the window.

END OF STEPS

□

Establish WaveStar® Equipment

Purpose Use this procedure to manually establish (manually pre-provision) new bays, shelves, and circuits packs for WaveStar® NEs. Bays, shelves, and circuit packs can be added and removed.

Before you begin Before you begin this task, decide what equipment you want to establish.

Be aware that you can establish (pre-provision) new shelves, circuit packs, or ports for a LambdaRouter™ 128/256 AOS, but you cannot manually pre-provision bays.

Task Complete the following steps to establish WaveStar® equipment.

1 Choose **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

2 Select **Establish** from the Configuration menu.

Result:

The Choose an NE window is displayed.

3 Select an NE from the list by double-clicking on it.

4 Click the OK button.

Result:

The Create/Provision Equipment window for the selected NE is displayed.

The window initially consists of a section called “Establish this” and three radio buttons labeled Bay, Shelf, and Pack, and an explorer portion that will be unpopulated when the window is initially displayed.

You may need to expand the window to see the explorer portion when it is populated. To expand the window, position the mouse cursor on the lower right hand corner of the window, and then click and hold

the left mouse button to resize the window in order to display all components of the window, including the explorer when it is populated.

5 Select one of the three radio buttons near the top left of the window to establish equipment for a Bay, Shelf, or Pack.

- **Bay**—When you select this radio button, the Explorer section (just below the radio buttons) contains the available data on all bays, including the AIDs of all bays that have not yet been established. ***You can choose a bay to establish.***
- **Shelf**—When you select this radio button, the Explorer section (just below the radio buttons) contains the available data on all bays, including the AIDs of all bays that have not yet been established and the corresponding shelf AIDS for those bays. It also contains the AID of each bay that does not have all shelves established in it, and the AID of the shelf or shelves that are not established. ***You can choose a shelf to establish.***
- **Pack**—When you select this radio button, the Explorer section (just below the radio buttons) contains the available circuit pack data, including the AIDs of ***existing*** bays and ***existing*** shelves. Under the shelves are displayed only those slots for which no circuit pack has been established. Within the slot is displayed the type of circuit packs that are legal types for that slot AID. ***You can choose a circuit pack type within the slot.***

As an example, let's assume that you have clicked the **Shelf** radio button to establish a new shelf in the NE. The explorer portion of the window would contain the bays of the NE.

6 Click the plus (+) sign next to the AID of the equipment above the component you want to establish, to expand the explorer tree until the AID of the equipment component to be established is displayed.

In the example used in this procedure, you would click the plus (+) sign next to the associated bay, to expand and show the associated shelves in the bay.

7 Single-click on the equipment AID (in this case, the shelf AID) in the explorer to select it.

Result:

Selecting the AID enables the Get Parameters button.

8 Click the Get Parameters button.

Result:

The right hand portion of the panel is populated with the current values for provisionable parameters. Additional parameter information may have to be entered before the equipment is established. The correct parameter labels are displayed and are populated with their default values, which are updatable. Enter or change the equipment parameters.

The equipment AID field should not be modified. The label next to this field is greyed out, indicating that this field cannot be modified.

9 Click the Apply button.

Result:

The equipment is established. If there is a problem with the request to establish equipment, a pop-up error message is displayed, indicating the nature of the problem.

When the type of circuit pack being provisioned on a Universal I/O shelf is a Switching Interface (SWIF) circuit pack, the BSW Port Identifier must be provisioned in such a manner that no two SWIF circuit pack pairs both have the same identifier. SWIF circuit packs are paired based on their slot AIDs. Each pair of circuit packs share a single BSW Port ID, so if there is already a circuit pack in one slot of the slot pair, then the other circuit pack should have the same BSW Port ID defaulted in the provisioning window.

When the circuit pack being provisioned is the first one in the current slot pair, the list of possible values for the BSW Port Identifier parameter includes only those values that are not already assigned to a slot pair. When the circuit pack being provisioned is the second one in the current slot pair, the list of possible values includes only the value already chosen for the first circuit pack provisioned in the slot pair.

When provisioning I/O shelves, the list of possible values for the ON Cable Pair parameter is a list of only those values that are not currently assigned to another shelf in this NE.

END OF STEPS

□

Remove WaveStar® Equipment

Purpose Use this procedure to remove WaveStar® NE equipment. In the WaveStar® BWM, bays, shelves, and circuit packs can be added and removed.

Before you begin Before you begin this task, decide what equipment you want to remove.

Task Complete the following steps to remove WaveStar® equipment.

1 From the main menu bar on the Map window, select **Configuration**.

Result:

A sub-menu is displayed.

2 Select **Remove** from the displayed sub-menu.

Result:

The Choose an NE window is displayed.

3 Double-click on the NE in the list to select it.

4 Click the OK button.

Result:

The Removing Equipment window is displayed.

This window allows you to choose existing equipment from the explorer tree and to remove that equipment provisioning from the network element.

5 To remove the undesired equipment, first select it with the mouse.

Select a circuit pack or select an empty bay or shelf.

6 After selecting the undesired equipment with the mouse, click the Remove button.

Result:

If the removal is allowed, the system displays a confirmation window to which you should reply Yes.

If you try to remove a bay/shelf that is not empty, the system displays a message window explaining that the bay/shelf is not empty and cannot be removed. You must first empty the bay/shelf before removing it (if that is still desired).

END OF STEPS

□

5 Topology Management

Overview

Purpose

This chapter describes procedures for defining trails (physical links between Data Communication Channel (DCC)-connected NEs, represented graphically as solid lines between NEs on the Map pane) and aggregates (a named collection of related NEs).

Before you begin

Read Chapter 10, "Getting Started Concepts" to gain a basic familiarity with the Navis™ Optical EMS GUI. Read Chapter 13, "Topology Management Concepts" to learn about trails and aggregates in the Navis™ Optical EMS.

Contents

Add a Trail	5-2
Delete a Trail	5-4
Add an Aggregate	5-6
Modify an Aggregate	5-9
Delete an Aggregate	5-11

Add a Trail

Purpose

Use this procedure to manually add a trail between two NEs. Trails between identical Lucent Technologies NEs may be autodiscovered by the DNO feature and do not have to be manually added. Manually added trails may also be manually deleted.

Before you begin

Before you begin this task, verify that the NEs at either end of the trail are compatible for the connection and that the AIDs at both ends of the trail are using compatible software releases. DNO has to be performed on the NEs at either end of the trail before manually adding a trail.

When you are adding a trail between an NE managed by the Navis™ Optical EMS and a non-managed device (such as a DDM-2000), the AID(s) may not be available for the non-managed device, and, subsequently, will not be displayed in the AID list on the Add a Trail window. The trail can still be added between the managed and non-managed NE.

To perform this task, access the Map window.

Task

Complete the following steps to manually add a trail.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Network** from the Administration menu.

Result:

The Network sub-menu is displayed.

3 Select **Trails** from the Network sub-menu.

Result:

The Trail Manager window is displayed, showing the current list of user-defined trails between NEs.

4 Click the Add button.

Result:

The Add a Trail window is displayed. This window consists of:

- From TID and To TID scroll lists for both NEs
- From AID and To AID explorers for both NEs

The Trail Termination Point (TTP) for either end of the trail consists of the NE's TID and AID.

5 Select the first NE's TID from the From TID list.

Result:

The corresponding AIDs for the first NE's TID are displayed in the From AID explorer.

6 Select the second NE's TID from the To TID list.

Result:

The corresponding AIDs for the second NE's TID are displayed in the To AID explorer.

If the TID chosen is for a non-managed device, the associated AID list is empty and disabled. The trail can still be added between the managed NE and non-managed device.

7 Select a valid AID for the first NE's TID from the From AID explorer.

8 Select a valid AID for the second NE's TID from the To AID explorer.

9 Click the Apply button to create the trail, or click the OK button to create the trail and close the window.

END OF STEPS

□

Delete a Trail

Purpose Use this procedure to manually delete a trail between two NEs. Automatically discovered trails are deleted automatically if one of the NEs at either end is deleted.

Before you begin Before you begin this task, be aware that if you delete a trail, it is removed from the trail list in any open windows, including the Trail Manager window. The deleted trail is also removed from all open Map windows. Be aware that autodiscovered trails cannot be deleted.

To perform this task, access the Map window.

Task Complete the following steps to manually delete a trail.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Network** from the Administration menu.

Result:

The Network sub-menu is displayed.

3 Select **Trails** from the Network sub-menu.

Result:

The Trail Manager window is displayed, showing the current list of trails between NEs

4 Select a trail to be deleted.

5 Click the Delete button.

Result:

A pop-up window is displayed, asking if you really want to delete the trail.

6 Choose Yes to delete the trail.

Result:

The trail is removed from the Trail Manager window.

END OF STEPS

□

Add an Aggregate

Purpose Use this procedure to add an aggregate. An aggregate is a collection of related NEs/aggregates that are grouped and named for purposes of streamlining network monitoring and resynchronization. A new aggregate is created by providing a unique aggregate name and alias and adding NEs or other aggregates to it.

Before you begin Before you begin this task, identify which NEs and/or aggregates you want to associate with the aggregate being created.

To perform this task, access the Map window.

Task Complete the following steps to create a new aggregate.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Network** from the Administration menu.

Result:

The Network sub-menu is displayed.

3 Select **Aggregates** from the Network sub-menu.

Result:

The Aggregates sub-menu is displayed.

4 Select **Add** from the Aggregates sub-menu.

Result:

The Add a New Aggregate window is displayed.

5 Fill in the following fields, as needed:

- Aggregate Name—This is the aggregate name. The Aggregate name can be 1-20 alphanumeric characters. Dashes are allowed. This field is required. The Aggregate name must be unique.
- Aggregate Alias—This is the aggregate alias (alternate label). The Aggregate alias can be 1-20 alphanumeric characters. Dashes are allowed. This field is optional.

6 Click the OK button.

Result:

The Status Dialog window is displayed, indicating that creation of the new Aggregate has been completed.

When a new aggregate is created, it is automatically placed into the TOP layer of the Map view. Any NE or aggregate that is placed into the aggregate is removed from the TOP layer.

The icon for the new aggregate is displayed in the current Map view and the subnetwork explorer, and is automatically selected.

7 Add NEs and/or aggregates to the newly created aggregate using the sub-procedure immediately following this procedure.

Reference:

"Add Network Elements/Aggregates to an Aggregate" (5-8)

END OF STEPS

Add Network Elements/Aggregates to an Aggregate

Perform the steps below to add an NE or aggregate to the parent (owner) aggregate.

1 From the Map window, position the mouse cursor on the aggregate icon on the Map pane and single-click the select mouse button to select the aggregate icon, if it is not already selected.

2 Select an NE or aggregate (by pointing at it with the mouse cursor and single-clicking on it with the mouse select button).

3 Drag the NE or aggregate icon into the parent (owner) aggregate.

END OF STEPS

An NE or aggregate can be moved out of the currrent parent aggregate into the TOP Map view by choosing Return to Top in the NE/aggegate's pop-up menu.

□

Modify an Aggregate

Purpose

Use this procedure to change an aggregate's alias. To change the contents of an aggregate, use "Add Network Elements/Aggregates to an Aggregate" (5-8) following the task "Add an Aggregate" (5-6).

Before you begin

Before you begin this task, identify the aggregate to be modified. Be aware that the aggregate name for the Top Level Aggregate (TOP), which is the default parent of all member NEs in the network, cannot be changed.

Task

Complete the following steps to change the aggregate alias.

1 Select the aggregate to be modified from the Map window or subnetwork explorer.

OR

Select no aggregates at this point.

2 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

3 Select **Network** from the Administration menu.

Result:

The Network sub-menu is displayed.

4 Select **Aggregates** from the Network sub-menu.

Result:

The Aggregates sub-menu is displayed.

5 Select **Modify Alias** from the Aggregates sub-menu.

Result:

If no aggregates were chosen from the Map window or Subnetwork Explorer in Step 1, the Choose an NE/Aggregate

window is displayed for selection of the aggregate to be modified. Select the aggregate to be modified and click the OK button.

The Modify Aggregate window is displayed with the current aggregate name and/or alias.

6 Change the aggregate alias, as desired.

7 Click the OK button.

Result:

The Status Dialog box is displayed, indicating that the modifications to the aggregate have been completed.

END OF STEPS

□

Delete an Aggregate

Purpose Use this procedure to delete an aggregate from the Navis™ Optical EMS.

Before you begin Before you begin this task, be aware that NEs/aggregates that are members of the aggregate being deleted must be reassigned to another aggregate or to the TOP aggregate level as part of this task.

Task Complete the following steps to delete an aggregate.

1 Before deleting the aggregate, you may want to move the member NEs out of the aggregate and return them to the TOP level using the sub-procedure immediately following this procedure.

Reference:

"Add Network Elements/Aggregates to an Aggregate" (5-8)

2 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

3 Select **Network** from the Administration menu.

Result:

The Network sub-menu is displayed.

4 Select **Aggregates** from the Network sub-menu.

Result:

The Aggregates sub-menu is displayed.

5 Select **Delete** from the Aggregates sub-menu.

Result:

The Choose an Aggregate Aggregate/Delete window is displayed.

6 Select the aggregate to be deleted and click the OK button.

Result:

The Reassign an Aggregate window is displayed.

7 Choose an aggregate from the list to which you want to reassign any member NEs/aggregates. You may also choose “Return to TOP” to return the NE(s) to the TOP Level Aggregate, which includes all NEs.

Important! If you are not moving the majority of NEs to a single aggregate, it is recommended that you select the TOP Level Aggregate and modify those aggregates that take the NEs from the deleted aggregate.

8 Click the OK button.

Result:

The Status Dialog window is displayed, indicating that deletion of the aggregate has been completed.

END OF STEPS

Moving an NE to the TOP Aggregate Level

Perform the following steps below to move an NE out of an aggregate to the TOP level.

1 Expand the aggregate by selecting it on the Map window, clicking the right (menu) mouse button to display a pop-up menu, and choosing **Expand**.

2 Select the NE to be moved.

3 When the NE is selected, click the right (menu) mouse button to display a pop-up menu.

4 Choose **Return to TOP**.

Result:

Result: The NE is brought to the TOP aggregate level and is taken out of the aggregate.

END OF STEPS

6 Timing Provisioning

Overview

Purpose

This chapter describes procedures for configuring the external timing reference and clock mode for a network element and for synchronizing the date and time settings of a network element with the Navis™ Optical EMS host.

Before you begin

Read Chapter 14, "Timing Provisioning Concepts" to learn about NE date/time synchronization.

Contents

Configure External Timing Port Parameters for NE Timing Synchronization	6-3
View External Timing Port Parameters for NE Timing Synchronization	6-5
Operate an External Timing Reference/Timing Mode Switch	6-7
Release an External Timing Reference/Clock Mode Protection Switch	6-10
Set Network and NE Delay Threshold	6-12
Set Network Element Date/Time Synchronization	6-14
Enable Fall Back and Spring Forward	6-17
Set Drift Threshold for Date/Time Synchronization	6-20

Enable/Disable Automatic Date/Time Synchronization	6-22
Schedule Network Element Date/Time Synchronization	6-24
Modify a Scheduled Task	6-27
Delete a Scheduled Task	6-29

Configure External Timing Port Parameters for NE Timing Synchronization

Purpose

Use this procedure to provision the frame format, timing clock mode, and external timing reference parameters for external input and output ports on an NE.

Before you begin

Before you begin this task, be aware that only the Navis™ Optical EMS administrator login has access to this function.

This function is currently available for the WaveStar® BWM R3.1, the WaveStar® TDM 2.5G (OC-48 2F) R5.0, the WaveStar® TDM 10G (OC-192 2F) R5.0, and the WaveStar® TDM 10G (STM-64) R3.0 NEs.

Task

Complete the following steps to provision external timing reference and clock mode parameters for external input and output ports on an NE.

1 Select an NE from the map pane or subnetwork explorer on the Map window

OR

Select no NE at this point.

2 Choose **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

3 Choose **Synchronization** from the Configuration menu.

Result:

The Synchronization sub-menu is displayed.

4 Choose **Configure** from the Synchronization sub-menu.

If you did not choose an NE in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The ConfigSync window is displayed.

This is a multi-panel window.. The following panels are displayed:

- External Timing I/P (Input) Ports
- External Timing O/P (Output) Ports
- Timing Reference
- System Timing

5 On the External Timing I/P Ports window panel, configure the external timing port AID, timing input format (SF/Super Frame or ESF/Extended Super Frame), and Loop Delay.

Click the Ext Timing O/P Ports panel tab.

6 On the External Timing O/P Ports window panel, configure the external timing output port AID, Timing Output Format (SF/Super Frame or ESF/Extended Super Frame), Provisioning Timing Source Selection, Timing Output Equalization factor, and AIS/QL mode.

Click the Timing Reference panel tab.

7 On the Timing Reference window panel, configure the parameters for the external timing reference source and system timing clocks.

Click the System Timing panel tab.

8 On the System Timing window panel, configure the system clock mode, system SSM mode, timing reference wait to restore parameter, and system timing ASAP.

9 After setting up all of the timing parameters, click the Apply button to activate your settings on the NE. Click the Close button to close the window.

END OF STEPS

□

View External Timing Port Parameters for NE Timing Synchronization

Purpose

Use this procedure to view the current frame format, timing clock mode, and external timing reference parameters for external input and output ports on an NE

Before you begin

Before you begin this task, be aware that only the Navis™ Optical EMS administrator login has access to this function.

This function is currently available for the WaveStar® BWM R3.1, the WaveStar® TDM 2.5G (OC-48 2F) R5.0, the WaveStar® TDM 10G (OC-192 2F) R5.0, and the WaveStar® TDM 10G (STM-64) R3.0 NEs.

Related task

"Configure External Timing Port Parameters for NE Timing Synchronization" (6-3) describes how to configure the timing reference parameters for an NE.

Task

Complete the following steps to view the external timing reference and clock mode parameters for external input and output ports on an NE.

1 Select an NE from the map pane or subnetwork explorer on the Map window

OR

Select no NE at this point.

2 Choose **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

3 Choose **Synchronization** from the Configuration menu.

Result:

The Synchronization sub-menu is displayed.

4 Choose **View** from the Synchronization sub-menu.

If you did not choose an NE in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The ViewSync window is displayed.

This is a multi-panel window.. The current timing settings are shown on the following window panels:

- External Timing I/P (Input) Ports
- External Timing O/P (Output) Ports
- Timing Reference
- System Timing

5 Click the appropriate panel tab to view the current settings.

6 Click the Close button to close the window.

END OF STEPS

□

Operate an External Timing Reference/Timing Mode Switch

Purpose

Use this procedure to operate (provision) a timing synchronization protection switch to an alternate system timing reference or timing mode. A protection switch can be provisioned to another external timing reference in case the primary timing reference fails. A timing mode protection switch can be forced from locked to holdover mode.

Before you begin

Before you begin this task, be aware that only the Navis™ Optical EMS administrator login has access to this function.

This function is currently available for the WaveStar® BWM R3.1, the WaveStar® TDM 2.5G (OC-48 2F) R5.0, the WaveStar® TDM 10G (OC-192 2F) R5.0, and the WaveStar® TDM 10G (STM-64) R3.0 NEs.

Related information

See the "Network Element Timing Synchronization" (14-2) section in Chapter 14, "Timing Provisioning Concepts".

Task

Complete following steps to operate an external timing reference or timing mode protection switch.

1 Select an NE from the map pane or subnetwork explorer on the Map window

OR

Select no NE at this point.

2 Choose **Fault** from the main menu bar on the Map window.

Result:

The Fault menu is displayed.

3 Choose **Synchronization** from the Fault menu.

Result:

The Synchronization sub-menu is displayed.

4 Choose **Operate** from the Synchronization sub-menu.

If you did not choose an NE in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The Operate Synchronization window is displayed.

5

TO...	DO THIS...
Operate an external timing reference switch	Click the down arrow next to the Sync Switch Modifier field to display a drop-down list and choose Timing Reference Switch
Operate an timing mode switch	Click the down arrow next to the Sync Switch Modifier field to display a drop-down list and choose System Clock Mode Switch

6

IF...	DO THIS...
An external timing reference switch has been selected	Click the down arrow next to the Switch Type field to display a drop-down list and choose the type of switch to be performed. The choices are: Forced Switch, Manual Switch, and Lockout Switch. Go to Step Step 7 .
A timing mode switch has been selected	Click the down arrow next to the Switch Type field to display a drop-down list and choose the type of switch to be performed. The choice is: FORCED. Go to Step Step 8.

7

IF...	DO THIS...
An external timing reference switch has been selected	Click the down arrow next to the Destination field to display a drop-down list and choose the timing reference for the switch.

IF...	DO THIS...
The NE type is a WaveStar® TDM 10G (STM-64) and an external timing output switch has been selected	Click the down arrrow next to the Destination field to display a drop-down list and choose the timing reference for the switch.

8 After your protection switch selections are made, click the Operate button.

Result:

A question dialog window is displayed, informing you that the requested synchronization switch may affect NE operations and asks if you want to continue.

9 Choose Yes.

Result:

The synchronization protection switch request is sent to the NE and performed.

END OF STEPS

□

Release an External Timing Reference/Clock Mode Protection Switch

Purpose

Use this procedure to release (clear) any existing lockout, forced, or manual system timing reference protection switch or forced request on the timing mode so it will return to the provisioned locked mode from the holdover mode.

Before you begin

Before you begin this task, be aware that only the Navis™ Optical EMS administrator login has access to this function.

This function is currently available for the WaveStar® BWM R3.1, the WaveStar® TDM 2.5G (OC-48 2F) R5.0, the WaveStar® TDM 10G (OC-192 2F) R5.0, and the WaveStar® TDM 10G (STM-64) R3.0 NEs.

Related information

See the "Network Element Timing Synchronization" (14-2) section in Chapter 14, "Timing Provisioning Concepts".

Task

Complete the following steps to release a timing reference or timing mode switch.

1 Select an NE from the map pane or subnetwork explorer on the Map window

OR

Select no NE at this point.

2 Choose **Fault** from the main menu bar on the Map window.

Result:

The Fault menu is displayed.

3 Choose **Synchronization** from the Fault menu.

Result:

The Synchronization sub-menu is displayed.

4 Choose **Release** from the Synchronization sub-menu.

If you did not choose an NE in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The Release Synchronization window is displayed.

5

TO...	DO THIS...
Release an external timing reference switch	Click the down arrow next to the Sync Switch Modifier field to display a drop-down list and choose Timing Reference Switch. Click the down arrow next to the Destination field to display a drop-down list and choose a destination.
Release an external timing output switch for the WaveStar® TDM 10G (STM-64) NEs.	Click the down arrow next to the Sync Switch Modifier field to display a drop-down list and choose Timing Output Switch. Click the down arrow next to the Destination field to display a drop-down list and choose a destination.
Release an timing mode switch	Click the down arrow next to the Sync Switch Modifier field to display a drop-down list and choose System Clock Mode Switch

6 After your select is made, click the Release button.

Result:

A question dialog window is displayed, informing you that releasing selected synchronization switch may affect NE operations and asks if you want to continue.

7 Choose Yes.

Result:

The request to release the selected synchronization protection switch is sent to the NE and performed.

END OF STEPS

Set Network and NE Delay Threshold

Purpose Use this procedure to set the Network and NE Delay threshold for date/time synchronization. The Network and NE Delay threshold is the allowable time that it takes for a ***RTRV-HDR*** message, requesting the date/time settings, to travel from the Navis™ Optical EMS host to an NE, for an NE to process the request, and for an NE's response to be received by the Navis™ Optical EMS host. The Network and NE Delay Threshold applies to all NEs under the Navis™ Optical EMS host's control. The allowed values are 01-999 seconds. The default is 15 seconds.

Before you begin Before you begin this task, access the Map window.

Task Complete the following steps to set the Network and NE Delay threshold for date/time synchronization..

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administraton menu is displayed.

2 Select **Network** from the Administration menu.

Result:

The Network sub-menu is displayed.

3 Select **Date/Time Mgmt** from the Network sub-menu.

Result:

A sub-menu is displayed.

4 Select **Set Network and NE Delay** from the displayed sub-menu.

Result:

The Set Network and NE Delay window is displayed.

5 Select the Network and NE Delay threshold value by clicking the up and down arrows to the right of the Delay field until the desired value (in seconds) is displayed in the field.

6 Click the OK button.

Result:

The threshold value selected is applied to date/time sychronization between the Navis™ Optical EMS host and managed NEs.

END OF STEPS

□

Set Network Element Date/Time Synchronization

Purpose

Use this procedure to manually initiate date/time synchronization for a single NE, a group of NEs, an aggregate, or all NEs under Navis™ Optical EMS control.

Before you begin

Before you begin this task, you must take into account whether the NE(s) being set with the date/time synchronization feature are located in the same or a different time zone as the Navis™ Optical EMS host. The NE's time zone can be set when you manually add a network element through the Add an NE window, or be modified through the Modify an NE window. You can also select to have the Navis™ Optical EMS automatically make adjustments for Daylight Savings Time (Spring Forward) and standard time (Fall Back) before doing date/time synchronization for the selected NE(s).

Be aware that if the Navis™ Optical EMS interfaces with the Navis™ Optical NMS, and if the time zone of the Navis™ Optical NMS server is set to GMT, the time zone of the Navis™ Optical EMS server should also be set to GMT, and the date/time synchronization feature in the Navis™ Optical EMS should be enabled to ensure date/time synchronization between the Navis™ Optical EMS host and its managed NEs. The time zone of the managed NEs should be set to Same As Host (which is the default), which would be GMT. The time zone of an NE can be changed through the Add/Modify an NE window.

Related information

For related information, see "Add a Network Element—X.25 Communications Via a Gateway Network Element" (3-4), "Add a Network Element—OSI Communications" (3-8), "Add a Network Element—TCP/IP Communications" (3-16), "Add a Gateway Network Element—X.25 Communications" (3-22), and "Modify a Network Element" (3-28) in the Chapter 3, "Management Communications Setup".

Task

Complete the following steps to manually perform date/time synchronization..

1 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

2 Select **Date/Time Synchronization** from the Configuration menu.

Result:

A sub-menu is displayed.

3 Select **Manual** from the sub-menu.

Result:

The Choose an NE/Aggregate window is displayed.

4

TO..	CLICK...
display a list of NEs	the NEs radio button
display a list of aggregates	the Aggregates radio button

5 Double-click on the NE or aggregate to select it for date/time synchronization.

To perform date/time synchronization on all NEs, scroll to the top of the Choose an NE/Aggregate window and double-click on the word ALL in the list.

Important! If there are any non-communicating NEs in the system, a warning dialog box is displayed with the warning message "...getDateTimeRsp is incomplete for X out of Y NEs". Click the OK button to close this dialog box.

6 Click the OK button. The Manual Date/Time Synchronization window is displayed.

7 Click the OK button to initiate date/time synchronization for the NE(s) or aggregate. Date/Time synchronization is initiated. A pop-up

window is displayed, showing the status of the date/time synchronization. The status is as follows:

- Completed—date/time synchronization is completed for the selected NE(s) or aggregate.
- Incomplete—The command to perform date/time synchronization may be completed but the time difference between the host and NE is greater than the drift threshold set.

Reference:

"Set Drift Threshold for Date/Time Synchronization" (6-20)

END OF STEPS

Enable Fall Back and Spring Forward

Purpose Use this procedure to enable or disable the Spring Forward (Daylight Savings Time) and Fall Back (standard time) feature to make automatic time adjustments in date/time synchronization for the selected NE(s)/aggregate(s).

Task Complete the following steps to enable or disable the Spring Forward/Fall Back time adjustment feature.

1 Select one or more NEs/aggregates from the Map window using the sub-procedure immediately following this procedure.

OR

Select no NEs/aggregates to use this feature for all NEs in your Target group.

Reference:

"SE 6-1: Selecting NEs and Aggregates on the Map Pane" (6-18)

2 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

3 Select **Date/Time Synchronization** from the Configuration menu.

Result:

A sub-menu is displayed.

4 Select **Spring/Fall Change** from the displayed sub-menu. If you have not yet selected the NE(s)/aggregate(s), the Choose an NE/Aggregate window is displayed. Select the NE(s)/aggregate(s) on which to use the Spring Forward/Fall Back feature and click the OK button.

Result:

The Fall Back and Spring Forward Status window is displayed.

5

IF ...	THEN ...
you want to enable the Spring Forward/Fall Back feature for the selected NE(s)	Click the “Enable FB/SF for above NEs” button.
you want to disable the Spring Forward/Fall Back feature for the selected NE(s)	Click the “Disable FB/SF for above NEs” button.

6 Click the OK button to activate your choices.

Important! If Daylight Savings Time is already in effect for an NE, and you disable Spring Forward/Fall Back for an NE, requiring a date/time synchronization, a pop-up window is displayed, asking if you want to automatically initiate date/time synchronization for the NE(s). Choose Yes to initiate automatic date/time synchronization for the NE or No to skip date/time synchronization for the NE.

END OF STEPS

SE 6-1: Selecting NEs and Aggregates on the Map Pane

To select a single NE or aggregate on the Map pane, position the mouse pointer over the NE or aggregate icon and click the select mouse button.

To select a group of NEs or aggregates on the Map pane.

1 Position the mouse pointer over a portion of the background adjacent to the items to be selected.

2 Click the mouse select button and drag the mouse pointer. As you drag the mouse pointer, an outlined box appears over the selected area.

3 Drag the mouse pointer over the NE(s)/aggregate(s) to be selected, enclosing them in the selection box. As items in the Map pane are

selected, they change color. Release the mouse select button. The items are selected.

END OF STEPS

To deselect a selected item in the Map pane, position the mouse pointer over the item and single-click the mouse select button. To deselect a group of items, position the mouse pointer anywhere in the Map pane (not on the NE symbol itself) and single-click the mouse select button. Any item in the box that is already selected becomes deselected.

□

Set Drift Threshold for Date/Time Synchronization

Purpose

Use this procedure to set the drift threshold, or the maximum time difference allowed (in seconds) between the NE and the EMS host before date/time synchronization is performed automatically. The default drift threshold is 15 seconds. If the time difference between the NE and EMS host is greater than the drift threshold set here when a communications link that was down has been brought back up, the NE's time zone changes, or there is a daylight savings time adjustment, date/time synchronization is performed automatically.

Before you begin

Before you begin this task, be sure that you make the drift threshold setting before enabling the Automatic Date/Time Synchronization feature.

To perform this task, access the Map window.

Task

Complete the following steps to set a drift threshold for automatic date/time synchronization.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Network** from the Administration menu.

Result:

A sub-menu is displayed.

3 Select **Date/Time Mgmt** from the sub-menu.

Result:

The Date/Time Management sub-menu is displayed.

4 Select **Set Drift** from the displayed sub-menu.

Result:

The Set Date/Time Synchronization Drift Cycle window is displayed.

5 Use the up and down spinner buttons next to the NE Drift Threshold field to select a drift value, in seconds, for the time difference between the NE and the EMS host before date/time synchronization is performed automatically.

6 Click the OK button.

Result:

The system processes your choice.

END OF STEPS

□

Enable/Disable Automatic Date/Time Synchronization

Purpose

Use this procedure to enable or disable automatic date/time synchronization. When this feature is enabled, the Navis™ Optical EMS automatically sets each NE's date/time to match the Navis™ Optical EMS host's date/time on establishing communication with an NE for the first time or if the communications link between the Navis™ Optical EMS host and the NE is down for more than 15 seconds, or the drift threshold specified using the Date/Time Synchronization Drift window. Automatic date/time synchronization takes into account whether the NE is set up in a different time zone than the Navis™ Optical EMS host. The Navis™ Optical EMS also makes adjustments for Daylight Savings Time and Standard time if the NE has the Fall Back/Spring Forward feature enabled.

Before you begin

Before you begin this task, you must decide if changes to the time zone setting must be made for the NE(s) in the network for date/time synchronization to work properly. You must also check if the Fall Back/Spring Forward feature is enabled (it is enabled, by default). To perform this task, access the Map window.

Be aware that if the Navis™ Optical EMS interfaces with the Navis™ Optical NMS, and if the time zone of the Navis™ Optical NMS server is set to GMT, the time zone of the Navis™ Optical EMS server should also be set to GMT, and the date/time synchronization feature in the Navis™ Optical EMS should be enabled to ensure date/time synchronization between the Navis™ Optical EMS host and its managed NEs. The time zone of the managed NEs should be set to Same As Host (which is the default), which would be GMT. The time zone of an NE can be changed through the Add/Modify an NE window.

Task

Complete the following steps to enable or disable automatic date/time synchronization.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Network** from the Administration menu.

Result:

The Network sub-menu is displayed.

3 Select **Date/Time Mgmt** from the Network sub-menu.

Result:

The Date/Time Management sub-menu is displayed.

4 Select **Automatic Date/Time Sync** from the Date/Time Management sub-menu.

Result:

The Automatic Date/Time Sync window is displayed.

5

IF …	THEN …
you want to enable Automatic Date/Time Synchronization	click the Enable button.
you want to disable Automatic Date/Time Synchronization	click the Disable button.

6 Click the OK button.

Result:

The system processes your choice.

When processing is completed, the Status Dialog window is displayed, indicating the change in the automatic date/time synchronization setting.

END OF STEPS

□

Schedule Network Element Date/Time Synchronization

Purpose Use this procedure to schedule date/time synchronization for an NE.

Before you begin Before you begin this task, be aware that if you are scheduling a job to be performed monthly, regardless of the frequency (every x months) that a job is scheduled, the first time the job will be performed will be at the time and day you selected, which can occur in the current month or the following month. For example, if you have scheduled a job to be performed once every two months, at 1:00 AM, on the 21st day of the month, the first time that the job will be performed could be on the 21st day of this month, if that date has not yet passed.

Be aware that if the Navis™ Optical EMS interfaces with the Navis™ Optical NMS, and if the time zone of the Navis™ Optical NMS server is set to GMT, the time zone of the Navis™ Optical EMS server should also be set to GMT, and the date/time synchronization feature in the Navis™ Optical EMS should be enabled to ensure date/time synchronization between the Navis™ Optical EMS host and its managed NEs. The time zone of the managed NEs should be set to Same As Host (which is the default), which would be GMT. The time zone of an NE can be changed through the Add/Modify an NE window.

Task Complete the following steps to schedule date/time synchronization for an NE.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Schedule** from the Administration menu.

Result:

A sub-menu is displayed.

3 Select **Date/Time Sync** from the sub-menu.

Result:

The Schedule Manager window is displayed, showing a list of currently scheduled date/time synchronizations.

4 Click the Add button.

Result:

The Add a Scheduled Date/Time Sync window is displayed.

5 Choose an NE (by TID) from the Choose an NE scroll bar list by double-clicking on the item. Use the type ahead field and/or filter/sort functions to narrow the list, if necessary.

6 Choose the following Scheduling Options, as needed:

- Daily—click on this radio button if you want the task to be done on a daily basis. If you schedule the task to be done daily, use the Schedule Time spinner field to select the time of day for the scheduled task.
- Weekly on...—click on this radio button if you want to task to be done on a weekly basis. If you schedule the task to be done weekly, choose the day of the week by using the spinner field list next to this option.
- Once every...—click on this radio button if you want the task to be done periodically. If you schedule the task to be done periodically, choose the frequency (every *x* month(s)) and the day of the month it will be done using the spinner field lists next to this option or click the Last Day of the Month checkbox.
- Schedule Time—click the up and down arrows on this spinner field to select the time of day for the scheduled task. The schedule time is in 24-hour format, in hours:minutes. You can also type the time into this field. The time must be input in 24-hour format as hh:mm in 15 minute increments (for example, 11:15 P.M. is entered as 23:15). If the time entry is invalid, the color of the field changes to yellow, and you must re-enter a valid time in the proper format.

7 Click the Apply button to activate your choices, or click the OK button to activate your choices and close the window.

END OF STEPS

□

Modify a Scheduled Task

Purpose Use this procedure to change the parameters of a task for any function that can be scheduled.

Before you begin Before you begin this task, be aware that you cannot modify a scheduled task that is already in progress. You cannot modify another user's scheduled tasks unless you are the system administrator or have a privileged login.

To perform this task, access the Map window.

Task Complete the following steps to modify a scheduled task.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Schedule** from the Administration menu.

Result:

The Schedule sub-menu is displayed.

3 Select the function of the task to be modified.

Result:

The Scheduler Manager window for the selected function is displayed, showing a list of currently scheduled tasks.

4 Select a task from the list to be modified.

5 Click the Modify button.

Result:

The appropriate Modify a Scheduled Item window is displayed.

6 Make modifications to the information.

7 Click the Apply button to apply the changes or click the OK button to apply the changes and close the window.

END OF STEPS

□

Delete a Scheduled Task

Purpose

Use this procedure to delete a scheduled task for any function that can be scheduled.

Before you begin

Before you begin this task, be aware that you cannot delete any scheduled task that is already in progress. You cannot delete another user's scheduled tasks unless you are the system administrator or have a privileged login.

To perform this task, access the Map window.

Task

Complete the following steps to delete a scheduled task.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Schedule** from the Administration menu.

Result:

The Schedule sub-menu is displayed.

3 Select the function of the task to be deleted.

Result:

The Scheduler Manager window for the selected function is displayed, showing a list of currently scheduled tasks.

4 Choose the item to be deleted, which is identified by TID, from the list.

5 Click the Delete button.

Result:

A pop-up question dialog window is displayed, asking if you want to delete the selected scheduled task.

6 Choose Yes to delete the selected scheduled task or No to cancel the deletion.

END OF STEPS

□

7 Traffic Provisioning

Overview

Purpose

This chapter describes procedures related to traffic provisioning, including procedures for setting up optical associations and NE cross-connections.

Before you begin

Read Chapter 14, "Timing Provisioning Concepts" to learn about optical associations and cross-connections in the NE.

Contents

Add an Optical Association or Connection	7-3
Delete an Optical Association	7-7
Add a Single NE Cross-Connection	7-9
Roll a One-Way Cross-Connection	7-17
Roll a Two-Way Cross-Connection	7-21
Add a Path-Protected Cross-Connection	7-25
Add an Adjunct Path-Protected Cross-Connection	7-31
Add an NE Multi-Cast Cross-Connection	7-36
Add Compound Cross-Connections (via the Cross Connect Template)	7-39
Add a One-Way Merge Cross-Connection (for LambdaRouter™ 128/256 AOS NEs)	7-47

Add a One-Way Bridge Cross-Connection (for LambdaRouter™ 128/256 AOS NEs)	7-54
Add a Two-Way Cross-Connection (for LambdaRouter™ 128/256 AOS NEs)	7-61
Delete an NE Cross-Connection—Graphical	7-67
Delete an NE Cross-Connection—Textual	7-70
Delete Multiple NE Cross-Connections—Textual	7-73
Modify an NE Cross-Connection—Graphical	7-76
Modify an NE Cross-Connection—Textual	7-79
Add a Loopback	7-82
View Loopbacks	7-88
Delete a Loopback	7-90

Add an Optical Association or Connection

Purpose Use this procedure to add an optical association or connection.

Before you begin During this task, the user will need to specify the following:

- The association type (for optical associations) or connection type (for optical connections)
- The line on which the association will operate
- The optical channel power level (for OLS 400G/1.6T External Add associations only).
- The source and destination port information
- The port location (for OLS 400G/1.6T Add or Terminal Drop associations only)

Be aware that the Port Location field is only displayed for OLS 400G/1.6T R. NEs for Add or Terminal Drop associations, and it is an optional field. Some OLS 400G NEs do not require a port location to be chosen.

Screen examples shown in this procedure are for illustration purposes. The specific information displayed on a window will vary, based on the NE type.

Task Complete the following steps to add an optical association.

1 Select an NE from the map pane or subnetwork explorer on the Map window

OR

Select no NE at this point.

2 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration sub-menu is displayed.

3 Select **Connection Management** from the Configuration sub-menu.

Result:

The Connection Management sub-menu is displayed.

4 Select **Optical Channel Connections** from the Connection Management sub-menu.

If you did not choose an NE in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The Optical Associations Manager window is displayed

The Optical Associations Manager window contains all optical associations currently in the network element with Direction, Line, From Port, To Port, Optical Channel Power and Port Location information (for Navis™ Optical EMSOLS 1.6T NEs).

5 Click the Add button to add an optical association or connection.

Result:

The first Add Optical Associations window is displayed.

6 Choose an association type or connection type to be added for the selected NE.

Result:

The Next button is enabled.

7 Click the Next button.

Result:

The next Add Optical Associations window is displayed to choose line and port information for the selected association/connection type.

The values that you can select in the Line, From Port, and To Port fields are limited to what is compatible with the NE selected, the association/connection type chosen, and the available ports for that association/connection.

In many cases, some of these fields are disabled, because the only available choice has already been pre-selected by the system.

8 Choose the port information by clicking the down arrow next to the applicable port field to display a drop-down list of choices. Select a port from the drop-down list.

The port information fields consist of the following:

- The first field is a drop-down list of valid bay-shelf-slot level AIDs for the circuit pack type chosen in the first field
- The second field is a drop-down list of valid circuit pack types for the source of the association/connection type
- The third field is a drop-down list of valid frequencies or port numbers for the circuit pack type and bay-shelf-slot level AIDs chosen for the association/connection type

For WaveStar®OLS 1.6T NE External Add associations, an additional parameter field is displayed at the top of the window:

- Optical Channel Power Level—Select the optical channel power level by clicking the down arrow next to the field to display a drop-down list. The available choices are high and low.

For each port information field, click the down-arrow next to the field to display a drop-down list of available choices. Select a choice from the drop-down list.

9 Click the Next button.

Result:

The next Add Optical Associations window is displayed, showing the selected information for the association/connection.

10 If you want to change any information entered for the association/connection, or enter additional associations/connections for this NE, click the Back button to go back to the previous windows.

If you are finished adding associations/connections at this point, click the Finish button.

Result:

A status window is displayed.

If you entered a multi-association connection, one line per association (not one line per connection) is shown in the status window.

If the association/connection addition is successful, a status of "Completed" is shown in the status window indicating that the association/connection has been added.

If the operation failed for some reason (for example, the NE lost communications with the system while in the process of adding the association/connection), a status of "Incomplete" is shown in the status window next to the attempted addition.

11 Click the Close button to close the status window.

END OF STEPS

□

Delete an Optical Association

Purpose Use this procedure to delete an optical association.

Before you begin Before you begin, be aware that before deleting an optical association, you must first un-provision any ports or circuit packs related to the optical association from ASAP profile assignments.

Task Complete the following steps to delete an optical association.

1 Select an NE from the map pane or subnetwork explorer on the Map window

OR

Select no NE at this point.

2 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration sub-menu is displayed.

3 Select **Connection Management** from the Configuration sub-menu.

Result:

The Connection Management sub-menu is displayed.

4 Select **Optical Channel Connections** from the Connection Management sub-menu.

If you did not choose an NE in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The Optical Associations Manager window is displayed.

The Optical Associations Manager window contains all optical associations currently in the network element with Direction, Line, From Port, To Port, Optical Channel Power and Port Location information (for WaveStar®OLS 1.6T NEs).

5 Click on the association to be deleted in the list.

To select more than one adjacent association in the list for deletion, press and hold the left mouse button and drag the mouse cursor down the list until the desired associations are selected. To select more than one non-adjacent association in the list, press and hold the Control key while positioning the mouse cursor and clicking the left mouse button to select one association at a time, or clicking/holding the left mouse button and dragging the mouse cursor across the desired association entries. Then, release the mouse button. The selections are highlighted.

6 Click the Delete button.

Result:

A message box is displayed asking you to confirm the deletion.

7

TO...	DO THIS...
Delete the association(s) in the NE	Click on Yes in the message box.
Cancel the deletion	Click on No in the message box.

8 Choose Yes.

Result:

A status window is displayed, indicating whether the deletion is successfully completed.

If you deleted more than one association, one line per deleted association is shown in the status window.

END OF STEPS

□

Add a Single NE Cross-Connection

Purpose

Use this procedure to add new NE cross-connections.

Before you begin

Before you begin this task, determine the NE and the elements for which you want to add cross-connections.

Prior to creating cross-connections, make sure that the associated ports have been provisioned correctly. See "Provision NE Ports" (4-4) in Chapter 4, "Equipment Provisioning".

There are several ways to access the Cross-Connection window besides the method described in this procedure. Other ways to access the Cross-Connection window:

1. ***From the Map Main Menu***
   a. Choose the network element to work with in the Map.
   b. Choose **Configuration** from the main menu.
   c. Choose **Connection Management** from the Configuration sub-menu.
   d. Choose **Cross Connection** from the Connection Management sub-menu.
   e. The Cross Connection Window is displayed.
2. ***Equipment View Window Menu***
   a. Choose **Configuration** from the equipment view main menu.
   b. Choose **Connection Managment** from the Configuration sub-menu.
   c. Choose **Cross Connection** from the Connection Management sub-menu.
   d. The Cross-Connection Window is displayed.
3. ***Equipment View Pop-Up Menu***
   a. Right click over the equipment whose cross connection window is to be displayed.
   b. Choose **Connection Management** from the popup menu.
   c. Choose **Cross Connection** from the Connection Management sub-menu.
   d. The Cross-Connection Window is displayed.

When a port tributary is displayed in the Main View of the Cross-Connection window, and you position the mouse cursor on the tributary block, a message is displayed next to the tributary address in the status bar identifying it as a “Source” or “Destination” tributary. The “Source” and “Destination” literal displayed in the status bar is used to indicate whether the tributary could act as a “Source” or “Destination” , or both, for additional cross-connections.

On the Cross-Connection window, the availability of a port tributary to be the source or destination for a cross-connection is also indicated by a block of letters that precede the tributary’s AID in the Network Element Explorer portion of the window. There are two letters, “S” (for Source) and “D” (for Destination) if the tributary has been provisioned to carry traffic bidirectionally. If it is only provisioned to serve as the Source or Destination for traffic, the appropriate letter, “S” or “D” is prefixed to the AID. The background color of the letter indicates whether it is available or not. The color blue indicates that it is already serving as the source (or destination), or both, for another cross-connection. For example, if the “S” (for Source) background color is blue, the tributary can only be the destination for a new cross-connection.

If the background color of the selected tributary in the explorer is gray, this indicates that the tributary is provisioned to allow cross-connections at a lower rate than the selected level. For example, if the selected tributary is an STS-12, the background color of the letter block preceding the AID in the explorer is gray, indicating that you can expand the explorer to the STS-3 and STS-1 tributary level and make cross-conections at the STS-3 or STS-1 level.

Task **Important!** The screen examples shown in this procedure are for illustration purposes. The specific information displayed on the Cross-Connection window will vary by NE type.

Complete the following steps to add a single new cross-connection.

1 Position the mouse cursor on the NE in the Map pane portion of the Map window and click the menu (right) menu mouse button. A pop-up menu is displayed. Choose **Connection Management** from

the pop-up menu, then choose **Cross Connection** from the Connection Management sub-menu.

OR

Choose **Configuration** from the main menu bar on the Map window. The Configuration menu is displayed. Choose **Connection Management** from the Configuration menu. Choose **Cross Connection** from the Connection Management sub-menu. The Choose an NE window is displayed. Double-click on the NE in the window list and click the OK button.

Result:

The Cross-Connection window for the selected NE is displayed.

The equipment hierarchy in the Network Element Explorer portion of the window is automatically expanded to the slot (circuit pack) level for the NE.

You can also expand any level of the equipment hierarchy (bay,shelf, slot, port) in the Network Element Explorer by clicking the plus (+) sign next to the item. To collapse the item, click the minus (-) sign next to it. If items in the explorer are partially obscured, place the mouse cursor on the pane edge between the right side of the explorer and Main View, click and hold the left mouse button, and drag the edge to the right until the explorer items can be seen clearly.

2 Position the mouse cursor on the slot displayed in the explorer tree. Press the select (left) mouse button twice to highlight the slot and expand the explorer tree to show the port groups beneath the slot.

To show or hide all cross-connection lines, click the Show/Hide button on the window toolbar. If cross-connection lines were hidden, they will now be displayed. If they were displayed, they will now be hidden.

To show or hide a single cross-connection line, click on an AID representation (building block) that indicates that it contains a cross-connection and click the Show/Hide toolbar button. The desired cross-connection line is displayed or hidden.

3 Expand and display the desired source port tributary in the Main View of the Cross-Connect window. There are two ways to do this:

- Position the mouse cursor on the port in the explorer to be expanded and click the menu (right) mouse button to display a pop-up menu of positions. Select the position for the tributary block from the pop-up menu list (left, right, top, or bottom).
- Position the mouse cursor on the port in the explorer, click and hold the select (left) mouse button and drag the selected port into the left, right, top, or bottom portion of the Main View of the Cross-Connect window. The tributary block for the selected port is displayed in the Main View.

Important! To remove a tributary block from the Main View, position the mouse cursor on the tributary block. Then, click the right mouse button. A single option, “Clear”, is displayed in a pop-up window. Move the mouse cursor over the word “Clear” in the pop-up window and click the left mouse button. The tributary block is cleared from the Main View.

4 Select the destination port tributary using one of the methods described and position it on the top, bottom, left, or right portion of the Main View, using one of the methods described in step 3 for the source port tributary.

Important! Do not place the destination tributary on top of a previously selected/positioned source tributary block.

5 Move the mouse cursor to the source tributary block on the Main View and click the select (left) mouse button to select the source tributary for the cross-connection. The color of the selected tributary block changes from yellow to magenta.

Important! If necessary, click the arrow keys located next to the tributary blocks displayed to scroll and locate the tributary you want to use. When you position the cursor on a tributary block, the status bar indicates the tributary address and whether the tributary is available to be used as a source or destination, or both.

The available cross-connection type buttons are enabled at the top toolbar portion of the window above the Main View and Network

Element Explorer. If a specific type of cross-connection is not possible for the source tributary selected, its cross-connection type button is greyed out.

6 Select the cross-connection type by clicking on the appropriate cross-connection type button at the top portion of the window.

Result:

The color of the selected source tributary block changes to green.

7 Move the mouse cursor and position it on the destination port tributary block.

8 Click the select (left) mouse button on the destination port tributary block to select it.

Result:

A Cross-Connect Attributes window is displayed for selecting certain attributes for the cross-connection, such as:

- ALIAS — this attribute is used to provision a label for the cross-connection. The label can be used for a customer's internal name for the cross-connection or other miscellaneous information (such as associating a circuit ID with the cross-connection). This label can be modified later. The cross-connection alias is maintained in the Navis™ Optical EMS database and is displayed in the cross-connection list. This field is optional.
- LOCA node
- LOCZ node
- OMODE — originating mode
- REDLINE — this attribute is used to identify the redline status of a cross-connection. Redlining a cross-connection prohibits the cross-connection from being deleted unless redlining is disabled. This attribute may not be provisionable for the cross-connection type/NE type.

- Cross-Connection Application (XCAPPL) — this attribute is used to identify the cross-connection type. This field is optional.
- Cross-Connection Number — this attribute is used to assign identifying numbers to atomic cross-connections with the same output tributary.

To change any/all of the attributes displayed on the Attributes window, click the down arrow next to the respective field to display a drop-down list of choices, select the choice from the list, and then click the OK button on the Cross-Connect Attributes window to activate your choice(s) or the Cancel button to cancel the attribute changes and the current cross-connection operation for the previously selected source/destination tributaries.

9 After making your selections on the Attributes window, click the OK button.

Important! If you click the Cancel button on the Cross-Connect Attributes window (if one is displayed) at this point, you will have to select the source tributary, the cross-connection type, and the destination tributary again.

Result:

A pop-up question dialog window is displayed, asking if you are sure that you want to create the selected type of cross-connection between the selected source and destination tributaries. Choose Yes to iniitiate the cross-connection or No to cancel the cross-connection operation.

10 Choose Yes to create the cross-connection.

Result:

The line of the newly created cross-connection momentarily changes to orange.

When the cross-connection has been established, the line and arrows of the created cross-connection change color from orange to black and the colors of the tributary blocks change to blue, indicating that the cross-connection has been made.

The sample cross-connection created in this procedure was made at the STS-1 level, even though the STS-12 tributary block was originally expanded and displayed in the Main View, the use of the involved tributaries (in this case, the STS-1 level tributaries) as a source or destination for the new cross-connection is indicated in the Network Element explorer portion of the window. The color of the "S" or "D" letter in front of the tributary's AID in the explorer has been changed to blue, indicating that is now in use as a source or destination for a cross-connection.

11 To verify the changes made on the tributary in the Network Element Explorer, expand the affected tributary block down to the level that the cross-connection was made by clicking the plus (+) sign next to the tributary AID. For example, at the STS-12 level, click the plus (+) sign to see the STS-3 tributaries below the STS-12. In this case, click the plus (+) sign next to the STS-3 of the involved tributary block to see the STS-1 tributaries where the cross-connection was made.

Notice that, for the STS-1 tributary used as the source of the cross-connection, the background color of the "S" displayed in front of the AID in the explorer is blue. For the STS-1 tributary used as the destination of the cross-connection, the background color of the "D" displayed in front of the AID in the explorer is blue.

The cross-connection has been successfully made.

To print a copy of the window, go to step 12. Otherwise, the procedure is finished. Choose **File** from the menu bar, then choose **Close** to close the window.

12 To print a copy of the window, choose File from the menu bar, and then choose **Print Screen** from the File sub-menu (this step is optional).

Result:

A Print window is displayed, allowing you to choose the destination printer and specifications for the print job.

13 Make selections for the printer destination and specifications on the Print window and click the OK button.

Result:

The window with the cross-connection information is printed.

END OF STEPS

Roll a One-Way Cross-Connection

Purpose

Use this procedure to roll a one-way cross-connection. A roll operation consists of moving the input (source) of an existing leg of a one-way or two-way point-to-point cross-connection from the current input (source) tributary to a new input (source) tributary, while leaving the output tributary unchanged. Typically, a roll is used as a tail-end switch in a “facility or tributary” rolling operation, whereby traffic is moved from one facility to another or from one tributary to another on a facility. The head-end side of a facility or tributary roll usually has a bridge established (in one NE) so that the traffic flows on both the old and new facilities, minimizing the signal interruption time when the roll is carried out to that introduced by the roll itself (in the other NE). A roll is inherently a one-way operation, but because facilities are generally two-way, a head-end bridge/tail-end roll sequence is typically done in both directions.

Before you begin

Before you begin this task, determine the existing cross-connection for which you want to roll a cross-connection.

Description

This task explains how to roll an input (source) of an existing one-way point-to-point cross-connection.

In this procedure, rolling the input (source) of an existing one-way cross-connection is described in the context of a “bridge and roll” operation, where the output tributary on an existing one-way cross-connection is “bridged” to a new destination (output) tributary to preserve traffic flow. Once the bridge is established, the original one-way cross-connection can be deleted. The newly formed one-way cross-connection can be rolled to a new input (source) tributary.

Task

Use the following procedure to roll a one-way cross-connection (explained in the context of a “bridge and roll” operation.

1 Display the Cross-Connection window, as described in “Add a Single NE Cross-Connection” (7-9).

2 Add a new one-way cross-connection as described in “Add a Single NE Cross-Connection” (7-9).

3

IF...	THEN...
The Main View of the Cross-Connecton window is open and the one-way cross-connection to be rolled is displayed.	Go to Step 5.
The Main View of the Cross-Connection window is **not** open and the one-way cross-connection to be rolled is **not** displayed	Display the Cross-Connection window, as described in "Add a Single NE Cross-Connection" (7-9). Select the source tributary of the existing cross-connection and display the cross-connection.There are two ways to do this: • Position the mouse cursor on the port in the explorer to be expanded and click the menu (right) mouse button to display a pop-up menu of positions. Select the position for the tributary block from the pop-up menu list (left, right, top, or bottom). • Position the mouse cursor on the port in the explorer, click and hold the select (left) mouse button and drag the selected port into the left, right, top, or bottom portion of the Main View of the Cross-Connect window. The tributary block for the selected port is displayed in the Main View.

4

IF...	THEN...
If the existing one-way cross-connection to be rolled is not yet displayed and you selected the source tributary in Step 3	Select and display the destination tributary of the cross-connection, using one of the methods described in Step 3 . The cross-connection for the selected tributary should be displayed in the Main View of the Cross-Connection window.**Important!** If the existing cross-connection is not displayed in the Main View, click the Show/Hide toolbar button to see if the lines of the cross-connection were hidden.

5 Select the one-way cross-connection to be rolled by positioning the mouse cursor on the lines of the cross-connection and clicking the left mouse button. The line of the cross-connection becomes thicker.

6 Click the Roll button on the Cross-Connection window toolbar.

Important! If you are not sure which button is the Roll button on the toolbar, move the mouse cursor across each button until the Roll function is indicated in the status bar and/or a tooltip. Then click the Roll button.

Result:

A pop-up window is displayed, prompting you to select a new input (source) tributary for the roll.

7 Click the OK button to close the pop-up window.

8 Select the new input tributary (source) for the roll by clicking on the tributary block.

Result:

A Roll Cross Connect Attributes window is displayed.

9 On the Roll Cross Connect Attributes window, choose the new LOCA NE by clicking the down arrow next to the NEWLOCA field to

display a drop-down list of choices. This list may contain just the current NE or more choices, depending on the rate of the selected source tributary.

10 After choosing the NEWLOCA NE, click the OK button on the Roll Cross Connect Attributes window.

Result:

A pop-up window is displayed, asking if you really want to perform the roll operation for the selected cross-connection.

11 Choose Yes.

Result:

The color of the line of the cross-connection momentarily changes to orange, then to black when it is completed. The cross-connection is rolled to the new source tributary.

END OF STEPS

□

Roll a Two-Way Cross-Connection

Use this procedure to roll a two-way cross-connection. A roll operation consists of moving the input(source) of an existing leg of a one-way or two-way point-to-point cross-connection from the current input (source) tributary to a new input (source) tributary, while leaving the output tributary unchanged. Typically, a roll is used as a tail-end switch in a “facility or tributary” rolling operation, whereby traffic is moved from one facility to another or from one tributary to another on a facility. The head-end side of a facility or tributary roll usually has a bridge established (in one NE) so that the traffic flows on both the old and new facilities, minimizing the signal interruption time when the roll is carried out to that introduced by the roll itself (in the other NE). A roll is inherently a one-way operation, but because facilities are generally two-way, a head-end bridge/tail-end roll sequence is typically done in both directions.

Before you begin

Before you begin this task, determine the existing cross-connection for which you want to roll a cross-connection.

Task

This task explains how to roll input (source) legs of an existing two-way point-to-point cross-connection in both directions..

1 Display the Cross-Connection window, as described in “Add a Single NE Cross-Connection” (7-9).

2 Add a new two-way cross-connection using the methods described in “Add a Single NE Cross-Connection” (7-9).

Result:

The two-way cross-connection created is displayed in the Main View of the Cross-Connection window.

3 Click the right mouse button to display a pop-up list showing the two one-way cross-connections that comprise the two-way cross-connection.

4 Select the two-way cross-connection to be rolled to a different source tributary by positioning the mouse cursor on the cross-connection in the pop-up list and clicking the left mouse button.

Result:

The pop-up list disappears from the window and the line and arrow of the selected cross-connection becomes thicker in the Main View.

5 Click the Roll button on the Cross-Connection window toolbar.

Important! If you are not sure which button is the Roll button on the toolbar, move the mouse cursor across each button until the Roll function is indicated in the status bar and/or a tooltip. Then click the Roll button.

Result:

A pop-up window is displayed, asking you to specify the leg of the cross-connection to roll.

6 Choose the leg to roll by clicking the appropriate radio button.

Result:

A pop-up window is displayed, prompting you to select a new input (source) tributary for the roll.

7 Click the OK button to close the pop-up window.

8 Select the new input tributary (source) for the roll by clicking on the tributary block.

Result:

A Roll Cross Connect Attributes window is displayed.

9 On the Roll Cross Connect Attributes window, choose the new LOCA NE by clicking the down arrow next to the NEWLOCA field to display a drop-down list of choices. This list may contain just the

current NE or more choices, depending on the rate of the selected source tributary.

10 After choosing the NEWLOCA NE, click the OK button on the Roll Cross Connect Attributes window.

Result:

A pop-up window is displayed, asking if you really want to perform the roll operation for the selected cross-connection.

11 Choose Yes.

Result:

The color of the line of the cross-connection momentarily changes to orange, then to black when it is completed. The cross-connection is rolled to the new source tributary.

12 Select the other one-way cross-connection that comprises the two-way cross-connection by either positioning the mouse cursor on the cross-connection line and clicking the left mouse button to select it or by positioning the mouse cursor on the cross-connection lne, clicking the right mouse button to display a pop-up list window with the cross-connection, then clicking the left mouse button to select it in the pop-up list window.

Result:

The line of the cross-connection becomes thicker and the color of the destination tributary block changes to purple.

13 Click the Roll button on the Cross-Connection window toolbar.

Important! If you are not sure which button is the Roll button on the toolbar, move the mouse cursor across each button until the Roll function is indicated in the status bar and/or a tooltip. Then click the Roll button.

Result:

A pop-up window is displayed, prompting you to select a new input (source) tributary for the roll.

14 Click the OK button to close the pop-up window.

15 Select the new input tributary (source) for the roll by clicking on the tributary block.

Result:

A Roll Cross Connect Attributes window is displayed.

16 On the Roll Cross Connect Attributes window, choose the new LOCA NE by clicking the down arrow next to the NEWLOCA field to display a drop-down list of choices. This list may contain just the current NE or more choices, depending on the rate of the selected source tributary.

17 After choosing the NEWLOCA NE, click the OK button on the Roll Cross Connect Attributes window.

Result:

A pop-up window is displayed, asking if you really want to perform the roll operation for the selected cross-connection.

18 Choose Yes.

Result:

The color of the line of the cross-connection momentarily changes to orange, then to black when it is completed. The cross-connection is rolled to the new source tributary.

END OF STEPS

□

Add a Path-Protected Cross-Connection

Purpose

Use this procedure to create a path-protected cross-connection. This type of cross-connection can be used in Bidirectional Line-Switched Ring (BLSR)/Dual Node Interconnection (DNI) and Unidirectional Path-Switched Ring (UPSR)/Subnetwork Connection Protection (SNCP) topologies.

For Dual Ring Interworking(DRI)/DNI applications, the path-protected cross-connection comprises one add and one through cross-connection with a working and protection leg. On an LCT, the source address for DRI-type path-protected cross-connections must be on a low speed interface.

For UPSR/SNCP applications, a 1-way path-protected cross-connection is created at the drop node, consisting of two drop cross-connections with a working and protection leg.

This type of cross-connection can be assigned to a Path Protection Group Name, which allows all cross-connections with the same Path Protection Group Name to be retrieved in a single request to the NE. This is a 1-26 character name that can consist of, for example, a combination of both input port AIDs.

The path protection behavior between the working and protection legs of the cross-connection can be defined as non-revertive with no hold-off time (NN) (the initial setting for UPSR/SNCP applications) or revertive with a hold-off time enabled (RH) (the initial setting for DRI/DNI applications).

Before you begin

Before you begin this task, determine the NE for which you want to create a path-protected cross-connection.

Be aware that for creation of path-protected cross-connections in a BLSR configuration, ports associated with the input tributaries for this type of cross-connection must be provisioned to be in a 2-Fiber BLSR configuration. Also, the path protection behavior in the Cross-Connect Attributes window must be set to revertive with a hold-off time enabled (RH).

Be aware that Gigabit Ethernet tributaries (Virtual Concatenation Groups) can be used to create path-protected cross-connections.

Task Complete the following steps to add a path-protected cross-connection.

1 Position the mouse cursor on the NE in the Map pane portion of the Map window and click the menu (right) menu mouse button. A pop-up menu is displayed. Choose **Connection Management** from the pop-up menu, then choose **Cross Connection**.

OR

Choose **Configuration** from the main menu bar on the Map window. The Configuration menu is displayed. Choose **Connection Management** from the Configuration sub-menu. Choose **Cross Connection** from the Connection Management sub-menu. The Choose an NE window is displayed. Double-click on the NE in the window list and click the OK button.

Result:

The Cross-Connection window for the selected NE is displayed.

The equipment hierarchy in the Network Element Explorer portion of the window is automatically expanded to the slot (circuit pack) level for the NE.

You can expand any item in the Network Element Explorer by clicking the plus (+) sign next to the item. To collapse the item, click the minus (-) sign next to it. If items in the explorer are partially obscured, place the mouse cursor on the pane edge between the right side of the explorer and Main View, click and hold the left mouse button, and drag the edge to the right until the explorer items can be seen clearly.

2 Position the mouse cursor on the plus (+) sign next to each slot in the explorer portion of the window, then click and expand the equipment hierarchy until all ports for the cross-connection are shown.

3 Expand and display the desired source port tributary in the Main View of the Cross-Connect window. There are two ways to do this:

- Position the mouse cursor on the port in the explorer to be expanded and click the menu (right) mouse button to display a pop-up menu of positions. Select the position for the tributary block from the pop-up menu list (left, right, top, or bottom).
- Position the mouse cursor on the port in the explorer, click and hold the select (left) mouse button and drag the selected port into the left, right, top, or bottom portion of the Main View of the Cross-Connect window.

Result:

The tributary block for the selected port is displayed in the Main View.

To remove a tributary block from the Main View, position the mouse cursor on the tributary block. Then, click the right mouse button. A single option, “Clear”, is displayed in a pop-up window. Move the mouse cursor over the word “Clear” in the pop-up window and click the left mouse button. The tributary block is cleared from the Main View.

4 Select and display the destination port tributary in the Main View, using one of the methods described in step 3.If necessary, click the arrow keys located next to the tributary blocks displayed to scroll and locate the tributary you want to use. When you position the cursor on a tributary block, the status bar indicates the tributary address and whether the tributary is available to be used as a source or destination, or both.

5 Select and display the secondary source port tributary (to be used initially for the protection leg of the cross-connection) in the Main View, using one of the methods described in step 3.

6 Position the cursor on the tributary to be used as the source (input) tributary and click the left mouse button to select it.

Result:

The selected tributary block changes color from yellow to magenta (yellow/brown)The available cross-connection type buttons are enabled at the toolbar portion of the window above the Main View and Network Element Explorer. If a specific type of cross-connection is not possible for the source tributary selected, these cross-connection type buttons are greyed out.

7 Click on the cross-connection type toolbar button, One Way PP (for One Way Path-Protected).

Important! If you are not sure which button is the One way PP cross-connection type toolbar button, move the mouse cursor across each cross-connection type toolbar button until the label One Way PP is displayed in the status bar in the bottom portion of the window. A tooltip help bubble with the label One Way PP will also be displayed (if tooltips help has been enabled through the Preferences window).

Result:

The color of the selected source/input tributary changes to green

8 Position the cursor on the tributary to be used for the working output/destination leg of the cross-connection and click the left mouse button to select it.

Result:

The color of the selected tributary changes to purple.

9 Position the cursor on the tributary to be used for the protection/secondary source leg of the cross-connection and click the left mouse button to select it.

Result:

The color of the selected protection/secondary tributary block changes from yellow to magenta (yellow/brown).

A pop-up Cross-Connections Attributes window is displayed.

This window is used to specify the attributes of the path-protected cross-connection. Select values for the following fields as needed:

- LOCA—click the down arrow next to this field to display a drop-down list of NEs and select the NE to be used as the source node for this cross-connection. The field defaults to the current NE.
- LOCZ—click the down arrow next to this field to display a drop-down list of NEs and select the NE to be used as the destination node for this cross-connection. The field defaults to the current NE.
- LOCA2—click the down arrow next to this field to display a drop-down list of NEs and select the NE to be used as the secondary source node (for DRI/DNI application of the path-protected cross-connection). The field defaults to the current NE.
- OMODE—click the down arrow next to this field to display a drop-down list of options for the Output Mode for this cross-connection.
- APPL (Application)—click the down arrow next to this field to display a drop-down list of choices for the application (type) of cross-connection. Select 1-Way Path-Protected as the application.
- XCNUM (Cross-Connection Number)—this field is pre-populated with a Cross-Connection number (it functions as a drop-down list; you can click the down arrow to display and select the number). The Cross-Connection Number is used to associate all atomic cross-connections that are created from the same associated legs and leg-pairs so information can be retrieved from the NE together. This Cross-Connection number can be used to modify and delete associated legs of one or more cross-connections with the same number on the List Cross-Connections window at one time. The List Cross-Connections window can be accessed by clicking the List Cross-Connections toolbar button on the Cross-Connection window toolbar.

- PPGNAME (Path Protection Group Name)—this is an optional field for entering a 1-26 character Path Protection Group Name that identifies a path protection group for the path-protected cross-connection. All cross-connections associated with a Path Protection Group Name can be retrieved in a single request to the NE.
- PPBV (Path Protection Behavior)—click the down arrow next to this field to display a list of choices for the Path Protection Behavior between the working and protection legs of the cross-connection. The choices are: NN (Non-Revertive with No Holdoff Time) and RH (Revertive with a Holdoff Time Enabled).

10 Click the OK button to activate your attribute choices in the Attrbutes window.

Result:

A pop-up confirmation window is displayed.

11 Choose Yes. The lines and arrows of the newly created cross-connection are momentarily displayed in orange.

Result:

When the cross-connection has been established, the lines and arrows of the cross-connection change to black and the tributary blocks change to blue, indicating that they are cross-connected

The protection leg of the cross-connection is represented by a dashed line.

12 The path-protected cross-connection is represented on the Main View as a cross-connection with multiple legs.

To illustrate this, position the mouse cursor on the working leg (line) of the cross-connection and click the right mouse button. The source and destination addresses for the working and protection legs of the cross-connection are indicated

END OF STEPS

□

Add an Adjunct Path-Protected Cross-Connection

Purpose Use this procedure to add an adjunct path-protected cross-connection. An adjunct path-protected cross-connection is created by using the same input tributary as an existing path-protected cross-connection with a different output tributary. Adjunct path-protected cross-connections are used for Bidirectional Line-Switched Ring (BLSR) and Unidirectional Path-Switched Ring (UPSR)/Subnetwork Connection Protection (SNCP) NE ring topologies. There must be an existing path-protected cross-connection from which to form an adjunct path-protected cross-connection. The adjunct path-protected cross-connection is not assigned to a separate path protection group as the existing path-protected cross-connection.

Before you begin Before you begin this task, determine if there is an existing path-protected cross-connection for which an adjunct path-protected cross-connection can be added.

Task Complete the following steps to add an adjunct path-protected cross-connection.

1 Position the mouse cursor on the NE in the Map pane portion of the Map window and click the menu (right) menu mouse button. A pop-up menu is displayed. Choose **Connection Management** from the pop-up menu. Choose **Cross Connection** from the Connection Management sub-menu..

OR

Choose **Configuration** from the main menu bar on the Map window. The Configuration menu is displayed. Choose **Connection Managment** from the Configuration menu. Choose **Cross Connection** from the Connection Management sub-menu. The Choose an NE window is displayed. Double-click on the NE in the window list and click the OK button.

Result:

The Cross-Connection window for the selected NE is displayed

The equipment hierarchy in the Network Element Explorer portion of the window is automatically expanded to the slot (circuit pack) level for the NE.

You can expand any item in the Network Element Explorer by clicking the plus (+) sign next to the item. To collapse the item, click the minus (-) sign next to it. If items in the explorer are partially obscured, place the mouse cursor on the pane edge between the right side of the explorer and Main View, click and hold the left mouse button, and drag the edge to the right until the explorer items can be seen clearly.

2 Position the mouse cursor on the plus (+) sign next to each slot in the explorer portion of the window, then click and expand the equipment hierarchy until all ports for the cross-connection are shown.

3 Locate the tributary pair on the NE that have the path-protected cross-connection to which the adjunct path-protected cross-connection is being added.

One method of locating existing cross-connections on the NE is by clicking on the NE's TID at the top level of the equipment hierarchy in the Network Element explorer, then clicking the List Cross Connections toolbar button on the Cross-Connection window toolbar (which is identified by a message in the Status bar or by tooltips help when you position the mouse cursor on the correct button). The List Cross Connections window for the entire NE is displayed.

Important! The first time you choose to list all cross-connections for the NE, a pop-up window may be displayed, advising you that the listing of all cross-connections for the NE may take a long time and asks if you want to proceed. Choose Yes to display the List Cross Connections window.

The tributary of the path-protected cross-connection's working leg has a type of "1WAYPSW" in the Type field of the List Cross Connections display.

4 You can leave the List Cross-Connections window open (position the mouse cursor, then click and hold the left mouse button to drag the window to a different position to avoid obscuring the rest of the Cross-Connection window display) or click the Close button to close the List Cross Connections window.

5 Once you have identified the source tributary that has the path-protected cross-connection to which the adjunct cross-connection is being added, expand the explorer tree until the same source tributary is found.

6 Expand and display the source, destination, and secondary source tributaries for the path-protected cross-connection in the Main View of the Cross-Connect window. There are two ways to do this:

- Position the mouse cursor on the port in the explorer to be expanded and click the menu (right) mouse button to display a drop-down menu of positions. Select the position for the tributary block from the drop-down menu list (left, right, top, or bottom).
- Position the mouse cursor on the port in the explorer, click and hold the select (left) mouse button and drag the selected port into the left, right, top, or bottom portion of the Main View of the Cross-Connect window. The tributary block for the selected port is displayed in the Main View.

Result:

The lines and arrows of the existing path-protected cross-connection are displayed in the Main View

7 Position the mouse cursor on the working leg of the existing path-protected cross-connection closest to the input (source) tributary block.

Result:

The color of the input (source) tributary block changes to green, the lines of the working legs of the cross-connection become thicker, and the One Way Adjunct cross-connection type button is enabled.

8 Click on the One Way Adjunct cross-connection type button on the toolbar.

Result:

A message is displayed in the status bar, “Please select destination for One Way Adjunct cross-connection.

9 Select the destination tributary for the adjunct cross-connection.

Result:

The color of the selected destination tributary changes from yellow to magenta (yellow/brown), and the Cross-Connection Attributes window is displayed.

The Attributes window is used to specify the attributes of the path-protected cross-connection.

10 Select values for the following fields as needed:

- LOCZ—click the down arrow next to this field to display a drop-down list of NEs and select the NE to be used as the destination node for this cross-connection. The field defaults to the current NE.
- OMODE—click the down arrow next to this field to display a drop-down list of options for the Output Mode for this cross-connection.
- XCAPPL (Application)—click the down arrow next to this field to display a drop-down list of choices for the application (type) of cross-connection. Select 1-Way Adjunct Path-Protected as the application.
- XCNUM (Cross-Connection Number)—this field is pre-populated with a Cross-Connection number (it functions as a drop-down list; you can click the down arrow to display and select the number). The Cross-Connection Number is used to associate all atomic cross-connections that are created from the same associated legs and leg-pairs so information can be retrieved from the NE together. This Cross-Connection number can be used to modify and delete associated legs of one or more cross-connections with the same number on the List Cross-Connections window at one time. The List Cross-Connections window can be accessed by clicking the List Cross-Connections toolbar button on the Cross-Connection window toolbar.

11 Click the OK button to activate your attribute choices in the Attrbutes window.

Result:

A pop-up confirmation window is displayed, asking if you are sure that you want to create the adjust cross-connection.

12 Choose Yes.

Result:

The lines and arrows of the newly created cross-connection are momentarily displayed in orange. When the cross-connection has been established, the lines and arrows of the cross-connection change to black and the tributary blocks change to blue, indicating that they are cross-connected.

END OF STEPS

□

Add an NE Multi-Cast Cross-Connection

Purpose

Use this procedure to add a new multi-cast cross-connection. This is accomplished via the Add a Multi-Cast Cross-Connection window, which allows you to choose the number of destination AIDs for a multi-cast cross-connection.

Before you begin

Before you begin this task, determine the NE and the elements for which you want to add a multi-cast cross-connection.

Be aware that the maximum number of destination AIDs allowed for a multi-cast cross-connection for any NE type is two.

Task

Complete the following steps to add a new multi-cast cross-connection.

1 Display the port tributaries to which a multi-cast cross-connection is to be added, as described in "Add a Single NE Cross-Connection" (7-9).

2 Single-click on a high or low speed tributary at the appropriate signal rate for the new multi-cast cross-connection.

3 Choose the multi-cast button from the group of cross-connection buttons at the top of the Cross-Connections window (if tooltips help is enabled, positioning the mouse pointer over the button will indicate the correct button).

Result:

The Add a Multi-Cast Cross-Connection window is displayed.

The Total Number of Destinations in this NE field is a display only field that is hard-coded to 2. A maximum of two drops is allowed for any NE type.

4 In the main view area of the Cross-Connections window, click on each port/tributary that is to be a drop for the new multi-cast cross-connection.

Result:

As each drop is specified, it is added to the Chosen Destinations area of the Add a Multi-Cast Cross-Connection window.

If necessary, you can remove a previously selected AID from the Chosen Destinations area by selecting it with the mouse and then clicking the nearby Remove AID button.

5 After you have specified the last drop, click the Done button.

Result:

The Create Cross-Connect Attributes window is displayed for defining additional attributes for the cross-connection.

6 Select values for the following fields as needed:

- LOCZ—click the down arrow next to this field to display a drop-down list of NEs and select the NE to be used as the destination node for this cross-connection. The field defaults to the current NE.
- OMODE—click the down arrow next to this field to display a drop-down list of options for the Output Mode for this cross-connection.
- XCAPPL (Application)—click the down arrow next to this field to display a drop-down list of choices for the application (type) of cross-connection. Select 1-Way Adjunct Path-Protected as the application.
- XCNUM (Cross-Connection Number)—this field is pre-populated with a Cross-Connection number (it functions as a drop-down list; you can click the down arrow to display and select the number). The Cross-Connection Number is used to associate all atomic cross-connections that are created from the same associated legs and leg-pairs so information can be retrieved from the NE together. This Cross-Connection number can be used to modify and delete associated legs of one or more cross-connections with the same number on the List Cross-Connections window at one time. The List Cross-Connections window can be accessed by clicking the List Cross-Connections toolbar button on the Cross-Connection window toolbar.

Result:

A pop-up confirmation window is displayed, asking if you are sure that you want to create the multi-cast cross-connection.

7 Choose Yes to send the new cross-connection command to the NE.

Result:

The lines of the newly create multi-cast cross-connection change momentarily to orange, then to black, indicating that the multi-cast cross-connection has been created.

END OF STEPS

□

Add Compound Cross-Connections (via the Cross Connect Template)

Purpose

Use this procedure to add compound cross-connections via the Cross Connect Template. The Cross Connect Template is accessed by clicking the Cross Connect Template button on the Cross-Connection window toolbar.

A compound cross-connection is a set of atomic cross-connections between input and output tributaries in a network element for a specific network application.

When a compound cross-connection is created for an NE via the Cross Connect Template window, Navis™ Optical EMS sends separate TL1 requests to the NE to create each of the individual cross-connections that comprise the compound cross-connection.

Before you begin

Before you begin this task, determine the NE and the elements for which you want to add cross-connections.

Be aware that this feature is currently supported only for the WaveStar® BWM, LambdaUnite ™ MSS, WaveStar® TDM 2.5G, and WaveStar® TDM 10G (STM-64) NE types.

Be aware that in the current Navis™ Optical EMS product release, the Cross Connect Template only supports creation of compound cross-connections for the UPSR/SNCP Add/Drop network topology, which provides protection for two-way traffic between separate NEs in a ring configuration and involves creation of 1 one-way path-protected cross-connection within Node 1 of the ring, and 2 one-way point-to-point cross-connections to carry traffic from Node 1 to another node in the ring.

Prior to creating cross-connections, make sure that the associated ports have been provisioned correctly. See “Provision NE Ports” (4-4) in Chapter 4, “Equipment Provisioning”.

There are several ways to access the Cross-Connection window besides the method described in this procedure. Other ways to access the Cross-Connection window:

1. ***From the Map Main Menu***
   a. Choose the network element to work with in the Map.
   b. Choose **Configuration** from the main menu.

c. Choose **Connection Management** from the Configuration sub-menu.

d. Choose **Cross Connection** from the Connection Management sub-menu.

e. The Cross Connection Window is displayed.

2. ***Equipment View Window Menu***

a. Choose **Configuration** from the equipment view main menu.

b. Choose **Connection Management** from the Configuration sub-menu.

c. Choose **Cross Connection** from the Connection Management sub-menu.

d. The Cross-Connection Window is displayed.

3. ***Equipment View Pop-Up Menu***

a. Right click over the equipment whose cross connection window is to be displayed.

b. Choose **Connection Management** from the pop-up menu.

c. Choose **Cross Connection** from the Connection Management sub-menu.

d. The Cross-Connection Window is displayed.

When a port tributary is displayed in the Main View of the Cross-Connection window, and you position the mouse cursor on the tributary block, a message is displayed next to the tributary address in the status bar identifying it as a “Source” or “Destination” tributary. The “Source” and “Destination” literal displayed in the status bar is used to indicate whether the tributary could act as a “Source” or “Destination” , or both, for additional cross-connections.

On the Cross-Connection window, the availability of a port tributary to be the source or destination for a cross-connection is also indicated by a block of letters that precede the tributary’s AID in the Network Element Explorer portion of the window. There are two letters, “S” (for Source) and “D” (for Destination) if the tributary has been provisioned to carry traffic bidirectionally. If it is only provisioned to serve as the Source or Destination for traffic, the appropriate letter, “S” or “D” is prefixed to the AID. The background color of the letter indicates

whether it is available or not. The color blue indicates that it is already serving as the source (or destination), or both, for another cross-connection. For example, if the “S” (for Source) background color is blue, the tributary can only be the destination for a new cross-connection.

If the background color of the selected tributary in the explorer is gray, this indicates that the tributary is provisioned to allow cross-connections at a lower rate than the selected level. For example, if the selected tributary is an STS-12, the background color of the letter block preceding the AID in the explorer is gray, indicating that you can expand the explorer to the STS-3 and STS-1 tributary level and make cross-conections at the STS-3 or STS-1 level.

Task **Important!** The specific information displayed on the Cross-Connection window will vary by NE type.

Complete the following steps to add a compound cross-connection in an NE via the Cross Connect Template available through the Cross-Connection window.

1 Position the mouse cursor on the NE in the Map pane portion of the Map window and click the menu (right) menu mouse button. A pop-up menu is displayed. Choose **Connection Management** from the pop-up menu, then choose **Cross Connection** from the Connection Management sub-menu.

OR

Choose **Configuration** from the main menu bar on the Map window. The Configuration menu is displayed. Choose **Connection Management** from the Configuration sub-menu. Choose **Cross Connection** from the Connection Management sub-menu. The Choose an NE window is displayed. Double-click on the NE in the window list and click the OK button.

Result:

The Cross-Connection window for the selected NE is displayed.

The equipment hierarchy in the Network Element Explorer portion of the window is automatically expanded to the slot (circuit pack) level for the NE.

You can also expand any level of the equipment hierarchy (bay,shelf, slot, port) in the Network Element Explorer by clicking the plus (+) sign next to the item. To collapse the item, click the minus (-) sign next to it. If items in the explorer are partially obscured, place the mouse cursor on the pane edge between the right side of the explorer and Main View, click and hold the left mouse button, and drag the edge to the right until the explorer items can be seen clearly.

2 Expand the equipment hierarchy in the Network Element Explorer until the desired tributaries for the compound cross-connection are displayed.

3 Click the Cross Connect Template button on the Cross-Connection toolbar.

Result:

The Cross Connect Template window is displayed.

The Cross Connect Template is divided into three parts:

- Cross Connect Type
- Cross Connect Topology
- Cross Connect Parameters

The Network Element Explorer portion of the main Cross-Connection window remains displayed, for selection of the tributaries to be used in creating the compound cross-connection.

4 Select the Cross Connect Type by clicking the down arrow next to the Cross Connect Type field to display a drop-down list and select the desired compound cross connection network application.

Important! The current Navis™ Optical EMS release only supports the UPSR/SNCP Ring Add, Drop Cross Connect Type, so the system defaults to this type and the field is greyed out.

5 In the Network Element Explorer, position the mouse cursor on the AID of the tributary to be used as the protection leg of the one-way path-protected cross-connection (Tributary A), click the right mouse

button to display a pop-up menu of position choices, and then choose **Tributary A** from the pop-up menu.

Result:

The AID of the selected tributary for Tributary A is displayed in the Tributary A field in the Cross Connect Topology part of the Template.

6 In the Network Element Explorer, position the mouse cursor on the AID of the tributary to be used as the working leg of the one-way path-protected cross-connection (Tributary B), click the right mouse button to display a list of position choices, and then choose **Tributary B** from the pop-up menu.

Result:

The AID of the selected tributary for Tributary B is displayed in the Tributary B field in the Cross Connect Topology part of the Template.

7 In the Network Element Explorer, position the mouse cursor on the AID of the tributary to be used for the one-way add/drop cross-connections (Tributary C), click the right mouse button to display a list of position choices, and then choose **Tributary C** from the pop-up menu.

Result:

The AID of the selected tributary for Tributary C is displayed in the Tributary C field in the Cross Connect Topology part of the Template.

Navis™ Optical EMS enforces that the tributaries selected are of the same rate and not selected for more than one tributary position in the compound cross-connection.

If the tributaries meet the above criteria, the fields in the Cross Connect Parameters part of the Template are enabled.

8 In the Cross Connect Parameters part of the Template, add/select/modify values for the following parameter fields, as needed:

- Output Mode — this parameter identifies the output signal provisioning for the cross-connected tributaries. The selectable values are: NORM (the default), IDLE/UNEQ, and AIS).
- Cross Connect Number — this attribute is used to assign identifying numbers to atomic cross-connections with the same output tributary. A value is required if a one-way path-protected cross-connection is part of the compound cross-connection.
- Path 2 NE Name — this drop-down list field defaults to the current NE. Tributary C must be part of a BLSR protection group.
- Path 1 NE Name — this drop-down list field defaults to the current NE. Tributary A must be part of a BLSR protection group.
- Add/Drop NE Name — this drop-down list field defaults to the current NE. Tributary B must be part of a BLSR protection group.
- Path Protected Group Name — this is an optional field for entering a 1-26 character Path Protection Group Name that identifies a path protection group for the path-protected cross-connection. All cross-connections associated with a Path Protection Group Name can be retrieved in a single request to the NE.
- Cross Connect Alias — this attribute is used to provision a label for the cross-connection. The label can be used for a customer's internal name for the cross-connection or other miscellaneous information (such as associating a circuit ID with the cross-connection). This label can be modified later. The cross-connection alias is maintained in the Navis™ Optical EMS database and is displayed in the cross-connection list. This field is optional.

- Path Protection Behavior — this is a drop-down list field which displays a list of choices for the Path Protection Behavior between the working and protection legs of the cross-connection. The choices are: Non-Revertive with No Holdoff (time), Revertive With No Holdoff (time), Non Revertive With Holdoff (time), and Non Revertive With Holdoff (time).
- Redline — this is a drop-down list field which is used to redline (prohibit) the legs of the cross-connection from being deleted. This field is only effective if the Redline option is supported for the NE type.

Important! If you want to change any tributary or parameter fields before creating the cross-connection, click the Clear button. The system resets the tributary fields and returns the parameter fields to their default values.

9 After making your selections, click the Create button.

Result:

A question dialog window is displayed, asking if you are sure that you want to create the compound cross connection using the set of selected tributaries.

10 Choose Yes.

Result:

The TL1 commands to create the individual cross-connections for the application are sent to the NE.

A Status window is displayed, showing the results of the compound cross-connection request.

If the compound cross-connection is created successfully, a “Complete” message is displayed in the Status column for the request on the Status window.

If any of the cross-connection commands fail, an “Incomplete” message is displayed next to the failed command.

You can view the details of each request sent to the NE on the Status window by double-clicking on the individual request or by selecting the request and clicking the Details button on the Status window.

You can also verify that the compound cross-connection has been successfully created by choosing **View** on the Cross-Connection window and then by choosing **List Cross Connections** to display a sub-menu, and then choosing **All** from the sub-menu to list all cross-connections for the NE.

11

IF...	THEN...
You want to create additional compound cross-connections	Click the Clear button to clear the field choices and go back to Step 4
You are finished with the Template	Click the Canvas button. **Result:** A question dialog window is displayed, informing you that the cross-connection information used on the Template will not be saved and asks if you want to continue. Choose Yes. The system returns to the main view of the Cross-Connection window.

END OF STEPS

Add a One-Way Merge Cross-Connection (for LambdaRouter™ 128/256 AOS NEs)

Purpose

Use this procedure to add a one-way merge cross-connection for aLambdaRouter™ 128/256 AOS NE. A one-way merge cross-connection involves adding a second destination for one-way egress traffic.

Ports on LambdaRouter™ 128/256 AOS OXI circuit pack for merge cross-connections

A Transparent Optical Cross-Connection Interface (OXI) circuit pack in a LambdaRouter™ 128/256 AOS OXI shelf provides four ports. Each of these ports has an input and output interface. Each output port has a 2:1 selector that permits the selection of one of the two merging paths.

Ports on LambdaRouter™ 128/256 AOS OEO circuit pack

An Optical -Electrical-Optical (OEO) circuit pack, which has one input port and one output port interface, is designed to operate at 10G. Each OEO input and output port provides the same bridging and selection functions, respectively, that are provided by an OXI circuit pack.

Before you begin

Before you begin this task, determine the NE and the OXI ports for the one-way merge cross-connection to be added.

There are several ways to access the Cross-Connection window:

1. ***From the Map Main Menu***
   a. Choose the network element to work with in the Map.
   b. Choose **Configuration** from the main menu.
   c. Choose **Connection Management** from the Configuration sub-menu.
   d. Choose **Cross Connection** from the Connection Management sub-menu.
   e. The Cross Connection Window is displayed.
2. ***Equipment View Window Menu***
   a. Choose **Configuration** from the equipment view main menu.
   b. Choose **Connection Management** from the Configuration sub-menu.

c. Choose **Cross Connection** from the Connection Management sub-menu.

d. The Cross-Connection Window is displayed.

3. ***Equipment View Pop-Up Menu***

a. Right click over the equipment whose cross connection window is to be displayed.

b. Choose **Connection Management** from the popup menu.

c. Choose **Cross Connection** from the Connection Management sub-menu.

d. The Cross-Connection Window is displayed.

When a port tributary is displayed in the Main View of the Cross-Connection window, and you position the mouse cursor on the tributary block, a message is displayed next to the tributary address in the status bar identifying it as a “Source” or “Destination” tributary. The “Source” and “Destination” literal displayed in the status bar is used to indicate whether the tributary could act as a “Source” or “Destination” , or both, for additional cross-connections.

On the Cross-Connection window, the availability of a port tributary to be the source or destination for a cross-connection is also indicated by a block of letters that precede the tributary’s AID in the Network Element Explorer portion of the window. There are two letters, “S” (for Source) and “D” (for Destination) if the tributary has been provisioned to carry traffic bidirectionally. If it is only provisioned to serve as the Source or Destination for traffic, the appropriate letter, “S” or “D” is prefixed to the AID. The background color of the letter indicates whether it is available or not. The color blue indicates that it is already serving as the source (or destination), or both, for another cross-connection. For example, if the “S” (for Source) background color is blue, the tributary can only be the destination for a new cross-connection.

Task **Important!** The specific information displayed on the Cross-Connection window will vary by NE type.

Complete the following steps to add a one-way merge cross-connection for a LambdaRouter™ 128/256 AOS NE.

1 Position the mouse cursor on the NE in the Map pane portion of the Map window and click the menu (right) menu mouse button. A pop-up menu is displayed. Choose **Connection Management** from the pop-up menu, then choose **Cross Connection** from the Connection Management sub-menu.

OR

Choose **Configuration** from the main menu bar on the Map window. The Configuration menu is displayed. Choose **Connection Management** from the Configuration sub-menu. Choose **Cross Connection** from the Connection Management sub-menu. The Choose an NE window is displayed. Double-click on the NE in the window list and click the OK button.

Result:

The Cross-Connection window for the selected NE is displayed.

The equipment hierarchy in the Network Element Explorer portion of the window is automatically expanded to the OXI circuit pack level for the NE.

You can also expand any level of the equipment hierarchy (bay,shelf, circuit pack, port) in the Network Element Explorer by clicking the plus (+) sign next to the item. To collapse the item, click the minus (-) sign next to it. If items in the explorer are partially obscured, place the mouse cursor on the pane edge between the right side of the explorer and Main View, click and hold the left mouse button, and drag the edge to the right until the explorer items can be seen clearly.

2 Expand the equipment hierarchy in the Network Element Explorer until the ports for the merge cross-connection are displayed.

3 Select the output (destination) port for the merge cross-connection by positioning the mouse cursor on it in the explorer portion of the window and single-clicking the left mouse button.

Result:

The selected port is highlighted.

4 Click the right mouse button to display a pop-up menu of position choices and choose the position to place the output (destination) port (**Upper Left**,**Lower Left**,**Upper Right**, **Lower Right** in the Main View of the Cross-Connection window.

For example, you may choose **Lower Right** as the position for the destination port for the signal being merged from two input (source) ports.

Result:

The block representing the selected port is displayed in the Main View of the Cross-Connection window. The color of the block is yellow, indicating that the cross-connection has not been added to the port at this point.

5 Select the port to be used as one of the input (source) ports for the merge cross-connection by positioning the mouse cursor on it in the explorer portion of the window and single-clicking the left mouse button.

Result:

The selected port is highlighted in the Explorer.

6 Click the right mouse button to display a pop-up menu of position choices and choose the position to place the output (destination) port (**Upper Left**,**Lower Left**,**Upper Right**, **Lower Right** in the Main View of the Cross-Connection window.

For example, choose **Upper Left**.

Result:

The block representing the selected port is displayed in the Main View of the Cross-Connection window.

7 Select the port to be used as the other input (source) port for the merge cross-connection by positioning the mouse cursor on it in the explorer portion of the window and single-clicking the left mouse button.

Result:

The selected port is highlighted in the Explorer.

---

8 Click the right mouse button to display a pop-up menu of position choices and choose the position to place the output (destination) port (**Upper Left**,**Lower Left**,**Upper Right**, **Lower Right** in the Main View of the Cross-Connection window.

For example, choose **Lower Left**.

Result:

The block representing the selected port is displayed in the Main View of the Cross-Connection window.

---

9 Select the output (destination) port block by positioning the mouse cursor on it in the Main View of the Cross-Connection window and single-clicking the left mouse button.

Result:

The color of the port block changes from yellow to magenta (brown).

---

10 Click on the Merge cross-connection type button in the toolbar of the Cross-Connection window.

If you are not sure which button is for Merge cross-connections, move the mouse cursor to each cross-connection type button until the word “Merge” is displayed in the Status bar of the window and click this cross-connection type button.

Result:

The color of the output (destination) port block changes from magenta to green.

---

11 Select the primary input (source) port block for the merge cross-connection by positioning the mouse cursor on it in the Main View of the Cross-Connection window and single-clicking the left mouse button.

Result:

The color of the primary source port block changes from yellow to purple.

A message is displayed in the Status bar of the window, indicating “Please select secondary source for Merge cross connection”.

12 Select the secondary input (source) port block for the merge cross-connection by positioning the mouse cursor on it in the Main View of the Cross-Connection window and single-clicking the left mouse button.

Result:

The color of the selected secondary source port block changes from yellow to magenta.

A Create Cross Connect Attibutes window is displayed.

Optionally, you can specify information for the following fields on this window, as needed:

- ALIAS — this attribute is used to provision a label for the cross-connection. The label can be used for a customer’s internal name for the cross-connection or other miscellaneous information (such as associating a circuit ID with the cross-connection). This label can be modified later. The cross-connection alias is maintained in the Navis™ Optical EMS database and is displayed in the cross-connection list. This field is optional.
- CCNUM (Cross Connect Number) — this attribute is used to assign identifying numbers to atomic cross-connections with the same output tributary. A value is required if a one-way path-protected cross-connection is part of the compound cross-connection.

13 Enter values for these attribute fields, or leave these fields blank, and click the OK button on the Attributes window.

Result:

A pop-up question dialog window is displayed, asking if you are sure that you want to create the merge cross-connection between the selected ports.

14 Choose Yes.

Result:

The cross-connection request is sent to the NE.

If it is successfully completed, black lines representing the completed cross-connection are drawn between the ports on the Main View of the Cross-Connection window.

The color of the selected port blocks changes from yellow to blue, indicating that a cross-connection has been created for the selected ports.

END OF STEPS

□

Add a One-Way Bridge Cross-Connection (for LambdaRouter™ 128/256 AOS NEs)

Purpose

Use this procedure to add a one-way bridge cross-connection for aLambdaRouter™ 128/256 AOS NE. A one-way bridge cross-connection involves adding a second 1-way cross-connection to a source (input) port already involved in a one-way cross-connection.

Ports on LambdaRouter™ 128/256 AOS OXI circuit pack for bridge cross-connections

A Transparent Optical Cross-Connection Interface (OXI) circuit pack in a LambdaRouter™ 128/256 AOS OXI shelf provides four ports. Each of these ports has an input and output interface. Each input port has an optical 1:2 splitter that permits a bridging cross-connection which can be used for 1+1 path protection.

Ports on LambdaRouter™ 128/256 AOS OEO circuit pack

An Optical -Electrical-Optical (OEO) circuit pack, which has one input port and one output port interface, is designed to operate at 10G. Each OEO input and output port provides the same bridging and selection functions, respectively, that are provided by an OXI circuit pack.

Before you begin

Before you begin this task, determine the NE and the OXI ports for the one-way bridge cross-connection to be added.

There are several ways to access the Cross-Connection window:

1. ***From the Map Main Menu***
   a. Choose the network element to work with in the Map.
   b. Choose **Configuration** from the main menu.
   c. Choose **Connection Management** from the Configuration sub-menu.
   d. Choose **Cross Connection** from the Connection Management sub-menu.
   e. The Cross Connection Window is displayed.
2. ***Equipment View Window Menu***
   a. Choose **Configuration** from the equipment view main menu.
   b. Choose **Connection Management** from the Configuration sub-menu.

c. Choose **Cross Connection** from the Connection Management sub-menu.

d. The Cross-Connection Window is displayed.

3. ***Equipment View Pop-Up Menu***

a. Right click over the equipment whose cross connection window is to be displayed.

b. Choose **Connection Management** from the popup menu.

c. Choose **Cross Connection** from the Connection Management sub-menu.

d. The Cross-Connection Window is displayed.

When a port tributary is displayed in the Main View of the Cross-Connection window, and you position the mouse cursor on the tributary block, a message is displayed next to the tributary address in the status bar identifying it as a “Source” or “Destination” tributary. The “Source” and “Destination” literal displayed in the status bar is used to indicate whether the tributary could act as a “Source” or “Destination” , or both, for additional cross-connections.

On the Cross-Connection window, the availability of a port tributary to be the source or destination for a cross-connection is also indicated by a block of letters that precede the tributary’s AID in the Network Element Explorer portion of the window. There are two letters, “S” (for Source) and “D” (for Destination) if the tributary has been provisioned to carry traffic bidirectionally. If it is only provisioned to serve as the Source or Destination for traffic, the appropriate letter, “S” or “D” is prefixed to the AID. The background color of the letter indicates whether it is available or not. The color blue indicates that it is already serving as the source (or destination), or both, for another cross-connection. For example, if the “S” (for Source) background color is blue, the tributary can only be the destination for a new cross-connection.

Task **Important!** The specific information displayed on the Cross-Connection window will vary by NE type.

Complete the following steps to add a one-way bridge cross-connection for a LambdaRouter™ 128/256 AOS NE.

1 Position the mouse cursor on the NE in the Map pane portion of the Map window and click the menu (right) menu mouse button. A pop-up menu is displayed. Choose **Connection Management** from the pop-up menu, then choose **Cross Connection** from the Connection Management sub-menu.

OR

Choose **Configuration** from the main menu bar on the Map window. The Configuration menu is displayed. Choose **Connection Management** from the Configuration sub-menu. Choose **Cross Connection** from the Connection Management sub-menu. The Choose an NE window is displayed. Double-click on the NE in the window list and click the OK button.

Result:

The Cross-Connection window for the selected NE is displayed.

The equipment hierarchy in the Network Element Explorer portion of the window is automatically expanded to the OXI circuit pack level for the NE.

You can also expand any level of the equipment hierarchy (bay,shelf, circuit pack, port) in the Network Element Explorer by clicking the plus (+) sign next to the item. To collapse the item, click the minus (-) sign next to it. If items in the explorer are partially obscured, place the mouse cursor on the pane edge between the right side of the explorer and Main View, click and hold the left mouse button, and drag the edge to the right until the explorer items can be seen clearly.

2 Expand the equipment hierarchy in the Network Element Explorer until the ports for the one-way bridge cross-connection are displayed.

3 Select the input (source) port for the bridge cross-connection by positioning the mouse cursor on it in the explorer portion of the window and single-clicking the left mouse button.

Result:

The selected port is highlighted.

4 Click the right mouse button to display a pop-up menu of position choices and choose the position to place the input (source) port (**Upper Left**,**Lower Left**,**Upper Right**, **Lower Right** in the Main View of the Cross-Connection window.

For example, you may choose **Upper Left** as the position for the source port for the signal that is being bridged onto two (working and protection) ports.

Result:

The block representing the selected port is displayed in the Main View of the Cross-Connection window. The color of the block is yellow, indicating that the cross-connection has not been added to the port at this point.

5 Select the port to be used as the primary destination ports for the bridge cross-connection by positioning the mouse cursor on it in the explorer portion of the window and single-clicking the left mouse button.

Result:

The selected port is highlighted in the Explorer.

6 Click the right mouse button to display a pop-up menu of position choices and choose the position to place the primary destination port (**Upper Left**,**Lower Left**,**Upper Right**, **Lower Right** in the Main View of the Cross-Connection window.

For example, choose **Upper Right**.

Result:

The block representing the selected port is displayed in the Main View of the Cross-Connection window.

7 Select the port to be used as the secondary destination port for the bridge cross-connection by positioning the mouse cursor on it in the explorer portion of the window and single-clicking the left mouse button.

Result:

The selected port is highlighted in the Explorer.

8 Click the right mouse button to display a pop-up menu of position choices and choose the position to place the secondary destination port (**Upper Left**,**Lower Left**,**Upper Right**, **Lower Right** in the Main View of the Cross-Connection window.

For example, choose **Lower Right**.

Result:

The block representing the selected port is displayed in the Main View of the Cross-Connection window.

9 Select the input (source) port block by positioning the mouse cursor on it in the Main View of the Cross-Connection window and single-clicking the left mouse button.

Result:

The color of the port block changes from yellow to magenta (brown).

10 Click on the Bridge cross-connection type button in the toolbar of the Cross-Connection window.

If you are not sure which button is for Bridge cross-connections, move the mouse cursor to each cross-connection type button until the word “Bridge” is displayed in the Status bar of the window and click this cross-connection type button.

Result:

The color of the output (destination) port block changes from magenta to green.

A secondary Bridge Cross Connect window is displayed, for selecting the destination port blocks (maximum permitted is two for this cross-connection type) for the one-way bridge cross-connection.

11 Select the primary destination port block for the bridge cross-connection by positioning the mouse cursor on it in the Main

View of the Cross-Connection window and single-clicking the left mouse button.

Result:

The color of the primary destination port block changes from yellow to magenta.

The AID for the selected primary destination port is displayed in the first row of the Bridge Cross Connect secondary window.

12 Select the secondary destination port block for the merge cross-connection by positioning the mouse cursor on it in the Main View of the Cross-Connection window and single-clicking the left mouse button.

Result:

The color of the selected secondary destination port block changes from yellow to magenta.

The AID for the selected secondary destination port is displayed in the second row of the Bridge Cross Connect secondary window.

13 Click the Done button on the Bridge Cross Connect secondary window.

Result:

A Create Cross Connect Attributes window is displayed.

Optionally, you can specify information for the following fields on this window, as needed:

- ALIAS — this attribute is used to provision a label for the cross-connection. The label can be used for a customer's internal name for the cross-connection or other miscellaneous information (such as associating a circuit ID with the cross-connection). This label can be modified later. The cross-connection alias is maintained in the Navis™ Optical EMS database and is displayed in the cross-connection list. This field is optional.
- CCNUM (Cross Connect Number) — this attribute is used to assign identifying numbers to atomic cross-connections with the same output tributary. A value is required if a one-way path-protected cross-connection is part of the compound cross-connection.

14 Enter values for these attribute fields, or leave these fields blank, and click the OK button on the Attributes window.

Result:

A pop-up question dialog window is displayed, asking if you are sure that you want to create the bridge cross-connection between the selected ports.

15 Choose Yes.

Result:

The cross-connection request is sent to the NE.

If it is successfully completed, black lines representing the completed cross-connection are drawn between the ports on the Main View of the Cross-Connection window.

The color of the selected port blocks changes from yellow to blue, indicating that a cross-connection has been created for the selected ports.

END OF STEPS

□

Add a Two-Way Cross-Connection (for LambdaRouter™ 128/256 AOS NEs)

Purpose

Use this procedure to add a two-way cross-connection for aLambdaRouter™ 128/256 AOS NE.

LambdaRouter™ 128/256 AOSPorts and two-way cross-connections

Input and output ports on a LambdaRouter™ 128/256 AOS are bidirectional; in other words, each port can accept ingress and egress traffic.

A Transparent Optical Cross-Connection Interface (OXI) circuit pack in a LambdaRouter™ 128/256 AOS OXI shelf provides four ports. Each of these ports has an input and output interface.

A two-way cross-connection can be defined using four ports, where the first two ports serve as one leg of the two-way cross-connection and the second two ports serve as the other leg, or it can be defined using only two of the ports that allow bidirectional traffic on the two-way cross-connection.

Before you begin

Before you begin this task, determine the NE and the OXI ports for the two-way cross-connection to be added.

There are several ways to access the Cross-Connection window:

1. ***From the Map Main Menu***
   a. Choose the network element to work with in the Map.
   b. Choose **Configuration** from the main menu.
   c. Choose **Connection Management** from the Configuration sub-menu.
   d. Choose **Cross Connection** from the Connection Management sub-menu.
   e. The Cross Connection Window is displayed.
2. ***Equipment View Window Menu***
   a. Choose **Configuration** from the equipment view main menu.
   b. Choose **Connection Management** from the Configuration sub-menu.

c. Choose **Cross Connection** from the Connection Management sub-menu.

d. The Cross-Connection Window is displayed.

3. ***Equipment View Pop-Up Menu***

a. Right click over the equipment whose cross connection window is to be displayed.

b. Choose **Connection Management** from the popup menu.

c. Choose **Cross Connection** from the Connection Management sub-menu.

d. The Cross-Connection Window is displayed.

When a port tributary is displayed in the Main View of the Cross-Connection window, and you position the mouse cursor on the tributary block, a message is displayed next to the tributary address in the status bar identifying it as a “Source” or “Destination” tributary. The “Source” and “Destination” literal displayed in the status bar is used to indicate whether the tributary could act as a “Source” or “Destination” , or both, for additional cross-connections.

On the Cross-Connection window, the availability of a port tributary to be the source or destination for a cross-connection is also indicated by a block of letters that precede the tributary’s AID in the Network Element Explorer portion of the window. There are two letters, “S” (for Source) and “D” (for Destination) if the tributary has been provisioned to carry traffic bidirectionally. If it is only provisioned to serve as the Source or Destination for traffic, the appropriate letter, “S” or “D” is prefixed to the AID. The background color of the letter indicates whether it is available or not. The color blue indicates that it is already serving as the source (or destination), or both, for another cross-connection. For example, if the “S” (for Source) background color is blue, the tributary can only be the destination for a new cross-connection.

Task **Important!** The specific information displayed on the Cross-Connection window will vary by NE type.

Complete the following steps to add a one-way bridge cross-connection for a LambdaRouter™ 128/256 AOS NE.

1 Position the mouse cursor on the NE in the Map pane portion of the Map window and click the menu (right) menu mouse button. A pop-up menu is displayed. Choose **Connection Management** from the pop-up menu, then choose **Cross Connection** from the Connection Management sub-menu.

OR

Choose **Configuration** from the main menu bar on the Map window. The Configuration menu is displayed. Choose **Connection Management** from the Configuration sub-menu. Choose **Cross Connection** from the Connection Management sub-menu. The Choose an NE window is displayed. Double-click on the NE in the window list and click the OK button.

Result:

The Cross-Connection window for the selected NE is displayed.

The equipment hierarchy in the Network Element Explorer portion of the window is automatically expanded to the OXI circuit pack level for the NE.

You can also expand any level of the equipment hierarchy (bay,shelf, circuit pack, port) in the Network Element Explorer by clicking the plus (+) sign next to the item. To collapse the item, click the minus (-) sign next to it. If items in the explorer are partially obscured, place the mouse cursor on the pane edge between the right side of the explorer and Main View, click and hold the left mouse button, and drag the edge to the right until the explorer items can be seen clearly.

2 Expand the equipment hierarchy in the Network Element Explorer until the ports for the two-way cross-connection are displayed.

3 Select the ports to be used for the two-way cross-connection.

In a LambdaRouter™ 128/256 AOS NE, two or four pots can be used for the two-way cross-connection.

For the purposes of the example in this procedure, four ports will be selected to create the two-way cross-connection.

To select each port, position the mouse cursor on the AID of the port in the Explorer and click the left mouse button.

Result:

The selected port is highlighted.

4 After a port is selected in the Explorer, click the right mouse button to display a pop-up menu of position choices and choose the position for the port (**Upper Left**,**Lower Left**,**Upper Right**, **Lower Right** in the Main View of the Cross-Connection window.

Result:

Each block representing a selected port is displayed in the Main View of the Cross-Connection window. The color of the block is yellow, indicating that the cross-connection has not been added to the selected ports at this point.

5 Select one of the port blocks to be used in the two-way cross-connection by positioning the mouse cursor on it in the Main View of the Cross-Connection window and single-clicking the left mouse button.

Result:

The color of the port block changes from yellow to magenta (brown).

6 Click on the Two-Way cross-connection type button in the toolbar of the Cross-Connection window.

If you are not sure which button is for Two-Way cross-connections, move the mouse cursor to each cross-connection type button until the word “Two Way” is displayed in the Status bar of the window and click this cross-connection type button.

Result:

The color of the output (destination) port block changes from magenta to green.

A secondary Two Way Cross Connect window is displayed, for the purpose of identifying the ports and direction of each leg of the two-way cross-connection.

This secondary Two Way Cross Connect window shows the direction of traffic for each leg and port involved in the cross-connection, and whether two ports or four ports are being used for the two-way cross-connection.

The first port block selected on the Main View of the Cross-Connection becomes Port A, and the cross-connection is constructed from this starting point.

Remember that either two ports or four ports can be selected for creating a two-way cross-connection on a LambdaRouter™ 128/256 AOS.

If you decide that you want to create this two-way cross-connection using only two ports, click the Close button on the secondary Two Way Cross Connect window and go back to Step 3 in the procedure, select only two ports, and follow the remaining steps in the procedure.

7 To select the port for the destination of the first leg (Port B), position the mouse cursor on the AID of the port in the Explorer, click the right mouse button to display a pop-up menu of choices, and choose **Port B** from the list of choices.

Result:

The AID of the port selected as Port B is displayed in the Port B field of the secondary Two Way Cross Connect window.

8 Select the remaining two ports (Port C and Port D), using the method described in the previous step.

Important! To create this cross-connection using only two ports, make Port A and Port D the same port, and Port B and Port C the same port. The input port cannot be the same as the output port on either leg (in other words, the AID for Port A cannot be used as the AID for Port B).

9 Optionally, you can specify information for the following fields on this window, as needed:

- ALIAS — this attribute is used to provision a label for the cross-connection. The label can be used for a customer's internal name for the cross-connection or other miscellaneous information (such as associating a circuit ID with the cross-connection). This label can be modified later. The cross-connection alias is maintained in the Navis™ Optical EMS database and is displayed in the cross-connection list. This field is optional.
- CCNUM (Cross Connect Number) — this attribute is used to assign identifying numbers to atomic cross-connections with the same output tributary. A value is required if a one-way path-protected cross-connection is part of the compound cross-connection.

10 When you are finished selecting ports and entering attributes for the cross-connection, click the OK button on the secondary Two Way Cross Connect window.

Result:

A pop-up question dialog window is displayed, asking if you are sure that you want to create the two-way cross-connection between the selected ports.

11 Choose Yes.

Result:

The cross-connection request is sent to the NE.

If it is successfully completed, black lines representing the completed cross-connection are drawn between the ports on the Main View of the Cross-Connection window.

The color of the selected port blocks changes from yellow to blue, indicating that a cross-connection has been created for the selected ports.

END OF STEPS

□

Delete an NE Cross-Connection—Graphical

Purpose Use this procedure to delete a selected cross-connection using the graphical representation.

Before you begin Before you begin this task, you must determine the cross-connection to be deleted and display it.

Task Complete the following steps to delete a cross-connection.

1 Position the mouse cursor on the NE in the Map pane portion of the Map window and click the menu (right) menu mouse button. A pop-up menu is displayed. Choose **Connection Management** from the pop-up menu. Choose **Cross Connection** from the Connection Management sub-menu.

OR

Choose **Configuration** from the main menu bar on the Map window. The Configuration menu is displayed. Choose **Connection Management** from the Configuration menu. Choose **Cross Connection** from the Connection Management sub-menu. The Choose an NE window is displayed. Double-click on the NE in the window list and click the OK button. The Cross-Connection window for the selected NE is displayed.

Important! To obtain a textual list of all existing cross-connections on the NE, while on the Cross-Connection window, click on the NE's TID in the explorer portion of the window, choose **View** from the Cross-Connection window menu bar, then choose **List Cross Connections** and then choose **All Cross Connection**. A pop-up window is displayed, providing a textual list of cross-connections. A listing of all existing cross-connections for an NE entity (such as a bay, shelf, slot, or port), can be obtained by selecting entity in the explorer, choosing **View** from the Cross-Connection window menu bar, choosing **List Cross Connections** from the View menu, and then choosing **All Cross Connections** from the displayed sub-menu to display a textual list of all existing cross-connections for the selected entity. To select a cross-connection from the list, position the mouse cursor on the cross-connection and click the select (left) mouse button. You can then click the Modify button on this window to modify the cross-connection or click the Delete button to delete it. In

both cases, a pop-up question dialog is displayed, asking if you really want to perform the operation. Choose Yes to perform the operation or No to cancel the operation.

Result:

The equipment hierarchy in the Network Element Explorer portion of the window is automatically expanded to the slot (circuit pack) level for the NE.

You can also expand any level of the equipment hierarchy (bay, shelf, slot, port) in the Network Element Explorer by clicking the plus (+) sign next to the item. To collapse the item, click the minus (-) sign next to it. If items in the explorer are partially obscured, place the mouse cursor on the pane edge between the right side of the explorer and Main View, click and hold the left mouse button, and drag the edge to the right until the explorer items can be seen clearly.

2 Position the mouse cursor on the port in the explorer tree and click the left mouse button to select it.

Result:

The port is highlighted in the explorer.

3 Click the right mouse button to display a drop-down list and select the position to place the associated tributaries in the Main View of the Cross-Connection window.

The other way to do this is to click and hold the left mouse button and drag the port into the left, right, or bottom position to display the associated tributaries in the Main View.

Result:

The window shows any existing cross-connections for the port.

If the cross-connection is not displayed, click the Show/Hide toolbar button to show the cross-connection. If there are multiple cross-connections, position the mouse cursor over one of the cross-connections and click the right mouse button to display a listing of the existing cross-connections. Then select the desired cross-connection.

4 On the Cross-Connection window, position the mouse cursor on the line that represents the cross-connection and click the left mouse button.

Result:

The line of the selected cross-connection becomes thicker and the color displayed is black.

5 Click the Delete button on the Cross-Connection window toolbar or press the Delete key on the keyboard.

Result:

If a two-way cross-connection has been selected for deletion, a Multiple Leg Cross Connection Deletion window is displayed. Choose the two-way cross-connection or either one-way cross-connection comprising the two-way cross-connection and click the OK button. If a one-way cross-connection or another type has been selected for deletion, this window is not displayed.

6

IF...	THEN...
A two-way cross-connection has been selected for deletion	A Multiple Leg Cross Connection window is displayed. Choose the two-way cross-connection or either leg of the two-way cross-connection to delete and click the OK button.
A one-way cross-connection or another type has been selected for deletion	The Multiple Leg Cross-Connection window is not displayed. **Result:** The system displays a confirmation window for your selection.

7 Select Yes in the confirmation window to delete the cross-connection.

END OF STEPS

□

Delete an NE Cross-Connection—Textual

Purpose

Use this procedure to delete a selected cross-connection using the Cross-Connections List window, which lists the cross-connections textually rather than graphically.

The Cross Connections List window shows all of the cross-connections and reservations in the selected NE. Headers displayed above each list differ from NE to NE, but the first three headers are always:

- Source AID (From)
- Destination AID (To)
- Cross Connection Type

For NEs that allow creation of multiple cross-connections from the same associated legs and leg pairs or assignment of a Path Protection Group Name for path-protected cross-connections (such as BWM NEs), you also have the option of displaying/viewing a textual list of cross-connections by Group Number or Group Name.

To list cross-connections related to a specific Group Number, choose **By Group Number**. A Cross-Connection By Group Number window is displayed. Click the arrow next to the Cross Connection Number field to display a pop-up list of group numbers and select one. Click the OK button. To close this window without making a selection, click the Close button.

To list cross-connection related to a specific Group Name, choose **By Group Name**. A Cross Connection By Group Name window is displayed. Click the arrow next to the Group Name field to display a pop-up list of group names and select one. Click the OK button. To close this window without making a selection, click the Close button.

Before you begin

Before you begin this task, you must determine the cross-connection to be deleted and display it.

Be aware that the following three scenarios will cause a cross-connection deletion request to be ***denied***:

- a request to remove a red-lined cross-connection
- a request to remove a cross-connection from a tributary used in a loop-back cross-connection

- a request to remove a cross-connection from a tributary used in a test access connection.
- a request to remove an adjunct path-protected cross-connection

Task Complete the following steps to delete a cross-connection textually.

1 Display the Cross-Connection window as described in "Add a Single NE Cross-Connection" (7-9).

2 In the explorer area of the Cross-Connection window, use your mouse to select the NE TID, a bay, a shelf, a circuit pack, or a port group.

3

TO....	DO THIS...
List all cross-connections for a particular bay, shelf, circuit pack, or port group	Position the mouse cursor on the particular entity in the Explorer portion of the Cross-Connection window and click the select (left) mouse button to select it.
List all cross-connections for the NE	Position the mouse cursor on the NE's TID in the Explorer portion of the Cross-Connection window and click the select (left) mosue button to select it.

4 Select **View** the main menu at the top of the Cross-Connection window.

Result:

A sub-menu is displayed.

5 Select **List Cross-Connections** from the displayed sub-menu.

6 To display all cross-connections for the selected entity, choose **All Cross Connections** from the displayed sub-menu. To display cross-connections by Group Name, choose **By Group Name** from the

displayed sub-menu. To display cross-connections by Group Number, choose **By Group Number** from the displayed sub-menu.

Result:

The Cross-Connection List window is displayed with the selected cross-connection information.

7 To select a cross-connection for deletion, position the mouse cursor the cross-connection displayed on the list, and click the left mouse button.

8 Press the Delete key on the Cross-Connection List window.

Result:

A confirmation window is displayed, asking if you are sure you want to delete the selected cross-connection.

9 If you are certain you want to delete the cross-connection indicated for deletion in the cross-connection window, click the Yes button. The system deletes the indicated cross-connection.

Upon successful deletion of a cross-connection, all reference to that cross-connection, in any window in the GUI, is removed.

END OF STEPS

□

Delete Multiple NE Cross-Connections—Textual

Purpose

Use this procedure to delete multiple cross-connections using the Cross-Connections List window, which lists the cross-connections textually rather than graphically.

Each cross-connection selected for deletion is sent as an individual delete command to the NE.

The Cross Connections List window shows all of the cross-connections and reservations in the selected NE. Headers displayed above each list differ from NE to NE, but the first three headers are always:

- Source AID (From)
- Destination AID (To)
- Cross Connection Type

For NEs that allow creation of multiple cross-connections from the same associated legs and leg pairs or assignment of a Path Protection Group Name for path-protected cross-connections (such as BWM NEs), you also have the option of displaying/viewing a textual list of cross-connections by Group Number or Group Name.

To list cross-connections related to a specific Group Number, choose **By Group Number**. A Cross-Connection By Group Number window is displayed. Click the arrow next to the Cross Connection Number field to display a pop-up list of group numbers and select one. Click the OK button. To close this window without making a selection, click the Close button.

To list cross-connection related to a specific Group Name, choose **By Group Name**. A Cross Connection By Group Name window is displayed. Click the arrow next to the Group Name field to display a pop-up list of group names and select one. Click the OK button. To close this window without making a selection, click the Close button.

Before you begin

Before you begin this task, you must determine for which NE the cross-connections are to be deleted.

Be aware that the following scenarios cause a cross-connection deletion request to be ***denied***:

- a request to remove a red-lined cross-connection
- a request to remove a cross-connection from a tributary used in a loop-back cross-connection
- a request to remove a cross-connection from a tributary used in a test access connection.
- a request to remove an adjunct path-protected cross-connection

Be aware that if a two-way cross-connection for a WaveStar® BWM is selected for deletion on the list, both legs of the cross-connection are deleted.

Task Complete the following steps to delete a cross-connection textually.

1 Display the Cross-Connection window as described in "Add a Single NE Cross-Connection" (7-9).

2 In the explorer area of the Cross-Connection window, use your mouse to select the NE TID, a bay, a shelf, a circuit pack, or a port group.

3

TO....	DO THIS...
List all cross-connections for a particular bay, shelf, circuit pack, or port group	Position the mouse cursor on the particular entity in the Explorer portion of the Cross-Connection window and click the select (left) mouse button to select it.
List all cross-connections for the NE	Position the mouse cursor on the NE's TID in the Explorer portion of the Cross-Connection window and click the select (left) mosue button to select it.

4 Select **View** the main menu at the top of the Cross-Connection window.

Result:

A sub-menu is displayed.

5 Select **List Cross-Connections** from the displayed sub-menu.

6 To display all cross-connections for the selected entity, choose **All Cross Connections** from the displayed sub-menu. To display cross-connections by Group Name, choose **By Group Name** from the displayed sub-menu. To display cross-connections by Group Number, choose **By Group Number** from the displayed sub-menu.

Result:

The Cross-Connection List window is displayed with the selected cross-connection information.

7 To select more than one cross-connection for deletion, position the mouse cursor on each cross-connection displayed on the list, and click the left mouse button and the Shift or Control key on the keyboard.

8 Click the Delete key on the Cross-Connection List window.

Result:

To check the status of deletion request, choose **View** from the main menu bar on the Map window, and then choose **Status Window** from the View menu. The Status window shows the status of each cross-connection deletion request.

Upon successful deletion of a cross-connection, all reference to that cross-connection, in any window in the GUI, is removed.

9 If you are certain you want to delete the cross-connection indicated for deletion in the cross-connection window, click the Yes button. The system deletes the indicated cross-connection.

END OF STEPS

□

Modify an NE Cross-Connection—Graphical

Purpose Use this procedure to modify cross-connections graphically via the Cross-Connections window. Use this procedure to modify certain parameters for the cross-connection, such as the redline status or source/destination node. For example, if you modify the redline parameter and enable redlining, it means that the cross-connection is prohibited from being deleted until you change the redline status from Yes to No in the associated Attributes window.

Before you begin Before you begin this task, determine the cross-connection you need to modify and the modification you need to make.

The screen examples shown in this procedure are for illustration purposes. The specific information displayed on the Cross-Connection window will vary by NE type.

Task Complete the following steps to modify cross-connections graphically via the Cross-Connections window.

1 Position the mouse cursor on the NE in the Map pane portion of the Map window and click the select (left) mouse button to select it.

Result:

The NE is highlighted in the Map window.

2 Click the menu (right) menu mouse button. A pop-up menu is displayed. Choose **Cross Connection** from the pop-up menu.

Result:

The Cross-Connection window is displayed.

3 Double-click on the TID of the NE in the Network Element Explorer portion of the window to expand and show the bay, shelf, slot, circuit pack, and port that contains the cross-connection to be deleted.

If the equipment hierarchy is not expanded to show all components down to port level, double-click on the bay, shelf, and slot in successive order until the explorer tree expands to show the desired port.

4 Position the mouse cursor on the port in the explorer tree and click the left mouse button to select it.

Result:

The port is highlighted in the explorer.

5 Click the right mouse button to display a drop-down list and select the position to place the associated tributaries in the Main View of the Cross-Connection window.

The other way to do this is to click and hold the left mouse button and drag the port into the left, right, or bottom position to display the associated tributaries in the Main View.

Important! If the existing cross-connection(s) is not displayed, click the Hide/Show button on the Cross-Connection window toolbar to display it. To expand the view of the Network Element Explorer to see any obscured tributary AIDs, position the mouse cursor next to the bar between the right edge of the Explorer and the tributary block display in the Main view, click the left mouse button and drag the border to the right.

Result:

The existing cross-connections are displayed in the window.

6 Position the mouse cursor on the line of the cross-connection to be modified and click the select (left) mouse button to select it.

Result:

The cross-connection lines become thicker and the color is black.

7 Click the Modify button on the toolbar part of the window.

Important! If you are not sure which button is the Modify button, move the cursor to each button until the tooltips help is displayed to indicate that it is the Modify button. Then click the button.

Result:

A Cross-Connection Attributes window is displayed for the selected cross-connection, showing the parameters that can be

modified.For example, the REDLINE parameter can be changed from NO to YES to redline the cross-connection and prohibit it from being deleted.

8 To change the REDLINE parameter, click the down arrow next to the REDLINE field in the Attributes window to display a drop-down list and select YES to enable the REDLINE feature

9 After making all necessary parameter changes, click the OK button in the Cross-Connect Attributes window.

Result:

A question dialog window is displayed, asking if you really want to modify the parameters for the cross-connection.

10 Choose Yes to modify the cross-connection.

11 In this example, the REDLINE status of the cross-connection was changed.

Result:

When the modification is completed, the color red will be displayed on the cross-connection line to indicate that the cross-connection is redlined (prohibited from being deleted, until the REDLINE status is changed again to NO, to disable redlining).

END OF STEPS

□

Modify an NE Cross-Connection—Textual

Purpose

Use this procedure to modify cross-connections textually via the Cross-Connections List window.

For NEs that allow creation of multiple cross-connections from the same associated legs and leg pairs or assignment of a Path Protection Group Name for path-protected cross-connections (such as BWM NEs), you also have the option of displaying/viewing a textual list of cross-connections by Group Number or Group Name.

To list cross-connections related to a specific Group Number, choose **By Group Number**. A Cross-Connection By Group Number window is displayed. Click the arrow next to the Cross Connection Number field to display a pop-up list of group numbers and select one. Click the OK button. To close this window without making a selection, click the Close button.

To list cross-connection related to a specific Group Name, choose **By Group Name**. A Cross Connection By Group Name window is displayed. Click the arrow next to the Group Name field to display a pop-up list of group names and select one. Click the OK button. To close this window without making a selection, click the Close button.

The Cross-Connection List window is displayed with the selected cross-connection information. Some general information about this window follows:

- This list shows all the cross-connections and reservations in the selected element.
- Headers displayed above each list differ from NE to NE, but the first three headers are always Source AID (From), Destination AID (To), and Cross-Connection Type.

Before you begin

Before you begin this task, determine the cross-connection you need to modify and the modification you need to make.

Task

Complete the following steps to modify cross-connections textually via the Cross-Connections List window.

1 Display the Cross-Connections List window as described in "Add a Single NE Cross-Connection" (7-9).

2 In the explorer area of the Cross-Connection window, use your mouse to select the NE TID, a bay, a shelf, a circuit pack, or a port group.

3

TO....	DO THIS...
List all cross-connections for a particular bay, shelf, circuit pack, or port group	Position the mouse cursor on the particular entity in the Explorer portion of the Cross-Connection window and click the select (left) mouse button to select it.
List all cross-connections for the NE	Position the mouse cursor on the NE's TID in the Explorer portion of the Cross-Connection window and click the select (left) mosue button to select it.

4 Select **View** the main menu at the top of the Cross-Connection window.

Result:

A sub-menu is displayed.

5 Select **List Cross-Connections** from the displayed sub-menu.

6 To display all cross-connections for the selected entity, choose **All Cross Connections** from the displayed sub-menu.

7 Choose a cross-connection to modify and select **Modify**.

Result:

A Modify Cross Connect Attributes window is displayed with the current information for the selected cross-connection.

8 Make the desired changes to the cross-connection attributes on this window and click the OK button.

Result:

A pop-up question dialog window is displayed, asking if you are sure you want to make the selected modifications.

9 Choose Yes.

Result:

The system changes the selected cross-connection with the selected modifications.

END OF STEPS

□

Add a Loopback

Purpose Use this procedure to add a loopback to an NE's tributary or port for signal testing purposes. The loopback remains in effect until it is "released", or taken down, by either issuing the proper TL1 command in Cut-Through mode or by deleting the loopback through the Manage Loopbacks window in the Navis™ Optical EMS GUI.

There are three types of loopbacks that can be set up through the Navis™ Optical EMS GUI:

- Cross-connect loopback—this type of loopback is done at the tributary level, by setting up a temporary cross-connection from the input of the tributary to the output of the same tributary for purposes of sending a test signal.
- Near-side facility loopback—this type of loopback is done at the port level, where the entire line is looped back from the input to the output of the same port.
- Far-side facility loopback—this type of loopback is done at the port level, where the entire line is looped back from the transmit (input) side of the port to the receive (output) side, and the test signal path may extend through the circuit pack equipment to a distant NE and back again.
- Maintenance cross-connection— this type of loopback is used to analyze "suspect" SWIPS for a LambdaRouter and then mark such SWIPs as either "faulty" or "unequipped". A maintenance cross-connection can only be set up if the ingress SWIP (in_aid parameter) and the egress SWIP (out_aid parameter) have their (PST,SST) attributes as either (OOS-MA, UEQ) or (OOS-MA, MT). This validation can only be enforced by the LambdaRouter™ 128/256 AOS NE.

Loopbacks can be operated in either a "normal" mode (without an active cross-connection on the tributary or port, or in a "forced" mode, when there is an active cross-connection. When a loopback is removed ("released") from a tributary or port, any pre-existing cross-connections on the tributary/port are automatically re-established in the NE.

Facility loopbacks must be operated in a “forced” mode. If you select the “normal” mode, the following restrictions must be followed:

- there are no existing cross-connections
- the selected port must be a protection port (not a working port) of a protection group
- the working port must be in lockout mode

Before you begin

Before you begin this task, you need to identify the tributary or port in the NE for which the loopback will be created for testing purposes. Information about the port or tributary, including the rate and AID, can be found by displaying the Cross-Connection window for the NE, and expanding the equipment hierarchy in the Network Element explorer portion of the Cross-Connection window until the desired port tributary is shown in the Network Element Explorer, or by selecting port or facility to be placed in loopback on the Network Element explorer portion of the Provisioning window.

Be aware that when you set up a cross-connect loopback on a LambdaRouter™ 128/256 AOS, a port AID is selected instead of a tributary AID, since this NE type has all optical interfaces without designated signal paths (tributaries) for specific rates.

When a loopback is removed from a tributary, any pre-existing cross-connections on the tributary are automatically re-established in the NE.

Related information

For instructions on how to display port/tributary information on the Cross-Connection window, see “Add a Single NE Cross-Connection” (7-9). For instructions on how to display NE ports, see “Provision NE Ports” (4-4) in the Chapter 4, “Equipment Provisioning”.

For additional information about configuring loopbacks for testing purposes in the WaveStar® TDM 2.5G (OC-48 2F) NE, refer to the *WaveStar® TDM 2.5G (OC-48 2F) User/Service Manual* and *WaveStar® TDM 2.5G (OC-48 2F) Operations Systems Engineering Guide*.

Task Complete the following steps to add loopback to in an NE for testing purposes.

1 Display the Cross-Connection window for the selected NE and obtain the AID of the port tributary to be put in loopback by expanding the Network Element explorer on the Cross-Connection window and "drilling down" the equipment hierarchy until the port tributary is found.

The Cross-Connection window can remain open while you access the Manage Loopbacks window to actually add the loopback to the port tributary. Or you may close the Cross-Connection window at this point. To close the Cross-Connection window, choose **File** from the Cross-Connection window menu bar and then **Close** from the File sub-menu.

Reference:

See for instructions on how to display the Cross-Connection window for an NE and expand the Network Element Explorer portion of this window to obtain port tributary information.

2 If the Cross-Connection window is open, the NE is already chosen.

Otherwise, click on the NE icon in the Map pane portion of the Map window to select it.

OR

Select no NE at this point.

3 Go to the Map window and choose **TestManagement** on the Map window menu bar.

Result:

A sub-menu is displayed.

4 Choose **Loopbacks** from the dislayed sub-menu.

If the NE for setting up the loopback was not already chosen in step 1 or step 2, the Choose an NE window is displayed.

To choose the NE from this window, double-click on the NE in the list and click the OK button.

Result:

The Manage Loopback window is displayed.

5 Expand the equipment hierarchy in the explorer portion of the window until the port or tributary to be placed in loopback is displayed.

6 Select the port or tributary in the explorer portion of the window.

7 Click the Create button.

Result:

A Create Loopback panel is displayed in the right portion of the Manage Loopback window.

8

TO...	DO THIS...
Set up a cross-connect loopback or maintenance cross-connection	Select the tributary AID (or port AID for a LambdaRouter facility loopback) by positioning the mouse cursor on the port or tributary in the explorer portion of the window, clicking the right mouse button, and selecting **aid**. The selected port or tributary AID automatically populates the AID field in the Loopback portion of the window.**Important!** For SDH NEs (such as the WaveStar® TDM 10G) and for SDH ports on a WaveStar® BWM NE, the AID format has to comply with the ITU-T format. For LambdaRouter™ 128/256 AOS NEs, the input and output port AIDs are shown.
Set up a Near-side or Far-side Facility loopback	Enter the port AID in the Access Identifier field.

9 Select the Loopback Type by clicking the down-arrow to the right of the Loopback Type field, which displays a list of choices, and choose the loopback type.

The choices are:

- Cross-Connect Loopback
- Near-side Facility Loopback
- Far-side Facility Loopback
- Maintenance Cross-Connect

10

TO...	DO THIS...
Set up a cross-connect loopback	Choose the rate by clicking the down arrow next to the Rate field to display a drop-down list of choices and select the rate of the tributary to be placed in loopback.**Important!** Choosing a rate is not required for cross-connect loopback on a LambdaRouter port AID.
Set up a near-side facility loopback or far-side facility loopback	Skip this step. The Rate field is greyed out for this loopback type.

11

TO...	DO THIS...
Set up a loopback on a port/tributary with no active cross-connection	Click the down arrow next to the Action field to display a drop-down list of choices and choose Operate Loopback.
Set up a loopback on a port/tributary with an active cross-connection	Click the down arrow next to the Action field to display a drop-down list of choices and choose Force Loopback. **Result:** After your loopback choices are made, the Create button is enabled.

12 Click the Create button.

Result:

A pop-up dialog window is displayed, informing you that the loopback being created may affect service and asking if you want to proceed.

13 Choose Yes.

Result:

The newly created loopback cross-connection for the selected port/tributary is displayed on the Loopback window table.

If part of the AID is obscured in the display portion of the window, position the mouse cursor on the pane edge between the Network Element Explorer and the display portion of the window, which displays a double-arrow cursor. Click and hold the left mouse button and drag the cursor to the left or right until the complete display of the loopback details is visible. You can also use the left/right scrollbar buttons at the bottom of the display portion to maneuver the display to the left or right.

14 Repeat Step 6 to Step 13 to create more loopbacks or click the Close button to close the window.

END OF STEPS

□

View Loopbacks

Purpose Use this procedure to view loopbacks in an NE.

Before you begin Before you begin this task, one or more loopbacks must be created in the NE to be viewed.

Task Complete the following steps to view loopbacks.

1 Select an NE in the Map pane portion of the Map window

OR

Select no NE at this point.

2 Choose **TestManagement** from the main menu bar on the Map window.

Result:

A sub-menu is displayed.

3 Choose **Loopbacks** from the displayed sub-menu.

If you did not choose an NE is step 1, the Choose an NE window is displayed.

Double-click on the NE in the list to select it. Click the OK button.

Result:

The Loopback window is displayed.

4 Click the plus (+) sign next to each level of the equipment hierarchy shown in the Network Element explorer portion of the window until the display expands down the desire equipment level.

5 Position the mouse cursor on the desired equipment component in the explorer (shelf, port, or tributary) and click the left mouse button to select it.

Result:

The List button, located at the bottom of the Network Element Explorer portion of the window, is enabled.

6 Click the List button.

Result:

The loopbacks created for the selected piece of equipment are displayed on the right panel.

Use the left/right scroll buttons located at the bottom of the loopback cross-connections display to move the display left or right to view all data.

END OF STEPS

□

Delete a Loopback

Purpose

Use this procedure to delete ("release") a loopback. After a cross-connect loopback is deleted on a port tributary, any other cross-connections defined for that tributary are automatically re-established in the NE.

Before you begin

Before you begin this task, you need to identify the port or tributary in the NE from which the t loopback will be deleted.

To view existing existing loopbacks, use the List Loopbacks window as described in "View Loopbacks" (7-88).

Task

Complete the following steps to delete a loopback.

1 Select an NE in the Map pane portion of the Map window

OR

Select no NE at this point.

2 Choose **TestManagement** from the main menu bar on the Map window.

Result:

A sub-menu is displayed.

3 Choose **Loopbacks** from the displayed sub-menu.

If you did not choose an NE is step 1, the Choose an NE window is displayed.

Double-click on the NE in the list to select it. Click the OK button.

Result:

The Loopback window is displayed.

4 Click the plus (+) sign next to each level of the equipment hierarchy shown in the Network Element explorer portion of the window until the display expands down the desired equipment level.

5 Position the mouse cursor on the desired equipment component in the explorer and click the left mouse button to select it.

Result:

The List button, located at the bottom of the Network Element Explorer portion of the window, is enabled

6 Click the List button.

Result:

The loopbacks created for the selected piece of equipment are displayed.

Use the left/right scroll buttons located at the bottom of the loopback cross-connections display to move the display left or right to view all data.

7 Double-click on the loopback in the display portion of the window to select it for deletion.

Result:

The Delete button is enabled.

8 Click the Delete button.

Result:

A pop-up question dialog window is displayed, informing you that deletion of the selected loopback may affect service and asking if you want to continue with the deletion.

9 Choose Yes to delete the loopback.

Result:

The deleted loopback is removed from the display.

10 Click the Close button to close the window.

END OF STEPS

□

8 Traffic Maintenance

Overview

Purpose

This chapter describes procedures related to maintaining traffic for network elements managed by Navis™ Optical EMS.

Before you begin

Read Chapter 16, "Traffic Maintenance Concepts" to learn about protection groups and protection switching in Navis™ Optical EMS.

Contents

Add Network Element Protection Groups	8-3
View Network Element Protection Groups	8-9
Modify Network Element Protection Groups	8-11
Delete Network Element Protection Groups	8-14
Operate Protection Switch (from the Manage Protection Groups Window)	8-16
Display Protection Switching Status	8-22
Operate Protection Switch (from the Protection Status Management Window)	8-24
Create a Test Access Connection	8-30
List Test Access Connections	8-34
Modify a Test Access Connection	8-37
Delete a Test Access Connection	8-40

Provision a Ring Map	8-42
Enable a Ring Map	8-46
View a Ring Map	8-48
Provision Nonpreemptible Unprotected Traffic (NUT) Status (NPPA/NUT Provisioning)	8-51

Add Network Element Protection Groups

Purpose

Use this procedure to add a port protection group to an NE.

Before you begin

Before you begin this task, make sure that you have identified the NE to which you want to add a protection group. Be aware that only certain types of protection are supported for a given transmission interface (rate) and NE type. For details about the types of protection supported for a given transmission interface (rate) and NE type, see Chapter 16, "Traffic Maintenance Concepts".

Be aware that after creating or deleting 1+1 protection groups on an LCT, you must manually initiate DNO on Port Parameters.

Related information

For related information, see the following:

- "View Network Element Protection Groups" (8-9)
- "Modify Network Element Protection Groups" (8-11)
- "Delete Network Element Protection Groups" (8-14)

Task

Complete the following steps to create protection groups on the Protection Provisioning window. ***This procedure follows the steps for adding a 1+1 port protection group as an example. The basic steps of this procedure apply to adding any other type or protection group.***

1 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration sub-menu is displayed.

2 Select **Protection Management** from the Configuration sub-menu.

Result:

The Protection Management sub-menu is displayed.

3 Select **Protection Groups** from the Protection Management sub-menu.

Result:

The Choose an NE window is displayed.

4 Double-click on the NE in the list to select it and click the OK button.

Result:

The Manage Protection Groups window is displayed for the selected NE.

The Manage Protection Groups window has an explorer that shows the available protection group types and protection groups created for each type.

To display existing protection groups for a protection group type, click the plus (+) sign next to the protection group type. The explorer expands the list to show existing protection groups for a type, if any. If there are no existing protection groups for a given type, the explorer tree shows “No protection Groups”. To collapse the listing, click the minus (-) sign next to the protection group type.

The Manage Protection Groups window also has a series of buttons:

- Add—click this button to add a new protection group.
- Modify—click this button to modify an existing protection group.
- Delete—click this button to delete an existing protection group.
- View—click this button to view the member ports and attributes of an existing protection group.
- Operate Switch—click this button to operate a protection switch for the selected protection group.
- Close—click this button to close the Protection Provisioning Manager window.
- Help—click this button to display online help for this window.

5 Single-click on the protection group type to select it.

Result:

The Add button is enabled (if applicable).

6 Click the Add button.

Result:

The Add Protection Group wizard window to select a transmission interface (rate) is displayed.

---

7 Select the rate by clicking on the appropriate radio button.

Result:

The Next button is enabled.

---

8 Click the Next button.

Result:

The Add Protection Group wizard window to identify the protection group and select the member ports is displayed.

The Protection Group Type is displayed at the top of the window.

If this is 2-Fiber BLSR/MSPRing or 4-Fiber BLSR/MSSPRing protection group, a Ring ID (Protection Group Name) field is displayed. Enter the Ring ID (this field is optional).

---

9 Click the down arrow next to the Bay-Shelf field to display a drop-down list of bays and shelves.

---

10 Select the bay/shelf for the port protection group.

Result:

The bay and shelf selected becomes part of the Protection Group ID displayed on the window and is later used to identify the protection group.

The Protection Group (PG) ID (identifier) is derived from the information you provide. The format for the PG AID is {BayAID }{ShelfAID}{Entity Type Qualifier}{Protection Group AID number}, where the {Entity Type Qualifier} is:

T – 2 Fiber

F – 4 Fiber

O – 1+1 Optical

N – 1xN Optical

For example, if you selected bay 1 shelf 1 in the Bay-Shelf field for a 1+1 Optical Port Protection Group, the prefix of the Protection Group ID displayed in the PG AID label on the window would be “1–1–O”, where “O” stands for “1+1 Optical”. The “O” is not actually entered into the PG AID field. It is a derived identifier that indicates which type of protection group is being created.

11 Enter the Protection Group (PG) AID number (1-99) in the field next to the PG AID label. This number is used to uniquely identify a protection group of the same type provisioned on the same shelf. This field is required.

12 In the portion of the window labelled Current Value and New Value, select the member ports for the protection group.

Depending on the protection group type chosen, the member ports may be labelled “East/West” (2-Fiber BLSR/MSSPRing), “Working/Protection” (1+1 Optical) or “East Working/East Protection, West Working/West Protection” (4-Fiber BLSR/MSSPRing).

The system enforces that the ports selected are on the same shelf and the same tranmission rate you selected. Mixing of SONET and SDH rates is not allowed by the system.

Important! At any point on this window, you can click the Back button to go back to the previous wizard window to change the rate for the protection group. However, if you do this, the current selections you have made on this wizard window to identify the protection group and select the member ports will be removed.

13 To select the Working port, click the down arrow under the New Value column to display a list of available ports for the selected bay/shelf.

14 Click on a port in the displayed drop-down list.

15 To select the Protection port, click the down arrow under the New Value column to display a list of available ports for the selected bay/shelf.

Result:

The system only displays a list of ports that are on the same bay/shelf as the first (reference) port chosen and the rate chosen on the previous wizard window. The system enforces that the working and protection ports are the same rate.

16 After selecting the member ports, click the Next button.

Result:

The system advances to the next panel to view or modify any provisional attributes for the protection group.

To view or modify any attributes for the protection group, click the Next button. Go to Step 17.

17 If you clicked the Next button in the previous step, one or more of the following attributes may be displayed for modification on the Enter Protection Group Attributes window (in this case, for 1+1 port protection groups):

Protocol—this field is used to set the direction in which a protection switch can be applied. The choices are: **1+1_BIDIR** (1+1 Bidirectional), **1+1_UNI** (1+1 Unidirectional), **1+1_OPTIM** (1+1 Optimize).

Revertive Mode Enable—this drop-down field is used to select whether traffic will automatically revert back to the service entity after a problem has cleared. If the Protocol field value is set to **1+1_BIDIR**, the Revertive Mode Enable field can be set to **Enabled**. If the Protocol field value is set to **1+1_UNI** or **1+1_OPTIM**, the Revertive Mode Enable field is greyed out and its value cannot be modified.

Wait to Restore—this field is used to select the amount of time (seconds) to wait before switching back to the working port when it becomes available again. Click the down arrow next to this field to display a list of choices. Click on the choice in the list to select it.

Important! If the Revertive Mode Enable field has been set to Disabled, or the NE type/transmission interface only allows non-revertive protection switching, the value of the Wait To Restore field cannot be modified.

18

IF...	THEN...
You are finished making changes to the protection group information	Click the Next button
You want to modify any information for the protection group	Click the Back button to go back to the previous panel(s) and make changes as needed

Result:

If you click the Next button at this point, a pop-up question dialog window is displayed, asking if you really want to create this protection group. Go to Step Step 19

19 Choose **Yes**.

Result:

A status window is displayed, showing whether the protection group was successfully created. If it was not successfully created, this is indicated on the status window. If the protection group was not successfully created, it may be that the protection group already exists or another problem with the NE or selections made.

Click the Refresh button to clear the status window or click the Close button to close it.

After the protection group is created, you can click the Next button and modify the characteristics of the protection group. If you are finished, click the Finish button.

END OF STEPS

□

View Network Element Protection Groups

Purpose Use this procedure to select an NE's port protection group and view all member ports and current attribute settings.

Befoe you begin Before you begin this task, determine the NE and protection group to be viewed. To perform this task, access the Map window.

Related information For related information, see the following:

- "Add Network Element Protection Groups" (8-3)
- "Modify Network Element Protection Groups" (8-11)
- "Delete Network Element Protection Groups" (8-14)

Task Complete the following steps to display protection groups on the Protection Provisioning window.

1 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

2 Select **Protection Management** from the Configuration menu.

Result:

The Protection Management sub-menu is displayed.

3 Select **Protection Groups** from the Protection Management sub-menu.

Result:

The Choose an NE window is displayed.

4 Double-click on the NE in the list to select it and click the OK button.

Result:

The Manage Protection Groups window for the selected NE is displayed.

5 In the explorer portion of the window, click on the plus (+) sign next to the protection group type under which is the protection group you want to view.

Result:

The explorer expands to show the existing protection groups under the type selected.

6 Select the protection group to be viewed by clicking on its protection group AID in the explorer tree.

7 Click the View button.

Result:

The View Protection Group window for the selected protection group is displayed.

This window shows the Protection Group Type, protection group (PG) AID, member ports and their value (assignment), and the current setting of any provisionable attributes.

8 Click the Close button to close the window.

Result:

The Manage Protection Groups window remains on the screen.

9 Click the Close button to close this window.

END OF STEPS

□

Modify Network Element Protection Groups

Purpose

Use this procedure to modify NE protection groups. Navis™ Optical EMS allows you to swap the function of existing member ports and to change any attributes associated with the protection group.

Before you begin

Before you begin this task, determine the NE and protection group to be modified. To perform this task, access the Map window.

Related information

For related information, see the following:

- "Add Network Element Protection Groups" (8-3)
- "View Network Element Protection Groups" (8-9)

Task

Complete the following steps to modify protection groups on the Protection Provisioning window.

1 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

2 Select **Protection Management** from the Configuration menu.

Result:

The Protection Management sub-menu is displayed.

3 Select **Protection Groups** from the Protection Management sub-menu.

Result:

The Choose an NE window is displayed.

4 Double-click on the NE in the list to select it and click the OK button.

Result:

The Manage Protection Groups window is displayed for the selected NE.

5 Click on the plus sign (+) next to the protection group type of the protection group to be modified in the explorer portion of the window.

Result:

The explorer expands to show a list of existing protection groups for the selected type.

6 Single-click on the protection group (identified by its Protection Group ID) in the list.

Result:

Your selection is highlighted and the Modify button is enabled.

7 Click the Modify button.

Result:

The Modify Protection Group wizard window for the selected NE and protection group is displayed.

The top of this window shows the Protection Group Type, the Protection Group (PG) AID, and the transmission rate (which cannot be modified). The bottom portion of the window shows the current value (assignment) of any provisionable attributes.

8 Make any changes to the attributes, as needed.

Important! If Revertive Mode has been disabled for this protection group through the Navis™ Optical EMS GUI, or is not supported by the NE type/transmission rate, the value of the Wait To Restore parameter cannot be modified.

9 Click the Next button.

Result:

A pop-up question dialog window is displayed, asking if you really want to make the selected modifications to the protection group.

10 Choose Yes.

Result:

When the modifications are completed, a status window is displayed, showing that the changes for the selected protection group are completed.

If, for some reason, the modification fails, the status window displays the request with a status of “Failed” and a pop-up window is displayed, providing the reason for the failure. Click OK on this pop-up window. The system returns to the Attributes panel to make more modification. Make the required change(s) and click the Next button, or click the Cancel button to cancel the operation and exit the window.

After modifying the protection group, you can view it by clicking the Next button to bring up a window that displays the protection group.

END OF STEPS

□

Delete Network Element Protection Groups

Purpose

Use this procedure to delete an existing port protection groups from an NE. Deleting a protection group removes all member ports from the group.

Before you begin

Before you begin this task, determine the NE and the protection group to be deleted. Be aware that removing protection groups with existing cross-connections or reservations is not permitted.

Be aware that after creating or deleting 1+1 protection groups on an LCT, you must manually initiate DNO on Port Parameters.

Related information

For related information, see the following:

- "Add Network Element Protection Groups" (8-3)
- "View Network Element Protection Groups" (8-9)

Task

Complete the following steps to delete protection groups on the Protection Provisioning window.

1 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

2 Select **Protection Management** from the Configuration menu.

Result:

The Protection Management sub-menu is displayed.

3 Select **Protection Groups** from the Protection Management sub-menu.

Result:

The Choose an NE window is displayed.

4 Double-click on the NE in the list to select it and click the OK button.

Result:

The Protection Provisioning Manager window is displayed.

5 In the explorer portion of the window, click on the plus (+) sign next to the protection group type to expand the explorer and show the list of protection group AIDs under that type.

6 Select the protection group ID of the port protection group to be deleted by single-clicking on it.

Result:

Your selection is highlighted and the Delete key is enabled.

7 Click the Delete key. A pop-up window is displayed, asking if you really want to remove the port protection group.

8 Choose Yes to remove the protection group.

Result:

A status window is displayed, showing the progress of the deletion. If the deletion is successfully completed, the status is shown as “Completed” on the status window.

END OF STEPS

□

Operate Protection Switch (from the Manage Protection Groups Window)

Purpose Use this procedure to provision a protection switch, for a specified protection group, from the Manage Protection Groups window.

The fields shown on the Operate Protection Switch window will vary, based on the Protection Group Type selected.

The fields common to all Protection Group Types are:

- Protection Group Type—this is a display-only field that shows the selected Protection Group Type.
  If the entities to be switched are ports (for example, in a 4-Fiber BLSR/MS-SPring Protection Group), the version of the Operate Switch window displayed is different.
  Identifying fields for this Protection Group Type (display-only) shown on the window are:
  - Protection Group Type
  - Protection Group Ring ID (RID)
  - Protection Group AID
- PG AID—this is a display-only field that shows the Protection Group AID of the selected protection group.
- Switch Status—this is a display-only field that shows the last message prompting a protection switch. If there is no current message, this field indicates that there has been No Request (“NR”).
- Switch Command—this field allows you to select the command for provisioning the type of protection switch to be performed. Click the down arrow next to the field to display a drop-down list of commands.
  The list of commands displayed depends on the selected Protection Group Type. Possible choices from the command list are:
  - `CLEAR`
  - `LOCKOUT`
  - `FRCED` (Forced)
  - `MAN` (Manual)
  - `CLEARFRCD` (Clear Forced)

- `CLEARLOCKOUT` (LambdaRouter™ 128/256 AOS)
- `RELEASEMANUAL` (LambdaRouter™ 128/256 AOS)
- `RELEASEFORCED` (LambdaRouter™ 128/256 AOS)

Switch priorities for WaveStar TDM NEs, in descending order, are: CLEAR, LOCKOUT, FRCED, MAN

The Operate Protection Switch window also has a series of buttons:

- Add—click this button to add a new protection group.
- Modify—click this button to modify an existing protection group.
- Delete—click this button to delete an existing protection group.
- View—click this button to view the member ports and attributes of an existing protection group.
- Operate Switch—click this button to bring up the Operate Protection Switch window to provision a protection switch for the selected protection group.
- OK—click this button to activate your choices.
- Close—click this button to close the Protection Provisioning Manager window.
- Details—click this button to get the status of the protection group switch.
- Help—click this button to display online help for this window.

Before you begin

Before you begin this task, identify the type of protection group and type of protection switch you want to provision. For details about the types of protection supported for a given transmission interface (rate) and NE type, see the Protection Groups section in the Traffic Maintenance Concepts chapter.

Check that there are no communications or physical connectivity problems between the working and protection entities in the NE that can prevent successful operation of a protection switch. This can be done by accessing the Alarm List for the NE for communications problems on the related circuit packs/ports, or issuing the TL1 command `RTRV-PROTN-GRP` through the Cut-Through window in the Navis™ Optical EMS GUI to obtain the status of the protection group. An example of this command is: `RTRV-PROTN-GRP:TID:1-1-Oall:123:1+1;`

Important! In the TL1 command`RTRV-PROTN-GRP` syntax, `0all` indicates 1+1 Optical, `tall` indicates 2–Fiber, `fall` indicates 4–Fiber, and `Nall` indicates 1xN Optical.

Related information

For related information, see the following:

- "Add Network Element Protection Groups" (8-3)
- "View Network Element Protection Groups" (8-9)
- "Modify Network Element Protection Groups" (8-11)
"Delete Network Element Protection Groups" (8-14)
- "Access the Alarm List" in the *Navis™ Optical EMS Maintenance Guide*.
- "Perform Cut-Through Commands" (2-25) in Chapter 2, "Getting Started"

Task

Complete the following steps to create protection groups on the Protection Provisioning window.

1 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

2 Select **Protection Management** from the Configuration menu.

Result:

The Protection Management sub-menu is displayed.

3 Select **Protection Groups** from the Protection Management sub-menu.

Result:

The Choose an NE window is displayed.

4 Double-click on the NE in the list to select and click the OK button.

Result:

The Manage Protection Groups window is displayed.

The Protection Provisioning Manager window has an explorer that shows the available protection group types and port protection groups created for each type.

To display existing protection groups for a protection group type, click the plus (+) sign next to the protection group type. The explorer expands the list to show existing protection groups for a type, if any. If there are no existing protection groups for a given type, the explorer tree shows “No protection Groups”. To collapse the listing, click the minus (-) sign next to the protection group type.

5 Click the plus (+) sign next to the protection group type to expand and see the protection groups set up for the selected protection group type.

6 Select the protection group to be provisioned for a protection switch by single-clicking on it in the explorer portion of the window, under the selected protection group type.

Result:

The buttons for actions that can be performed for the selected protection group are enabled. If, for example, you cannot add or change the member entities of the selected protection group type or delete the protection group itself, the Add, Modify, or Delete buttons remain disabled.

7 Click the Operate Switch button.

Result:

The Operate Protection Switch window for the selected protection group is displayed.

8 Select the switch command from the drop-down list of commands.

9 Select the destination of the entity that should be active after operation of the protection switch.

IF...	THEN...
You know the AID of the current working port or circuit pack that is being switched to protection	Click the down arrow next to the Destination Entity AID field to display a drop-down list and select the AID of the port or circuit pack that should be active after the protection switch.
You do not know the AID of the current working port or circuit pack that is being switched to protecton	1. Click the down arrow next to the Destination Entity field to display a drop-down list and select the entity that should be active after the protection switch. The choices are WKG (Working) or PROTN (Protection). For equipment protection groups, such as Switch Fabric Pack Equipment, the drop-down list for the Destination Entity field contains a list of slots. Choose the slot that of the circuit pack that should be active after the protection switch. 2. For port protection groups, click the down arrow next to the Destination Side field to display a drop-down list and select the port side that is being switched to protection. The choices are east or west. For 4–fiber port protection groups, the choices are east, west, or both.

10 To obtain the current status of the latest protection switch requested for the selected Protection Group Type, Protection Group Ring ID (if applicable) and Protection Group AID on the NE, click the Details button.

Result:

A Protection Switch Details window is displayed, showing the current status and success/failure of the latest protection switch request. To update the display on this window, click the Refresh button. To close this Protection Switch Details window, click the Close button.

11 After your choices are made, click the Apply button to initiate the switch request and leave the Operate Switch window open, or click the OK button to initiate the switch request and close the window.

Result:

A status window is displayed, showing the results of the request. If it is completed successfully, the status is shown as "Completed". If the request fails for some reason, the status of the request is shown as "Failed".

END OF STEPS

□

Display Protection Switching Status

Purpose Use this procedure to display protection switching status.

Task Complete the following steps to display protection switching status.

1 From the main menu bar of the Map window, select **Configuration**.

Result:

The Configuration menu is displayed.

2 Select **Protection Management** from the Configuration menu.

Result:

The Protection Management sub-menu is displayed.

3 Choose **Protection Switching** from the Protection Management sub-menu.

Result:

The Choose an NE/Aggregate window. Choose either Network Elements or Aggregates.

A Filtering/Sorting option is also available to the user by clicking on the Filter/Sort button. After setting the parameters for this option, click the Apply button to enter your data and then click the OK button to return to the Choose an NE/Aggregate window.

4 Double click on the desired selection from the list.

Result:

The OK button is enabled.

5 Click the OK button.

Result:

The Choose Protection Type window is displayed showing the available protection types to select.

6 From the available valid protection types, choose the protection type(s) to be displayed in the Protection Switching Status window.

Result:

The OK button becomes enabled.

7 Click the OK button.

Result:

The Protection Switching Status window is displayed with the correct information as indicated by the user.

8 When you have finished viewing the data, click on the Close button.

END OF STEPS

□

Operate Protection Switch (from the Protection Status Management Window)

Purpose Use this procedure to provision a protection switch for a selected protection group type and protection switch message related to that protection group type, from the Protection Status Management window.

Identifying fields for this Protection Group Type (display-only) shown on the Operate Protection Switch window are:

- Protection Group Type
- Protection Group Ring ID (RID)
- Protection Group AID

The fields common to all Protection Group Types are:

- Protection Group Type—this is a display-only field that shows the selected Protection Group Type.
- PG AID—this is a display-only field that shows the Protection Group AID of the selected protection group.
- Switch Request—this is a display-only field that shows the last message prompting a protection switch. If there is no current message, this field indicates that there has been No Request ("NR").
- Switch Command—this field allows you to select the command for provisioning the type of protection switch to be performed. Click the down arrow next to the field to display a drop-down list of commands.
  The list of commands displayed depends on the selected Protection Group Type. Possible choices from the command list are:
  - `CLEAR`
  - `LOCKOUT`
  - `FRCED` (Forced)
  - `MAN` (Manual)
  - `CLEARFRCD` (Clear Forced)
  - `CLEARLOCKOUT` (LambdaRouter™ 128/256 AOS)
  - `RELEASEMANUAL` (LambdaRouter™ 128/256 AOS)
  - `RELEASEFORCED` (LambdaRouter™ 128/256 AOS)

Switch priorities for WaveStar TDM NEs, in descending order, are: CLEAR, LOCKOUT, FRCED, MAN

Before you begin

Before you begin this task, identify the type of protection group and type of protection switch you want to provision. For details about the types of protection supported for a given transmission interface (rate) and NE type, see the Protection Groups section in the Traffic Maintenance Concepts chapter.

Check that there are no communications or physical connectivity problems between the working and protection entities in the NE that can prevent successful operation of a protection switch. This can be done by accessing the Alarm List for the NE for communications problems on the related circuit packs/ports, or issuing the TL1 command `RTRV-PROTN-GRP` through the Cut-Through window in the Navis™ Optical EMS GUI to obtain the status of the protection group. An example of this command is: `RTRV-PROTN-GRP:TID:1-1-0all:123:1+1;`

Important! In the TL1 command`RTRV-PROTN-GRP` syntax, `0all` indicates 1+1 Optical, `tall` indicates 2–Fiber, `fall` indicates 4–Fiber, and `Nall` indicates 1xN Optical.

Related tasks

For related information, see the following:

- "Access the Alarm List" in the *Navis™ Optical EMS Maintenance Guide.*
- in Chapter 2, "Getting Started"

Task

Complete the following steps to provision a protection switch for a given protection group type and protection switch message.

1 From the main menu bar of the Map window, select **Configuration**.

Result:

The Configuration menu is displayed.

2 Select **Protection Management** from the Configuration menu.

3 Choose **Protection Switching** from the Protection Management sub-menu.

Result:

The Choose an NE/Aggregate window is displayed.

You can limit the list shown on this window to either all NEs or aggregates in your Target Group by clicking the appropriate radio button.

4 Double-click on the NE or aggregate in the list to select it.

5 Click the OK button.

Result:

The Choose Protection Type window is displayed, showing the available protection types to select.

6 From the available valid protection types, choose the protection type(s) to be displayed in the Protection Switching Status window by positioning the mouse cursor in the box and clicking the select (left) mouse button to select the box.

Result:

A checkbox is placed in the box and the OK button is enabled.

7 Click the OK button.

Result:

The Protection Switching Status window is displayed, showing protection switch status messages (if any), for the selected protection group type(s).

Use the left/right scroll bar buttons located at the bottom of the display area of this window to scroll left or right, to see the complete status message.

8 Once you have located the protection group type and message for which you want to provision a protection switch, click on the message in the display portion of the window to select it.

9 Click the Operate Switch button.

Result:

The Operate Protection Switch for the selected protection group type and message is displayed.

The fields shown on the Operate Protection Switch window will vary, based on the Protection Group Type selected.

10 Click the down arrow next to the Switch Command field to display a drop-down list of commands and select the switch command.

11 Select the destination of the entity that should be active after operation of the protection switch.

IF...	THEN...
You know the AID of the current working port or circuit pack that is being switched to protection	Click the down arrow next to the Destination Entity AID field to display a drop-down list and select the AID of the port or circuit pack that should be active after the protection switch.

IF...	THEN...
You do not know the AID of the current working port or circuit pack that is being switched to protecton	1. Click the down arrow next to the Destination Entity field to display a drop-down list and select the entity that should be active after the protection switch. The choices are WKG (Working) or PROTN (Protection). For equipment protection groups, such as Switch Fabric Pack Equipment, the drop-down list for the Destination Entity field contains a list of slots. Choose the slot of the circuit pack that should be active after the protection switch. 2. For port protection groups, click the down arrow next to the Destination Side field to display a drop-down list and select the port side that is being switched to protection. The choices are east or west. For 4–fiber port protection groups, the choices are east, west, or both.

12 To obtain the current status of the latest protection switch requested for the selected Protection Group Type, Protection Group Ring ID (if applicable) and Protection Group AID on the NE, click the Details button.

Result:

A Protection Switch Details window is displayed, showing the current status and success/failure of the latest protection switch request. To update the display on this window, click the Refresh button. To close this Protection Switch Details window, click the Close button.

13 After your choices are made, click the Apply button to initiate the switch request and leave the Operate Switch window open, or click the OK button to initiate the switch request and close the window.

Result:

A status window is displayed, showing the results of the request. If it is completed successfully, the status is shown as "Completed". If the request fails for some reason, the status of the request is shown as "Failed".

END OF STEPS

□

Create a Test Access Connection

Purpose

Use this procedure to create a test access connection. A test access connection comprises a set of one-way or two-way cross-connections established to test the quality of circuits over part or all of an end-to-end connection that traverses multiple networks. It involves monitoring a signal at a particular NE that can be injected by a test system on a test tributary in the NE, to test the signal quality and isolate faults in a signal pathway.

A test access connection may involve a one-way or two-way cross-connection within the NE or for transmission of a test signal through the NE to a remote NE in the network path.

There are different test access modes. Single-test tributary modes access only the near-end (E-end) or far-end (F-end) in a one-way cross-connection or dual-test tributary modes that establish testing paths in both directions over a two-way cross-connection. The connection to the second test access tributary in a dual-test tributary mode is always from/to the far-end to the near-end of a signal path.

The monitoring near-end (MONE) test mode can be set up on an idle tributary or a leg of a one-way or two-way cross-connection.

The monitoring far-end (MONF) test mode can only be set up on a leg of a two-way cross-connection.

The monitoring test mode for both near-end and far-end in both directions (MONFE) can only be set up on a leg of a two-way cross-connection.

Before you begin

Before you begin this task, make sure that the one-way or two-way cross-connections to be used in creating a test access connection for a test mode have been created.

Related tasks

in Chapter 7, “Traffic Provisioning”

Task

Complete the following steps to create a test access connection..

1 Select an NE from the map pane or subnetwork explorer on the Map window

OR

Select no NE at this point.

2 Choose **TestManagement** from the main menu bar on the Map window.

Result:

The Test Management menu is displayed.

3 Choose **Test Access** from the Test Management menu.

If you did not choose an NE in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The Test Access window is displayed.

4 Expand the equipment hierarchy in the Network Element Explorer portion of the window until the desired shelf, port, or tributary is displayed.

5 Click on the desired equipment component in the explorer.

Result:

The Create button is enabled.

6 Click the Create button.

Result:

The Test Access configuration panel is displayed. It provides a graphical representation of the NE, tributaries, and cross-connections for each test mode selected, with additional guidance on tributary input (including the test access tributary) for each test mode.

7 Select the Test Access mode by clicking the down arrow to the right of the Test Access mode field to display a drop-down list of choices and select the test access mode. The choices are:

- MONE—Monitoring mode near-end
- MONF—Monitoring mode far-end
- MONFE—Monitoring mode near-end and far-end

8 Select the transmission signal rate to be tested by clicking the down arrow to the right of the Rate field to display a drop-down list of choices and choose the transmission signal rate (ALL, STS3, STS12, STS48, and so forth).

9

IF...	ENTER...
The test mode is MONE on an idle tributary	The E (near-end) tributary and test tributary AIDs
The test mode is MONE on the leg of a one-way or two-way cross-connection	The E (near-end) tributary, F (far-end) tributary, and test tributary AIDs
The test mode is MONF (can only be done on leg of a two-way cross-connection)	The E (near-end) tributary, F (far-end) tributary and test tributary
The test mode is MONFE (can only be done on leg of a two-way cross-connection)	The E (near-end) tributary, F (far-end) tributary and test tributary You can also populate the tributary field by positioning the mouse cursor on the tributary in the explorer and clicking the right mouse button to display a pop-up menu and choosing the tributary.

10 After entering your test mode data, click the Create button again.

Result:

A pop-up question dialog window is displayed, showing the test mode, rate, primary access (test) tributary, E tributary (and F

tributary, if need) for the test session, and asks if you are sure you want to initiate the test signal connection.

11 Choose Yes to initiate the test access connection.

Result:

The test access connection is created for the NE.

12 Click the Close button to close the window.

END OF STEPS

□

List Test Access Connections

Purpose Use this procedure to list the current test connections established in a specified NE.

Before you begin Before you begin this task, make sure that the one-way or two-way cross-connections to be used in creating a test access connection for a test mode have been created.

Task Complete the following steps to list the current test connections for an NE.

1 Select an NE from the map pane or subnetwork explorer on the Map window

OR

Select no NE at this point.

2 Choose **TestManagement** from the main menu bar on the Map window.

Result:

The Test Management menu is displayed.

3 Choose **Test Access** from the Test Management menu.

If you did not choose an NE in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The Test Access window is displayed.

4 Expand the equipment hierarchy in the Network Element Explorer portion of the window until the desired equipment component is displayed.

5 Click on the desired equipment component in the explorer.

Result:

The selected component is highlighted in the explorer tree. The List button is enabled.

6 Click the List button.

Result:

The Test Access configuration panel provides a list, in table format, of the current test connections set up in the NE.

Use the scroll bar located beneath the display panel to move the display to the left or right, as needed.

If there are no test access connections established for the selected shelf, the message “No Test Access” is displayed in the panel.

7

TO...	DO THIS...
Sort the test access connection list by transmission signal rate	Click the down arrow to the right of the Rate field to display a drop-down list of choices and select the rate.

8

TO...	DO THIS...
Save the output to a file.	Choose **Save** or **Save As** from the File menu option on the window menu bar. A Save window is displayed which allows you to select the file/folder to save the output. After making your selections, click Save to save the output or Cancel to cancel the operation.

TO...	DO THIS...
Set up the output for hardcopy printing	Choose **Print Setup** from the File menu option on the window menu bar. A Print Setup window is displayed, which allows you to select the fields and page orientation of the table output to print. After making your selections, click the OK button, or click the Close button to close the window without making any selections.
Preview the print output of the table	Choose **Print Preview** from the File menu option on the window menu bar. An online preview of the printed table is displayed. Click the "x" in the right hand border of the window to close it.
Print the table output	Choose **Print** from the File menu option on the window menu bar. A Print window is displayed. Set up the print properties for the print job and click the OK button. The table output is printed to the specified printer.

9 Click the Close button to close the window.

END OF STEPS

□

Modify a Test Access Connection

Purpose

Use this procedure to change the Test Access mode for an existing test access connection.

Before you begin

Before you begin this task, make sure that the one-way or two-way cross-connections to be used in creating a test access connection for a test mode have been created.

Related tasks

- "Create a Test Access Connection" (8-30)
- "List Test Access Connections" (8-34)

Task

Complete the following steps to change the Test Access mode and/or tributaries for an existing test access connection..

1 Select an NE from the map pane or subnetwork explorer on the Map window

OR

Select no NE at this point.

2 Choose **TestManagement** from the main menu bar on the Map window.

Result:

The Test Management menu is displayed.

3 Choose **Test Access** from the Test Management menu.

If you did not choose an NE in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The Test Access window is displayed.

4 Expand the equipment hierarchy in the Network Element Explorer portion of the window until the desired shelf is displayed.

5 Click on the desired equipment component in the explorer.

Result:

The selected equipment component is highlighted in the explorer tree. The List button is enabled.

6 Click the List button.

Result:

The Test Access configuration panel provides a list, in table format, of the current test connections set up in the NE.

Use the scroll bar located beneath the display panel to move the display to the left or right, as needed.

7 Click on the test access connection to be modified in the list shown on the Test Access configuration panel.

Result:

The Modify and Delete buttons are enabled.

8 Click on the Modify button.

Result:

The list displayed on the Test Acess configuration panel disappears from the window and is replaced by the graphical representation of the Test Access mode, Test Access mode field and Tributary fields.

9 Change the Test Acess mode, as needed.

10 Click the Modify button again.

Result:

A pop-up question dialog window is displayed, showing the test mode, rate, primary access (test) tributary, E tributary (and F tributary, if needed) for the test session, and asks if you are sure you want to modify the test signal connection.

11 Choose Yes to modify the test access connection or No to cancel the operation.

12 Choose Yes.

Result:

The test access connection is modified for the NE.

13 Click the Close button to close the window.

END OF STEPS

□

Delete a Test Access Connection

Purpose Use this procedure to delete a test access connection. When a test access connection is released, the NE:

- Automatically removes any connections between the test access tributaries and the E (near-end) and F (far-end) tributaries
- Automatically releases the test access tributaries
- Restores pre-existing cross-connections

Before you begin Before you begin this task, make sure that the one-way or two-way cross-connections to be used in creating a test access connection for a test mode have been created.

Task Complete the following steps to delete a test access connection..

1 Select an NE from the map pane or subnetwork explorer on the Map window

OR

Select no NE at this point.

2 Choose **TestManagement** from the main menu bar on the Map window.

Result:

The Test Management menu is displayed.

3 Choose **Test Access** from the Test Management menu.

If you did not choose an NE in Step 1, the Choose an NE window is displayed. Choose an NE from the list by double-clicking on it and click the OK button.

Result:

The Test Access window is displayed.

4 Expand the equipment hierarchy in the Network Element Explorer portion of the window until the desired equipment component is displayed.

5 Click on the desired equipment component in the explorer.

Result:

The selected shelf is highlighted in the explorer tree. The List button is enabled.

6 Click the List button.

Result:

The Test Access configuration panel provides a list, in table format, of the current test connections set up in the NE.

Use the scroll bar located beneath the display panel to move the display to the left or right, as needed.

7 Click on the test access connection to be deleted in the list shown on the Test Access configuration panel.

Result:

The Modify and Delete buttons are enabled.

The list displayed on the Test Access Configuration panel is removed and replaced by a graphical representation of the test access connection.

8 Click on the Delete button.

Result:

A pop-up question dialog window is displayed, showing the test mode, rate, primary access (test) tributary, E tributary (and F tributary, if needed) for the test session, and asks if you are sure you want to delete the selected test signal connection.

9 Choose Yes to delete the test access connection.

Result:

The test access connection is deleted from the NE.

10 Click the Close button to close the window.

END OF STEPS

Provision a Ring Map

Purpose

Use this procedure to manually provision a new ring map or to modify an existing ring map. A ring map can be created to show the interconnectivity of network elements in a 2–Fiber or 4–Fiber Bidirectional Line-Switched Ring (BLSR) associated with the same protection group.

An inactive manually provisioned ring map can be enabled.

To manually provision a ring map, you assign a unique node ID to each network element in the ring and identify the connectivity of each pair of network elements in the ring. The ring map is defined, starting with the local network element and going in the eastern direction from the local network element.

Before you begin

Before you begin this task, be aware that the minimum number of network elements that can be provisioned in a ring is two. The maximum number of network elements that can be provisioned in a ring is 16. Valid node IDs for each network element in the ring map are 0 to 16 and must be unique.

Be aware that this function is currently only supported for WaveStar® BWM R4.0 (and later) NEs.

Related information

For related information, see Chapter 16, “Traffic Maintenance Concepts” and “Enable a Ring Map” (8-46).

Task

Complete the following steps to manually provision a ring map.

1 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

2 Select **Protection Management** from the Configuration menu.

Result:

The Protection Management sub-menu is displayed.

3 Select **Ring Map Provisioning** from the Administration menu.

Result:

The Manual Ring Provisioning Management window is displayed.

The left portion of the window is an explorer. The explorer contains the TIDs of the WaveStar® BWM NEs that have protection groups which support Ring Map provisioning.

The right portion of the window contains the following buttons:

- Operational Map
- Manual Map/Enable
- DCC Map
- Provision

4 Click the plus (+) sign next to the TID of the Bandwidth Manager NE in the explorer to serve as the local NE for building the ring map.

Result:

The explorer expands to show the protection groups provisioned for this NE.

5 Single-click on the protection group AID under the NE to select it.

Result:

The buttons in the right portion of the window are enabled.

6 Click the Provision button.

Result:

The Provision Map Ring window is displayed.

The top portion of the window displays the Protection Group Information for the selected protection group (as read-only fields):

- Protection group AID
- Protection group type
- Protection group Ring ID (RID)
- The transmission rate of the protection group

The TID of the selected local NE is displayed in the local TID field in the Provision Ring Map portion of the window.

7 Enter a unique local node ID for the local NE. Valid values are 0–15.

8 Click the down arrow next to the East TID field to display a drop-down list and select the TID of the local NE.

9 Enter the node ID entered in the local Local Node ID field in the East Node ID field.

Result:

The TID and node ID of the local NE are displayed in the From TID/From Node ID in the first row of the ring map list.

10 Click the down arrow next to the To TID field to display a drop-down list of choices and choose the TID of the NE that is going in the eastern direction of the local NE.

11 Enter a unique node ID for the selected "To TID" NE. Valid values are 0–15.

12

TO...	DO THIS...
Add a row of NEs to the ring map	Click the Add Row button at the bottom of the window. **Result:** The TID and Node ID of the "To TID" NE are taken from the previous row and displayed in the From TID part of the next row. Enter the TID and node ID for the To NE in the new row. This provides the next To NE/From NE interconnection in the ring.

TO...	DO THIS...
Delete individual rows from the ring map	Click the checkbox to the left of the row(s) to be deleted to place a checkmark in each box and click the Delete Row(s) button.
Delete all rows from the ring map (except the initial local NE)	Click the Delete All Rows button. **Result:** One empty row remains in the scroll pane.

13 After making your selections, click the Apply button to activate your choices and leave the window open or click the OK button to activate your choices and close the window.

Result:

The ring map is created/modified.

If any of the values entered for the ring map are invalid, a warning dialog window is displayed. Click the OK button to close this warning dialog window. The Navis™ Optical EMS returns to the Provision Ring Map window. Repeat steps 6–11 to re-enter new values for the ring map.

END OF STEPS

□

Enable a Ring Map

Purpose Use this procedure to enable an inactive manually provisioned ring map.

Related task Refer to the following related tasks:

- "Provision a Ring Map" (8-42)
- "Manually Initiate DNO" (3-49)

Task Complete the following steps to enable a manually provisioned ring map.

1 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

2 Select **Protection Management** from the Configuration menu.

Result:

The Protection Mangement sub-menu is displayed.

3 Select **Ring Map Provisioning** from the Protection Mangement sub-menu.

Result:

The Manual Ring Provisioning Management window is displayed.

The left portion of the window is an explorer. The explorer contains the TIDs of the WaveStar® BWM NEs that have protection groups which support Ring Map provisioning.

The right portion of the window contains the following buttons:

- Operational Map
- Manual Map/Enable
- DCC Map
- Provision

4 Click the plus (+) sign next to the TID of the Bandwidth Manager NE in the explorer associated with the ring map to be enabled.

Result:

The explorer expands to show the protection groups provisioned for this NE.

5 Single-click on the protection group AID associated with the ring map to be enabled.

Result:

The buttons in the right portion of the window are enabled.

6 Click the Manual Map/Enable button.

Result:

The Manually Provisioned Ring Map window is displayed, showing the manually provisioned ring map(s) for the selected NE and protection group.

7 Select the manual ring map to be enabled.

8 Click the Enable button at the bottom of the window.

Result:

The selected manually provisioned ring map is enabled.

After a manually provisioned ring map has been enabled, you should perform a DNO on the local NE of the ring to update the trail records.

END OF STEPS

□

View a Ring Map

Purpose Use this procedure to view a ring map of network elements provisioned in a 2–Fiber BLSR or 4–Fiber BLSR ring associated with the same protection group.

You can view a ring of discovered DCC-connected network elements, the currently operational ring map, or a manually provisioned ring map.

Task Complete the following steps to view the specified ring map.

1 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

2 Select **Protection Management** from the Configuration menu.

Result:

The Protection Management sub-menu is displayed.

3 Select **Ring Map Provisioning** from the Protection Management sub-menu.

Result:

The Manual Ring Provisioning Management window is displayed.

The left portion of the window is an explorer. The explorer contains the TIDs of the WaveStar® BWM NEs that have protection groups which support Ring Map provisioning.

The right portion of the window contains the following buttons:

- Operational Map
- Manual Map/Enable
- DCC Map
- Provision

4 Click the plus (+) sign next to the TID of the Bandwidth Manager NE in the explorer associated with the ring map to be viewed.

Result:

The explorer expands to show the protection groups provisioned for this NE.

5 Single-click on the protection group AID associated with the ring map to be viewed.

Result:

The buttons in the right portion of the window are enabled.

6

TO...	DO THIS...
View a ring map that is currently operating	Click the Operational Map button.
View a manually provisioned ring map that is currently provisioned	Click the Manual Map/Enable button.
View a ring map of discovered DCC-connected NEs	Click the DCC Map button.
Enable an inactive manually provisioned ring map	Click the Manual Map/Enable button

Result:

When any of the ring map viewing options is selected, the Provisioned Ring Map window is displayed, showing the contents of the selected ring map. Essentially, the map contents shows the details about the interconnected NEs in the protected ring.

Each row of the display shows:

- The From NE TID
- The From NE Node ID
- The traffic direction of the From NE

- The To NE TID
- The To NE Node ID
- The traffic direction of the To NE

The window display is in tabular format. To move a field to a different column in the table display, position the mouse cursor on the column heading, click and hold the left mouse button, drag the field to the new position in the table, and release the mouse button.

7

TO...	DO THIS...
Refresh the display on the window	Click the Refresh button.
Close the window	Click the Close button.

END OF STEPS

□

Provision Nonpreemptible Unprotected Traffic (NUT) Status (NPPA/NUT Provisioning)

Purpose

Use this procedure to provision the handling of traffic between the service and protection sides of bandwidth on a 2–Fiber or 4–Fiber Bidirectional Line-Switched Ring (BLSR) on specified timeslots of the line/path for certain network elements that support Non Preemptible Protection Access (NPPA). NPPA increases the available span capacity for traffic that does not require protection by a ring, but cannot be preempted. You can select the service/protection setup for a specific working/protection timeslot pair (for example, protected/preemptible).

Provisioning NUT status of timeslots

The NUT status of timeslots are provisioned as working/protection pairs, according to the following table:

NUT Value of Timeslots 1–96 (working)	NUT Value of Timeslots 97–192 (protection)
protected	preemptible
unprotected	not preemptible
temporary unprotected	temporary not preemptible

Related information

See Chapter 16, “Traffic Maintenance Concepts”.

Task

Complete the following steps to provision the NUT status of a specific timeslot on a network element interface and protection group.

1 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

2 Select **Protection Management** from the Configuration menu.

Result:

The Protection Management sub-menu is displayed.

3 Select **NPPA/NUT Provisioning** from the Protection Management sub-menu.

Result:

The NPPA/NUT Management window is displayed.

The left portion of the window is an explorer that shows the TIDs of network elements that have a 2–Fiber BLSR protection group.

4 In the explorer portion of the window, expand the desired network element by clicking on the plus (+) sign next to the TID.

Result:

The AIDs/rates of the protection groups under the selected network element are displayed.

5 Choose a protection group under the expanded network element in the explorer portion of the window by single-clicking on the protection group AID.

6 Click the Provision button located on the right portion of the window.

Result:

The NPPA/NUT Provisioning window for the selected network element/protection group is displayed.

The top portion of the window displays the ring map for the selected 2–Fiber BLSR protection group, to show the interconnections and traffic flow between network elements in the ring and to assist in the provisioning of traffic between working/protection timeslots in the path/line.

If the Navis™ Optical EMS is unable to display the contents of the ring map for the selected network element and protection group, an informational message is displayed in the top portion of the window. This does not prevent you from being able to provisioning the NUT status of timeslots.

7 In the Timeslot Provisioning portion of the window, click the radio button that corresponds to the rate of the timeslots to be provisioned.

Result:

The provisionable timeslots for the selected rate are displayed in the bottom portion of the window.

Each timeslot row in the display shows:

- The timeslot (number)
- the Operational NUT status of the timeslot
- the Local NUT status of the timeslot
- the Network Element Title (NET). This is the TID of the network element that initiated the last NET status change on the timeslot, if the status change was successful, or the label NONE, if a timeslot status change has never been made or it has returned to its original value.

The Status Bar message area of the window indicates the number/range of timeslots that can be provisioned, based on the transmission rate selected. For example, if you selected the STS1 rate, timeslots 1–96 can be provisioned, corresponding to timeslots 1–96 of the service (working) bandwidth of the line/path.

If a rate other than the STS1 or VC3 rate,the Navis™ Optical EMS updates a range of timeslots, starting with the timeslot selected and ending with the timeslot as shown in the following table.

Transmission Rate	Range of timeslots in first half of bandwidth (working)	Range of timeslots in second half of bandwidth (protection)
STS3,VC4	n=1,4,3n+1,...,94	n+96 to n+98
STS12,VC44c	n=1–13,12n+1,..., 85	n+96 to n+107
STS48,VC416c	n=1 or 49	97 to 144, 145 to 192

If the system cannot retrieve the timeslot information for the selected protection group, an error dialog message is displayed informing you of this and and advises you to try accessing this feature at another time. If this occurs, click the Close button to close the window and try to access timeslots for the selected network element/protection group at another time.

8 Select the timeslot to be provisioned by single-clicking on it in the display portion of the window.

Result:

The selected timeslot is highlighted.

9

TO...	DO THIS...
Provision the NUT status of the selected working timeslot as Protected	Click the Protect button at the bottom of the window
Provision the NUT status of the selected working timeslot as Unprotected	Click the UnProtect button at the bottom of the window
Provision the NUT status of the selected working timeslot as Temporary Unprotected	Click the TUnProtect button at the bottom of the window

Result:

If the timeslot provisoning change is successful, a Completed message is displayed in the Status Bar message area of the window and the Local and Operational NUT status is updated in the display.

10 If you are finished making provisioning changes on timeslots, click the Close button to close the window.

END OF STEPS

□

9 Software Upgrade

Overview

Purpose

This chapter describes procedures related to managing and upgrading the network element software in the Navis™ Optical EMS.

Before you begin

Read the Software Upgrade Concepts chapter to learn about the NE softare management functions supported by the Navis™ Optical EMS.

Contents

Import Software to the Navis™ Optical EMS	9-3
Download NE Software	9-7
Copy Software from NE to NE	9-9
Activate NE Software	9-12
Delete NE Software	9-14
Back Up NE Data	9-16
Restore NE Data	9-18
In Service Upgrade of WaveStar® OLS 1.6T Software from Release 3.0 or Release 5.0 CMISE Mode to Release 6.0 TL1 Mode	9-22
Schedule NE Data Backup	9-29
Schedule NE Software Download	9-32
Schedule NE Software Copy	9-35

Schedule NE Software Activation	9-37
Modify a Scheduled Task	9-40
Delete a Scheduled Task	9-42

Import Software to the Navis™ Optical EMS

Purpose

Use this procedure to import an NE software release from a CD-ROM to the Navis™ Optical EMS host for eventual downloading to an NE.

Before you begin

The procedure described in this task is a generic version for all of the NE types except for the LambdaRouter™ 128/256 AOS NE type. Currently, the LambdaRouter™ 128/256 AOS software cannot be imported from CD to the Navis™ Optical EMS via the GUI; the software must be imported from CD manually. For LambdaRouter™ 128/256 AOS NEs, follow the procedure described in "SE 9-1: Import Software Manually from CD (for LambdaRouter™ 128/256 AOS NEs)" (9-5).

Be aware that while the Navis™ Optical EMS GUI shows the option of importing the NE software from tape drive or CD-ROM, the tape drive option is no longer supported.

Task

Complete the following steps to transfer NE software to theNavis™ Optical EMS.

1 Before importing a software release, you may want to see what software releases are already stored in the Navis™ Optical EMS for the NE type, using the View Software Release Descriptive Information function described in the sub-procedure following this procedure..

Reference:

"SE 9-2: View NE Software" (9-6)

2 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

3 Select **Software Management** from the Configuration menu.

Result:

The Software Management menu is displayed.

4 Select **Import Software to the EMS** from the Software Management menu.

Result:

The Select NE Type and Drive for Software Transfer window is displayed.

5 Choose CD Drive or Tape Drive for the media source of the NE software that you want to import to the EMS.

6 Single-click on the NE type in the NE Type list to select it.

7 Click the OK button.

Result:

The system begins a search for the software release on the tape or CD.

The status dialog window is displayed, indicating that the software transfer is in progress (working). If the software transfer is successful, the status shown on the window is “Completed”. If the software transfer is not successful, an error message is displayed and the status shown is “Incomplete”.

8 Click the Close button to close the status dialog window.

END OF STEPS

SE 9-1: Import Software Manually from CD (for LambdaRouter™ 128/256 AOS NEs)

NE release software for LambdaRouter™ 128/256 AOS NEs cannot be imported from CD to the Navis™ Optical EMS via the GUI; the software must be copied from the CD manually. Perform the steps below to do this.

1 Mount the CD onto the Navis™ Optical EMS host using the command:

```
mount/dev/cdrom/SD_CDROM
```

2 Determine the release number of the NE software, which is in the *generics.gci* file. For example, the line of the file with release information may be `Release=02.00.02`

3 Create a directory called *02.00.02*(or whatever the name of the release is) under the directory */ems/sw/data/OXC_LR*.

There is an *OXC_LR* directory for LambdaRouter ™256 NE types and an *OXC128_LR* directory for LambdaRouter 128 NEs. Use the appropriate NE type directory for the release directory.

4 Copy the contents of the CD (NE release software) to this newly created release directory using the following command (shown for illustration purposes):

```
cp -r /SD_CDROM/generics/ReleaseX/256/p/*
/ems/sw/data/OXC_LR/02.00.02
```

(For the appropriate release number.)

`ReleaseX` is the release number, such as Release 2.0 (or whatever is specified in the path)

5 Verify that all of the files and directories (if any) are copied into the */ems/sw/data/OXC_LR/02.00.02* (or whatever release number) directory.

Result:

Now the software is ready to be downloaded to the NE via the Navis™ Optical EMSGUI.

END OF STEPS

SE 9-2: View NE Software

Perform the steps below to see what software releases are already stored in Navis™ Optical EMS for an NE type.

1 Select **Configuration** from the Map window main menu.

Result:

The Configuration menu is displayed.

2 Select Software Management from the Configuration menu.

Result:

The Software Management menu is displayed.

3 Select View Software Release Descriptive Information from the Software Management menu.

Result:

The NE Type Selection for Viewing Descriptive Files is displayed.

4 Select the NE type from the NE Type list or type the NE type in the text field.

5 Click the OK button. A description of all the software releases stored in the Navis™ Optical EMS for the selected NE type is displayed.

END OF STEPS

□

Download NE Software

Purpose

Use this procedure to download a selected software release to a specific NE.

Important! Only one software download should be performed at a time. A software download may take up to two hours due to data communications and the size of the software being downloaded.

Before you begin

Before you begin this task, you must first access the Map window. The software release to be downloaded to the NE must be transferred to Navis™ Optical EMS from CD-ROM or tape. Be aware that after you download software to an WaveStar® OLS 1.6T NE, you must perform DNO on the NE before the release software can be activated.

Be aware that for WaveStar® TDM 2.5G and WaveStar® TDM 10G NEs, the Navis™ Optical EMS software download feature only supports download of an unpacked CD-ROM version of the NE release software.

Related information

For related information, see "Import Software to the Navis™ Optical EMS" (9-3).

Task

Complete the following steps to download software to an NE.

1 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

2 Select **Software Management** from the Configuration menu.

Result:

The Software Management menu is displayed.

3 Select **Download Software To NE** from the Software Management menu.

Result:

The Choose an NE/Aggregate window is displayed.

4 Select an NE by double-clicking on the NE's TID and click the OK button.

Result:

The Software Download to NE window is displayed.

5 Select a software release from the Releases Available list and click the Apply button.

Important! You can abort the software download at this point, if necessary, by clicking the Abort button. A Abort Progress window is displayed, showing the progress of the requested operation. Click the ABORT button on this window to abort the job or click the Close button to close the window without aborting the job.

Result:

The system verifies that the software release is not the same or older than the version currently running on the NE and is supported by the Navis™ Optical EMS. If the software version currently on the NE is the same or newer than the version being downloaded, the Navis™ Optical EMS displays a error message; otherwise, the software download process continues.

A pop-up message window is displayed, informing you that the download may take a certain amount of time and asks if you want to proceed with the software download. Choose:

- Yes to continue with the software download
  OR
- No to cancel the software download

6 Choose Yes.

Result:

The software download is initiated.

The status bar shows when the software download has been completed.

END OF STEPS

□

Copy Software from NE to NE

Purpose Use this procedure to copy software from one specified NE to one or more other specified NEs on demand.

Before you begin Be aware that an NE to NE software copy requires that the source NE and destination NE(s) are of the same NE type, and part of the same OSI domain. Thus, once the source NE has been selected, only other NEs of that type and part of the same OSI domain are allowable choices. To perform an software upgrade for this type of NE, the new or ugraded release of executable software must be downloaded to individual NEs.

Task Complete the following steps to copy software from NE to NE.

1 Select **Configuration** from the main menu bar on the Map window.

Result:

A sub-menu is displayed.

2 Select Software Management from the sub-menu.

Result:

The Software Management sub-menu is displayed.

3 Select **NE To NE Software Copy** from the sub-menu.

Result:

The Copy Software From NE to NE window is displayed. The Source NE list is populated with all the applicable NEs in the user's Target Group that support the NE to NE software copy feature, along with their release version.

4 Double-click on the desired source NE in the Source NE list.

Result:

The Available NE(s) list becomes populated with the NEs that are of the same type as the selected source NE.

For WaveStar® OLS 1.6T NEs, the Copy from active partition button and Copy from inactive partition button become enabled. For WaveStar® OLS 1.6T NEs only, the user must specify which memory partition of the source NE from which the software generic is to be copied (active partition is the default).

A Filtering/Sorting option is also available to the user by clicking on the Filter/Sort button. After setting the parameters for this option, click the Apply button to enter your data and then click the OK button to return to the Copy Software From NE to NE window.

5 Populate the Chosen NE(s) list with NEs from the available NE(s) list by using the arrow push buttons.

Result:

The OK button becomes enabled.

6 Click the OK button.

IF...	THEN...
The NE type selected is WaveStar® OLS 1.6T, the Copy from inactive partition button is clicked, and the software selected for copying is older than the software release is older than the release currently running on the target NE(s)	A question dialog message is displayed informing you that the software selected for copying is older than the release currently running on the target NE(s), and asks if you want to continue with the software copy anyway. Choose **Yes**.

IF...	THEN...
If the NE type selected is other than a WaveStar® OLS 1.6T, and the software selected for copying is older than the release currently running on the target NE(s) A confirmation pop-up window is displayed, asking if you want to continue with the software copy.	A question dialog message is displayed informing you that the software selected for copying is older than the release currently running on the target NE(s), and asks if you want to continue with the software copy anyway. Choose **Yes**.
There is no problem with the software selected for copying, or you have chosen Yes in response to any question dialog message asking if you want to continue with the software copy anyway	A followup question dialog is displayed, asking if you want to continue with the software copy at this point

7 Choose Yes to continue with the software copy.

Result:

When the copy is completed, a message notifies the user.

END OF STEPS

□

Activate NE Software

Purpose Use this procedure to activate software that has previously been transferred via software download or software copy.

Before you begin Be aware that the NE Software Activate function provides the set of allowable NEs for activation and only allows the user to select from among those choices. To activate software on a WaveStar® OLS 1.6T NE, perform a DNO after the software download is completed.

Be aware that you may lose the NE visability on the Map window for some time as the NE reboots during this process.

Task Complete the following steps to activate software that has previously been transferred via software download or software copy.

1 Select the desired network element(s) in the Navis™ Optical EMS map window.

2 Select **Configuration** from the main menu bar on the Map window. This displays a sub-menu.

3 Select **Software Management** from the sub-menu. This displays another sub-menu.

4 Select **Activate NE Software** from the sub-menu. This displays the Activate Software window populated with the selected NE(s) and their currently active software release.

5 Select an NE(s) and click Retrieve Standby Release to retrieve the standby release number of the selected NE(s).The user can also click on Remove From List to remove the chosen NE from the list.

6 Click on OK to initiate the activation of the new release.

Result:

The system verifies that the NE release version that has been requested for activation, is higher than the release version that is currently running on the NE, and also if the selected release is supported by the EMS.

A warning box appears if there is a problem with the selected software release.

Once verified, a dialog box confirms the software release number and NE.

7 Click on Yes to continue with the activation.

END OF STEPS

□

Delete NE Software

Purpose Use this procedure to delete a specific executable software release for an NE type from the Navis™ Optical EMS.

Before you begin Before you begin this task, access the Map window. The software to be deleted must be transferred to the Navis™ Optical EMS from CD-ROM or tape.

CAUTION

When software is deleted from the system, it is not recoverable. The only way to get the software back into the system is to reload it from a tape. Make sure that you want to delete the software release before following this procedure.

Task Complete the following steps to delete a specifc software release for the NE type.

1 Select **Configuration** from the main menu.

Result:

The Configuration menu is displayed.

2 Select **Software Management** from the Configuration menu.

Result:

The Software Management menu is displayed.

3 Select **Delete Software From the EMS** from the Software Management menu.

Result:

The Delete NE Software window is displayed.

4 Select the NE type from the Select NE Type list.

Result:

The Delete Software list shows the available software releases for the selected NE type.

5 Select the software release to be deleted from the Delete Software list by double-clicking on it.

6 Click the Delete button.

Result:

A confirmation window is displayed, asking if you want to proceed with the deletion.

7 Choose Yes to perform the software deletion or No to cancel the software deletion.

END OF STEPS

□

Back Up NE Data

Purpose

Use this procedure to back up an NE's provisioning data. The provisioning data includes port parameters and cross-connections. For the WaveStar® BWM and WaveStar® NCC, you can use this procedure to choose to back up the NE data to Navis™ Optical EMS memory or the NE's local secondary memory. For the NCC, you can choose to back up from NCC memory or NCC Directory Services data.

Before you begin

Before you begin this task, determine the NE for which you want to perform a backup. Ensure that there are no alarms present on the NE. You must access the Map window to perform this function.

Related information

For related information, see "Restore NE Data" (9-18).

Task

Complete the following steps to perform an NE backup.

1 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

2 Select **Software Management** from the Configuration menu.

Result:

The Software Management menu is displayed.

3 Select **Backup** from the Software Management menu.

Result:

The Choose an NE/Aggregate window is displayed.

4 Double click on the desired NE and click the OK button.

Result:

A pop-up window is displayed, indicating how long the backup process will take and asking if you want to proceed with the backup.

5

IF ...	THEN ...
a WaveStar® BWM or WaveStar® NCC is selected.	the Backup Details window is displayed. For a WaveStar® BWM or WaveStar® NCC, select EMS memory or NE Secondary Memory for NE data on the Backup Details window. For an NCC, select NCC Memory or NCC Directory Services data as the backup source.**Important!** If there is an alarm on the NE, a pop up window is displayed, indicating this and asks if you want to proceed with the backup. Choose Yes to continue with the backup or No to cancel the backup. **Result:** A pop-up confirmation window is displayed, asking if you want to proceed with the NE backup.

6 Choose Yes to perform the NE backup or No to cancel the backup.

END OF STEPS

□

Restore NE Data

Purpose

Use this procedure to restore NE provisioning data from a specified backup file. You can specify the type of provisioning data to be restored. This option restores all backup data from the selected NE file, including the default settings.

For the WaveStar® NCC, you have the option of restoring data from NCC memory or the Directory Services database.

Before you begin

Before you begin this task, determine the NE to which you want to restore data. You must access the Map window to perform this function.

Related information

For related information, see "Back Up NE Data" (9-16).

Task

Complete the following steps to restore an NE's backup data.

1 If the NE data being restored is for a WaveStar® TDM 2.5G, WaveStar® TDM 10G, or WaveStar® BWM NE, put the NE in Maintenance mode (in other words, enable the Maintenance Mode parameter using the Provisioning window in the GUI).

If the NE data restore operation is for a different NE type, skip to step 2.

Reference:

"Provision System Parameters" (4-2) in Chapter 4, "Equipment Provisioning"

2 Select **Configuration** from the main menu bar on the Map window.

Result:

The Configuration menu is displayed.

3 Select **Software Management** from the Configuration menu.

Result:

The Software Management menu is displayed.

4 Select **Restore** from the Software Management menu.

Result:

A sub-menu is displayed.

5 Select **Regular Restore** from the sub-menu.

Result:

The Choose an NE/Aggregate window is displayed.

6 Double click on the desired NE and click the OK button.

IF ...	THEN ...
an NCC is selected. For an NCC, choose NCC Memory or NCC Directory Services as the source of backup data and click the OK button.	the NCC Restore window is displayed. **Result:** The Select File for Restore window is displayed. For a WaveStar® BWM or WaveStar® NCC, the list includes the backup file that is stored in the NE's Non Volatile Memory.

7 Select a backup file for restoral. To look at a description of the backup data contained in the file before restoring it, click the View Descriptive Files button.

8 Click the OK button.

Result:

The restore process is started. As part of the restore process, the system performs several validation checks, comparing the software release, equipment, and switch settable parameters in the backup file with the current NE values. If there are discrepancies, a pop-up window is displayed with an error message asking if you want to continue with the restore. Choose:

- Yes to perform the NE restore anyway

OR

- No to cancel the NE restore

9

IF ...	THEN ...
you respond Yes to perform the restore anyway	The system continues with the restore. A pop-up message window is displayed, informing you that the restore may take a long time and asking if you want to proceed with the restore.

10 Choose Yes to perform the NE restore.

11

IF ...	THEN ...
you respond Yes to perform the restore.	The restore is initiated. The system informs you of the restore's progress with a status message. When the restore is completed, an information window appears that notifies you of the completion. If the restore fails, an error message is displayed in a pop-up window, indicating the source of the problem.

12 If the restore operation has been initiated, wait several minutes while the affected NE turns white on the Map window and then back to its original color (normally green, in the absence of alarms against the NE).

Important! The Navis™ Optical EMS kicks off a post-restore DNO at the end of the Restore operation, and it can continue after the "Restore Completed" message is displayed.

You must wait until the post-restore DNO is completed before proceding to the next step of this procedure.

When the NE icon changes back to green, this indicates that the post-restore DNO process has completed.

WARNING

Because the NE's previous database is backed up during inservice mode, once this database is restored, the NE is automatically placed in inservice mode, which occurs with restoral of the previous NE database. In this case, you do not have to use the GUI NE Provisioning window to disable or take the NE out of maintenance mode (if it is a WaveStar® 2.5G NE). The service mode of the NE on the Navis™ Optical EMS GUI does not reflect the new state of the NE until the DNO is completed. Therefore, there is an interval that Navis™ Optical EMS treats the NE as still being in maintenance mode before the NE exits maintenance mode.

13 Perform a complete manual DNO on the NE.

END OF STEPS

□

In Service Upgrade of WaveStar® OLS 1.6T Software from Release 3.0 or Release 5.0 CMISE Mode to Release 6.0 TL1 Mode

Purpose Use this procedure to upgrade the WaveStar® OLS 1.6T software from NE Release 3.0 or Release 5.0 CMISE mode to NE Release TL1 mode.

The basic upgrade procedure is as follows:

1. Archiving the configuration backup files of all WaveStar™ OLS 1.6T NEs to a CD
2. Importing the WaveStar® OLS 1.6T NE Release 6.0 software to Navis™ Optical EMS.
3. Upgrading each WaveStar® OLS 1.6T NE's software from NE Release 3.0 or Release 5.0 to NE Release 6.0. In doing a software upgrade, the Release 6.0 software that has been downloaded from Navis™ Optical EMS to a target NE must be copied to each WaveStar® OLS 1.6T NE to be upgraded. Once the software has been copied to each NE, the Release 6.0 upgrade software on each WaveStar® OLS 1.6T NE can be activated using the Navis™ Optical EMS Activate Software feature.
   The order in which the WaveStar® OLS 1.6T network elements in the network are upgraded is critical. The order/priority of network elements to be upgraded is as follows:
   a. Download software to the transport bridges or network elements serving as network "points of attachment".
   b. Copy software from the transport bridges or network points of attachment to the other network elements in the network, or download the software directly from the Navis™ Optical EMS.
   c. Activate software on network elements in order, starting with those furthest from the transport bridges or network points of attachment.
   d. Activate software on the secondary transport bridge.
   e. Activate software on the primary transport bridge.

Before you begin

Before you begin this task, the following is required:

- The WaveStar® OLS 1.6T Release 6.0 software on CD
- A CD

You must also determine which WaveStar® OLS 1.6T NE is the transport bridge and/or the Registration Manager (RM).

A software backup of the NE's configuration files must be completed for each NE to be upgraded, through the Navis™ Optical EMS GUI NE Software Backup function prior to performing this procedure.

When performing an in service software upgrade of an WaveStar® OLS 1.6T network element to NE software release 6.0, check that the WaveStar® OLS 1.6T NE's hardware is as follows:

- Verify that the BOS circuit packs are BOS2 (not BOS1)
- Verify that the SUPVY circuit packs are SUBVY1B (not SUPVY1)
- Verify that the OA circuit packs are at S1:5 or higher
- Verify that the Flashcards (PCMCIA) are 220MB (minimum)
- Verify that no OTU20 or OTU20D (LSBB) circuit packs are installed
- Verify that the network element is ***not*** provisioned with an NE TYPE of 2–Fiber End Terminal 40 CH (channel) or 2–Fiber Ring Terminal 40 CH (channel)

Related tasks

See the following related tasks:

- "Copy Software from NE to NE" (9-9)
- "Manually Initiate DNO" (3-49)

If problems are encountered during this procedure, refer to "Recover from WaveStar® OLS 1.6T In-Service Upgrade Failure"in the *Navis™ Optical EMS Administration Guide*.

Task

Complete the following steps to perform an in-service upgrade of an WaveStar® OLS 1.6T NE's software from NE Release 3.0 or Release 5.0 to NE Release 6.0.

1 Insert the CD into the CD-ROM drive of the Navis™ Optical EMS host computer.

2 Log into Navis™ Optical EMS as user ***ems***.

3 Enter the command `cd /ems/obr_root/Data/400G`

4 Enter the command `tar –xvf` ***tapedevice*** *

Example: `tar -xvf /dev/rmt/0m *`

Result:

A listing of all the files that were archived to tape is displayed.

5 Insert the WaveStar® OLS 1.6T Release 6.0 CD into the CD-ROM drive of the Navis™ Optical EMS host.

6 Using the Navis™ Optical EMS GUI, choose **Configuration->Software Management->Import Software to EMS** to copy the WaveStar™ OLS 1.6T Release 6.0 software to Navis™ Optical EMS.

Result:

A window is displayed for selecting the NE type and source (CD drive or tape drive) for transfer of the software. Select the NE type **OLS 1.6T** and **CD Drive** as the drive (media source) for the software (**CD Drive** is the default selection on this window).

7 Using the Navis™ Optical EMS GUI, position the mouse cursor on the NE for which a software download is to be performed and click the left mouse button to select it.

8 Using the Navis™ Optical EMS GUI, choose **Configuration->Software Management->Download Software to NE**

Result:

The Software Download to NE TID: EMS hostname window is displayed, listing the software releases that are available for the WaveStar® OLS 1.6T NE type.

9 Click on the 6.0.0 release to select it to be downloaded to the NE.

10 Click the Apply button.

Result:

A question dialog window is displayed, indicating that the 6.0.0 release will be downloaded to the selected WaveStar™ OLS 1.6T NE, that the download process may take a few hours to complete, and asks if you want to continue with the software download.

11 Choose Yes.

Result:

A Status window is displayed, showing the progress of the software download. The Status window indicates when the software download is completed. Click the Close button to close this window.

12 Using the Navis™ Optical EMS GUI Map window menu bar, choose **Configuration->Software Management->NE to NE Software Copy**

Result:

The Copy Software from NE to NE window is displayed.

13 Choose the source NE that contains the downloaded 6.0.0 release software from the Source NE(s) list on the window by double-clicking on the NE. Click the Copy from inactive partition radio button.

Result:

A list of NEs available to accept the 6.0.0 software copy is displayed in the Destination NE(s) list.

14 Select the destination NE(s) for the software copy from the list by single-clicking on the NE(s) and, using the arrow push buttons, move the selected NE(s) to the Chosen NE(s) list.

When all NEs have been selected for the copy, click the OK button on the Copy Software from NE to NE window.

Result:

The NE Copy Status window indicates when the software copy is complete.

15 Using the Navis™ Optical EMS GUI, position the mouse cursor on the NE for which the software was downloaded and for which a software activation is to be performed and click the left mouse button to select it.

16 Using the Navis™ Optical EMS GUI Map window menu bar, choose **Configuration->Software Management->Activate NE Software**

Result:

The Activate Software window is displayed.

17 Use the left mouse button to select the line that shows the NE TID and Active Release.

Result:

The Remove from List and Get Standby Release buttons are enabled.

18 Click the Get Standby Release button.

Result:

The Standby Release field on the window displays 6.0.0 (use the scroll bar to view the contents of the Standby Release field).

If the Standby Release field does not display 6.0.0, repeat Steps 12 through 14 of this procedure to repeat the software copy from the source NE to the destination NE(s).

19 Using the left mouse button, select the line that shows the NE's TID, Active Release and Standby Release again.

20 Click the OK button.

Result:

A question dialog window is displayed, indicating that the software activation process will cause a disruption in communication between the Navis™ Optical EMS and the NE, that it is a lengthy process, and asks if you want to continue with the software activation.

21 Choose Yes.

Result:

A Status window is displayed, indicating that the software activation is working. Wait until the software activation is completed.

When the status of the software activation changes from Working to Complete, it means that the software activation has completed.

The software activation causes the network element to reboot, causing Navis™ Optical EMS to lose communicatons with the network element. When the network element on the Map window turns magenta, Navis™ Optical EMS sends a notification of the software activation to WaveStar NMS. Navis™ Optical EMS waits 15 minutes before attempting to log into the network element.

Then, Navis™ Optical EMS logs into the upgraded NE and performs a DNO.

If an Incomplete status is displayed for the software activation, a warning dialog window is displayed with the following message: `Activate Software Response for NE-TID: EMS timeout. The NE might be still rebooting. Use Cut Through to check for completion.`

22 Verify that the DNO on the upgraded NE has been successfully completed by positioning the mouse cursor on the NE in the Map window, clicking the right mouse button to display a pop-up menu, and selecting **DNO**.

Result:

The DNO window is displayed.

Click the Get Status button on the DNO window to verify that the DNO process has successfully been completed.

If the software activation and DNO processes have been successfully completed, then the in-service upgrade for the selected NE has been completed.

When the DNO process is completed, Navis™ Optical EMS sends a software upgrade completion notification to WaveStar NMS.

Refer to the Troubleshooting chapter in the *Navis™ Optical EMS Administration Guide*, for the task that describes how to handle an WaveStar® NE in-service upgrade failure.

23 Verify that the optical associations for the upgraded WaveStar® OLS 1.6T NE are available by checking the Optical Associations Manager window through the Navis™ Optical EMS GUI. If not, perform DNO on the upgraded NE for Optical Associations data.

24 After the software upgrade is completed, if the newly upgraded NE(s) is blinking transparently on the Map window (showing the background color of the Map pane), this indicates that the Release 3.0 or Release 5.0 CMISE NE upgraded to a Release 6.0 TL1 NE has to be re-registered with the Directory Services Agent (DSA) through the Registration Manager (RM) NE.

If this is the case, choose **Configuration->Cut-Through** to display the Choose an NE window, select the RM NE, and select/enter the `ENT-RMA` command.

The `ENT-RMA` command is not needed if the newly upgrade NE(s) is not blinking transparently.

Result:

The `ENT-RMA` command causes the RM NE to reboot. After the NE has rebooted, the upgraded NE(s) is re-registered in the DSA through the RM NE.

END OF STEPS

□

Schedule NE Data Backup

Purpose

Use this procedure to schedule backup of an NE's provisioning data.

Before you begin

Before you begin this task, be aware that for WaveStar® BWM and WaveStar® NCC NE types, scheduling a backup to the NE's local secondary storage is not allowed. All scheduled backups for these NE types must be to EMS memory. For WaveStar® NCCs, a separate backup can be scheduled for WaveStar® NCC Memory and WaveStar® NCC Directory Services.

Be aware that if you are scheduling a job to be performed monthly, regardless of the frequency (every x months) that a job is scheduled, the first time the job will be performed will be at the time and day you selected, which can occur in the current month or the following month. For example, if you have scheduled a job to be performed once every two months, at 1:00 AM, on the 21st day of the month, the first time that the job will be performed could be on the 21st day of this month, if that date has not yet passed.

Related informaton

For related information, see "Modify a Scheduled Task" (9-40) and "Delete a Scheduled Task" (9-42).

Task

Complete the following steps to schedule an NE software backup.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Schedule** from the Administration menu.

Result:

A sub-menu is displayed.

3 Select **Software Mgmt** from the sub-menu.

Result:

The Software Management sub-menu is displayed.

4 Select **Backup** from the Software Management sub-menu.

Result:

The Schedule Manager window is displayed, showing a list of currently scheduled NE backups.

5 Click the Add button.

Result:

The Add a Scheduled Software Backup window is displayed.

6 Choose an NE (by TID) from the Choose an NE scroll bar list by double-clicking on the item. Use the type ahead field and/or filter/sort function to narrow the list, if necessary.

7 For Backup Type, click the Regular Backup or Intelligent Backup radio button.

Important! The Intelligent Backup option is disabled for any NE that uses file transferred based memory backup.

8

IF THE NE TYPE IS...	CHOOSE....
an WaveStar® NCC or WaveStar® BWM network element	to back up WaveStar® NCC Memory or WaveStar® NCC Directory Services in the “What to Backup” portion of the window.
any other NE type	skip this step, Go to Step 9.

9 Choose the following Scheduling Options, as needed:

- Daily—click on this radio button if you want the task to be done on a daily basis. If you schedule the task to be done daily, use the Schedule Time spinner field to select the time of day for the scheduled task.
- Weekly on...—click on this radio button if you want to task to be done on a weekly basis. If you schedule the task to be done weekly, choose the day of the week by using the spinner field list next to this option.
- Once every...—click on this radio button if you want the task to be done periodically. If you schedule the task to be done periodically, choose the frequency (every x months) and the day of the month it will be done using the spinner field lists next to this option or click the Last Day of the Month checkbox.
- Schedule Time—click the up and down arrows on this spinner field to select the time of day for the scheduled task. The schedule time is in 24-hour format, in hours:minutes. You can also type the time into this field. The time must be input in 24-hour format as hh:mm in 15 minute increments (for example, 11:15 P.M. is entered as 23:15). If the time entry is invalid, the color of the field changes to yellow, and you must re-enter a valid time in the proper format.
- Number of Retries—click the up and down arrows on this spinner field to specify the number of retries for the scheduled task.
- Retry Interval—If the Number of Retries selected is greater than 1, specify the retry interval, in minutes. Click the up and down arrows on the spinner field to select the time interval.

10 Click the Apply button to activate your choices, or click the OK button to activate your choices and close the window.

END OF STEPS

□

Schedule NE Software Download

Purpose

Use this procedure to schedule an NE software download.

Before you begin

Before you begin this task, make sure that the software release to be downloaded to the NE has been transferred to the Navis™ Optical EMS host. Be aware that after a software download is performed on an WaveStar® OLS 1.6T NE, you must perform DNO on the NE before the release software can be activated.

Be aware that if you are scheduling a job to be performed monthly, regardless of the frequency (every x months) that a job is scheduled, the first time the job will be performed will be at the time and day you selected, which can occur in the current month or the following month. For example, if you have scheduled a job to be performed once every two months, at 1:00 AM, on the 21st day of the month, the first time that the job will be performed could be on the 21st day of this month, if that date has not yet passed.

Related information

For related information, see "Modify a Scheduled Task" (9-40) and "Delete a Scheduled Task" (9-42).

Task

Complete the following steps to schedule an NE software download.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Schedule** from the Administration menu.

Result:

A sub-menu is displayed.

3 Select **Software Mgmt** from the sub-menu.

Result:

The Software Management sub-menu is displayed.

4 Select **Download Software to NE** from the Software Management sub-menu.

Result:

The Schedule Manager window is displayed, showing a list of currently scheduled NE software downloads.

5 Click the Add button.

Result:

The Add a Scheduled Software Download window is displayed.

6 Choose an NE (by TID) from the Choose an NE scroll bar list by double-clicking on the item. Use the type ahead field and/or filter sort function to narrow the list, if necessary. The NE type is displayed in the NE Type field after you choose an NE.

7 Click the down arrow next to the Release field to display a drop-down list of available releases and select the release to download. This field is required.

8 Choose the following Scheduling options, as needed:

- Date—click the up and down arrows on this spinner field to select the schedule date. Choose Today or the date. This field is required.
- Schedule Time—click the up and down arrows on this spinner field to select the time of day for the scheduled task. The schedule time is in 24-hour format, in hours:minutes. This field is required. You can also type the time into this field. The time must be input in 24-hour format as hh:mm in 15 minute increments (for example, 11:15 P.M. is entered as 23:15). If the time entry is invalid, the color of the field changes to yellow, and you must re-enter a valid time in the proper format.

- Number of Retries—click the up and down arrows on this spinner field to specify the number of retries for the scheduled task.
- Retry Interval—if the Number of Retries selected is greater than 1, specify the retry interval, in minutes. Click the up and down arrows on the spinner field to select the time interval.

9 Click the Apply button to activate your choices, or click the OK button to activate your choices and close the window.

END OF STEPS

□

Schedule NE Software Copy

Purpose Use this procedure to schedule an NE software copy from one NE to one or more NEs of the same type.

Before you begin Before you begin this task, be aware that WaveStar® BWM NEs do not support the NE Software Copy feature.

Related information For related information, see "Modify a Scheduled Task" (9-40) and "Delete a Scheduled Task" (9-42).

Task Complete the following steps to schedule an NE software copy to one or more NEs.

1 Select **Administration** from main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Schedule** from the Administration menu.

Result:

A sub-menu is displayed.

3 Select **Software Mgmt** from the sub-menu.

Result:

The Software Management sub-menu is displayed.

4 Select **NE to NE Software Copy** from the Software Management sub-menu.

Result:

The Schedule Manager window is displayed, showing a list of currently scheduled NE software copy jobs.

5 Click the Add button.

Result:

The Add a Scheduled Software Copy window is displayed.

6 Choose the TID of the Source NE (the NE to be copied from) from the Source NE list by double-clicking on the item. Use the type ahead field and/or filter/sort function to narrow the list, if necessary.

7 Choose the TID of one or more Destination NEs (to be copied to) from the Destination NE list by clicking on the item.

Important! The system currently defaults to copying the software from the active partition of the source NE.

8 Choose the following Scheduling options, as needed:

- Date—click the up and down arrows on this spinner field to select the schedule date. Choose Today or the date. This field is required.
- Schedule Time—click the up and down arrows on this spinner field to select the time of day for the scheduled task. The schedule time is in 24-hour format, in hours:minutes. This field is required. You can also type the time into this field. The time must be input in 24-hour format as hh:mm in 15 minute increments (for example, 11:15 P.M. is entered as 23:15). If the time entry is invalid, the color of the field changes to yellow, and you must re-enter a valid time in the proper format.
- Number of Retries—click the up and down arrows on this spinner field to specify the number of retries for the scheduled task.
- Retry Interval—if the Number of Retries selected is greater than 1, specify the retry interval, in minutes. Click the up and down arrows on the spinner field to select the time interval.

9 Click the Apply button to activate your choices, or click the OK button to activate your choices and close the window.

END OF STEPS

□

Schedule NE Software Activation

Purpose

Use this procedure to schedule activation of an NE's executable software. When new software is downloaded to an NE, it is placed in "standby" until it is activated; it then replaces the old software. Software activations can be scheduled for more than one NE at a time, up to the limit imposed by the Navis™ Optical EMS host type.

Before you begin

Before you begin this task, make sure that the software to be activated has already been downloaded to the NE. Be aware that after a software download is performed on a WaveStar® OLS 1.6T NE, you must perform DNO on the NE before the release software can be activated.

Related information

For related information, see the following:

- "Download NE Software" (9-7)
- "Schedule NE Software Download" (9-32)
- "Modify a Scheduled Task" (9-40)
- "Delete a Scheduled Task" (9-42)

Task

Complete the following steps to schedule software activation for one or more NEs.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Schedule** from the Administration menu.

Result:

A sub-menu is displayed.

3 Select **Software Mgmt** from the sub-menu.

Result:

The Software Management sub-menu is displayed.

4 Select **Activate NE Software** from the Software Management sub-menu.

Result:

The Schedule Manager window is displayed, showing a list of currently scheduled NE software activations.

5 Click the Add button. The Add a Scheduled Software Activate window is displayed. The window is designed to show the current active and standby software releases for each NE once this information is displayed.

If necessary, use the scroll bar to move the window left to right to see the entire contents of the window.

If the standby software release is not displayed, click the Get Standby button.

6 Choose an NE (by TID) from the Choose an NE scroll bar list by positioning the mouse cursor on the item and single-clicking on it with the select (left) mouse button.

7 Click the Get Standby Release button to display the standby (currently inactive) release for the NE.

8 After displaying the standby release, single-click on the NE (by TID) again in the scroll list.

9 Choose the following Scheduling options, as needed:

- Date—click the up and down arrows on this spinner field to select the schedule date. Choose Today or the date. This field is required.
- Schedule Time—click the up and down arrows on this spinner field to select the time of day for the scheduled task. The schedule time is in 24-hour format, in hours:minutes. This field is required. You can also type the time into this field. The time must be input in 24-hour format as hh:mm in 15 minute increments (for example, 11:15 P.M. is entered as 23:15). If the time entry is invalid, the color of the field changes to yellow, and you must re-enter a valid time in the proper format.
- Number of Retries—click the up and down arrows on this spinner field to specify the number of retries for the scheduled task.
- Retry Interval—if the Number of Retries selected is greater than 1, specify the retry interval, in minutes. Click the up and down arrows on the spinner field to select the time interval.

10 Click the Apply button to activate your choices, or click the OK button to activate your choices and close the window.

Result:

The Status Dialog window is displayed, indicating that the task schedule request has been processed. Click the Close button to close the status window.

END OF STEPS

□

Modify a Scheduled Task

Purpose Use this procedure to change the parameters of a task for any function that can be scheduled.

Before you begin Before you begin this task, be aware that you cannot modify a scheduled task that is already in progress. You cannot modify another user's scheduled tasks unless you are the system administrator or have a privileged login.

Task Complete the following steps to modify a scheduled task.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Schedule** from the Administration menu.

Result:

The Schedule sub-menu is displayed.

3 Select the function of the task to be modified.

Result:

The Scheduler Manager window for the selected function is displayed, showing a list of currently scheduled tasks.

4 Select a task from the list to be modified.

5 Click the Modify button.

Result:

The appropriate Modify a Scheduled Item window is displayed.

6 Make modifications to the information.

7 Click the Apply button to apply the changes or click the OK button to apply the changes and close the window.

END OF STEPS

□

Delete a Scheduled Task

Purpose Use this procedure to delete a scheduled task for any function that can be scheduled.

Before you begin Before you begin this task, be aware that you cannot delete another user's scheduled tasks unless you are the system administrator or have a privileged login.

Task Complete the following steps to delete a scheduled task.

1 Select **Administration** from the main menu bar on the Map window.

Result:

The Administration menu is displayed.

2 Select **Schedule** from the Administration menu.

Result:

The Schedule sub-menu is displayed.

3 Select the function of the task to be deleted.

Result:

The Scheduler Manager window for the selected function is displayed, showing a list of currently scheduled tasks.

4 Choose the item to be deleted, which is identified by TID, from the list.

5 Click the Delete button.

Result:

A pop-up question dialog window is displayed, asking if you want to delete the selected scheduled task. Choose Yes to delete the selected scheduled task or No to cancel the deletion.

6 Choose Yes to delete the scheduled task.

END OF STEPS

10 Getting Started Concepts

Overview

Purpose This chapter provides general information about the Navis™ Optical EMS Graphical User Interface (GUI), the Cut-Through feature for issuing TL1 commands to network elements, and the graphical display of equipment in the system.

Objectives This chapter explains how to do the following:

- How to use the mouse buttons to perform various GUI functions
- Log into and log out of the Navis™ Optical EMS GUI
- Identify and use the different parts of the Navis™ Optical EMS Map window
- Display and use the Navis™ Optical EMS help documentation
- Use GUI lists and tables
- Issue TL1 commands in Cut-Through mode
- Build a TL1 command file
- Broadcast TL1 commands to one or more network elements
- Identify how equipment configurations for various network elements are represented graphically on the Navis™ Optical EMS equipment display
- Determine the presence and level of alarms on the equipment display

Contents

The Navis™ Optical EMS Graphical User Interface	10-3
Using the Mouse	10-4
Manipulating Fields and Text	10-5
Logging Into the Navis™ Optical EMS	10-6
Logging Out of the Navis™ Optical EMS	10-11
The Navis™ Optical EMS Map Window	10-12
Selecting NEs and Aggregates	10-32
Moving NEs and Aggegates	10-33
Finding a Network Element or Aggregate	10-34
Network Element Explorer	10-35
Window Buttons	10-37
Using Lists	10-41
Sorting Tables	10-47
Cut-Through	10-50
Equipment Display	10-52

The Navis™ Optical EMS Graphical User Interface

Overview

The Navis™ Optical EMS Graphical User Interface (GUI) is a Java-based, multilevel windowing environment that provides fault, provisioning, configuration, and security management functions and allows you to graphically monitor the status of the network. The Navis™ Optical EMS GUI is designed to be an intuitive, consistent, easy-to-use interface. Status bar messages and windows keep you informed of the outcome of an operation. The GUI offers point-and-click, menu-driven operation, as well as a cut-through interface to issue TL1 commands to connected NEs. Several types of on-line help are available to assist you in performing any task.

The GUI runs on PCs. Once a GUI session is started, the GUI server can support multiple platform-independent GUI client connections simultaneously.

□

Using the Mouse

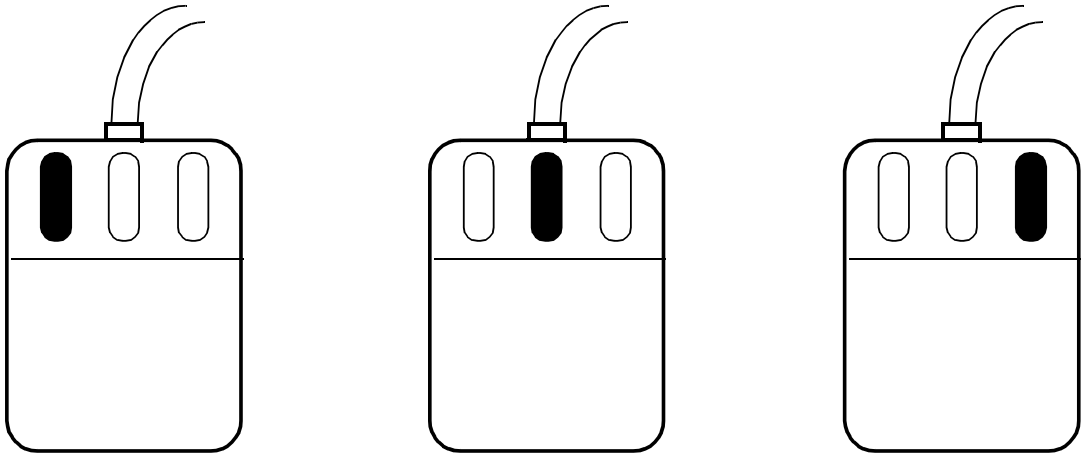
Introduction

The mouse is used to move a pointer around the screen. A mouse usually has three buttons, two of which are used to select items on the display.

Diagram

The following diagram shows the different mouse buttons, as configured for a right-handed person. To reconfigure the mouse buttons for a left-handed person, consult the mouse and workstation documentation. The mouse for your workstation or PC may only be equipped with two buttons, so consult the hardware documentation.

Figure 10-1 Mouse Buttons



Select mouse button

The select mouse button, which is the leftmost button on the mouse, is used to select an item in Navis™ Optical EMS. To do a click or select operation, position the mouse pointer over the desired list item, NE/aggregate icon, button, field, or menu, and click the select mouse button.

Menu mouse button

The menu mouse button, which is the rightmost button on the mouse, is used to bring up (activate) a pop-up menu.

To activate a pop-up menu, position the mouse pointer over the object (like an NE or aggregate icon on the Map pane or Subnetwork Explorer), and single-click the menu mouse button.

□

Manipulating Fields and Text

Entering text

The following guidelines explain how to enter text in windows that contain text fields:

- Press the Tab key to enter text that you have typed in a field. Pressing the Tab key in a text field accepts the data in the text field and moves the cursor focus to the next field that accepts input. If the cursor is positioned in the last enterable field on the window, pressing the Tab key moves the cursor to the first button on the bottom of the window.
- Use the Tab key for field-to-field navigation within a window.
- Use the Backspace key to delete text field input.
- You can cut and paste text between text fields and/or text areas using the standard cut and paste hot keys for Microsoft Windows and HP Vue.

□

Logging Into the Navis™ Optical EMS

Introduction

To start up an instance of the GUI on your PC or workstation, double-click on the desktop or menu bar icon representing the Navis™ Optical EMS application. When you click on this icon, a command is sent to the Navis™ Optical EMS host machine to start up the application.

Double-click on the same icon/menu item to start up another instance and log into the same host. Click on a separate icon/menu item to start up a GUI instance and log into a different host.

The Navis™ Optical EMS Login window is then displayed for logging into Navis™ Optical EMS.

To log into the Navis™ Optical EMS, you must enter a valid user ID (login) and password that you been supplied to you by your Navis™ Optical EMS system administrator.

When you log into the Navis™ Optical EMS for the first time with a new GUI user login, you must change your password from the default password given for the login. A pop-up window is displayed, indicating that you must change your password before being allowed to log into Navis™ Optical EMS. You are given the option of continuing the session or exiting the system at this point. If you choose to continue the login session, the Change Password window is displayed, prompting you to change your password from the default password. The system validates your new password. If it is valid, the system re-displays the Login window to re-enter your user ID and your new password.

Successful login

If the user ID and password that you entered are valid, the Navis™ Optical EMS displays an advisory message, the Alarm Notification window and Map window are displayed.

Unsuccessful login attempts

If you cannot log into the Navis™ Optical EMS the first time, because you entered an invalid user login or password, the system allows you to retry a certain number of times (as defined by the system administrator) before you are denied access. You must enter a valid user ID (login) and valid password. See the “Valid user ID” (10-7) and “Valid password” (10-7) sections in this chapter for definitions of a valid user ID and password.

Password expiration

Passwords must be changed after a period of time, as defined by the system administrator. If you attempt to log into the Navis™ Optical EMS with a password that is about to expire, the system informs you of this via a pop-up window and asks if you want to change your password. If you choose to change your password at this time, the Change Password window is displayed. If you choose not to change your password at this time, but the password expiration period has not yet been reached, you can continue to log into the system. If the password has expired, and you do not change it, the login session will be terminated.

Related information

Log Into the Navis™ Optical EMS in the Getting Started chapter describes how to log into the Navis™ Optical EMS.

Change Your User Password in the *Navis™ Optical EMS Administration Guide* describes how to change your user password.

Globally Provision User Login/Password Parameters (Global Security Provisioning Feature) in the *Navis™ Optical EMS Administration Guide* describes how the system administrator sets up certain aspects of login/password procedures enforced by the Navis™ Optical EMS, such as the password expiration period and the number of login attempts allowed.

Valid user ID

A valid User ID (login) is 3-10 alphanumeric characters in any combination. Special characters (such as ;*&@) are not allowed.

Valid password

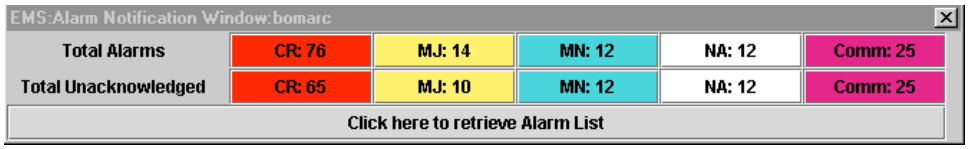
A valid password is 6-10 characters. A password must include at least two alphabetic characters, at least one numeric character, and at least one special character (!#$%^&*()-+_=?). The following special characters are not permitted (:,;).

A new password must differ from the old one by at least three (3) characters. For comparison purposes, an uppercase letter and its corresponding lowercase equivalent are treated as identical. This means, the new password must contain at least three (3) new and different characters that were not present in the old password. For example: It is valid to change the password “ems+123” to “abc+123” because all three characters ‘a’, ‘b’ and ‘c’ were not present in the old password. It is not valid to change the password “ems+123” to

"ems+321" because no "new" characters have been introduced in the new password.

Alarm notification window

Once you have logged in and the GUI is running, the Alarm Notification window is displayed. The following figure shows the Alarm Notification window.



The Alarm Notification window consists of two rows of alarm/event data.

The first row shows a current tally of outstanding alarms/events, broken down by alarm/event category. Depending on how you configure the Alarm Display through the Navis™ Optical EMS Preferences window, the Alarm Notification window shows the current number of Critical, Major, Minor alarms, Not Alarmed (which represents Standing Condition events that require clearing), and Communication alarms, or the current number of Prompt, Deferred alarms, No Alarms (which represents Standing Condition events that require clearing), and Communication alarms.

The second row shows a current tally of unacknowledged alarms/events, broken down by alarm/event category, as explained above.

The total number of alarms or events for a category is automatically updated whenever a new alarm or event of that alarm category is received. The count of unacknowledged alarms/events in a category decreases by one whenever an alarm or event of that category is acknowledged. Alarms/events are acknowledged either by using one of the Alarm Acknowledgement functions in the GUI or by selecting an alarm or event on the Alarm List and acknowledging it. Instructions on how to acknowledge specific alarms and events are provided in the *Navis™ Optical EMS Maintenance Guide*.

The color of each alarm category box is the default color for each alarm category (see the table in the "Alarms" (10-20) section in this chapter for a list of default colors for each alarm category), unless you change the color used for an alarm category through the Preferences option via the View/Preferences menu selection on the

Map window main menu. For additional instructions on how to modify user preferences, see Modify User Preferences in the Getting Started chapter.

When the color of an NE is white on the Map window (the default color), this indicates that the NE is in a "Not Alarmed" state, or has received one or more Standing Condition (SC) events which require clearing by the NE. When the SC event has been cleared by the NE, the color of the NE returns to green, indicating that there are no active alarms present and the NE is communicating.

You can click on any of the alarm category boxes in the Total Alarms row to display the Alarm List window and obtain a list of the currently active alarms for that category. If you click on the Communications alarms box, a list of NEs that are currently not communicating with the system is displayed. The Alarm List window is only displayed if there is one or more active alarms or standing condition events for the selected alarm category.

Below the two rows of alarm/event data is the Click Here to Retrieve Alarm List button. When you click this button, the Alarm List window is displayed with a complete list of all current alarms for all NEs (if no alarm filtering has been enabled) in the user's Target Group.

You can enable the Alarm Tally Popup option through the Navis™ Optical EMS Preferences window so that when a new alarm is received by the Navis™ Optical EMS, the Alarm Notification window is brought to the forefront of the GUI display to signal the arrival of the new alarm. Also, the text on the Click Here to Retrieve Alarm List button changes, displaying a message that shows the Navis™ Optical EMS host, affected NE, alarm severity (such as Critical, Major, or Minor), affected NE component, and alarm message text, time the alarm occurred, and, if there was an alarm resync, the time the resync occurred. The totals in the Total Alarms row on the window are automatically updated to account for the new alarm.

Once displayed, the Alarm Notification window remains open during the GUI session.

GUI application not running

If the Navis™ Optical EMS host is successfully contacted, but the application and/or GUI server is not functioning on the host, a pop-up message window is displayed, indicating that the Navis™ Optical EMS application is not currently running on the host machine.

Multiple GUI instances

If the Navis™ Optical EMS host machine is successfully contacted, and the application is running, but no more GUI instances can be started by the GUI server, a pop-up warning message window is displayed, informing you that no more GUIs can be connected to the host machine, and to retry later.

Idle session time out

When you do not use a GUI session for 15 minutes (or another time interval specified by the system administrator), a pop-up window is displayed, stating that the GUI session will time out in 60 seconds and asking if you want to exit Navis™ Optical EMS at this time. If you choose Yes or make no choice, you are automatically logged out of the Navis™ Optical EMS. If you choose No, the GUI session keeps running and the session timeout clock is reset.

□

Logging Out of the Navis™ Optical EMS

Introduction

When you log out of Navis™ Optical EMS, all open windows associated with the current session are closed and the GUI client/server sessions are terminated.

Changes made during GUI session

If you have made changes during the GUI session to certain settings, such as user-specified preferences for the GUI or NE positions, a pop-up window is displayed, asking if you want to save the settings. Choose Yes if you want to save the settings or No if you do not want to save them.

Related information

See Log Out of the Navis™ Optical EMS in Chapter 10, “Getting Started Concepts” for specific instructions on how to log out of the Navis™ Optical EMS.

□

The Navis™ Optical EMS Map Window

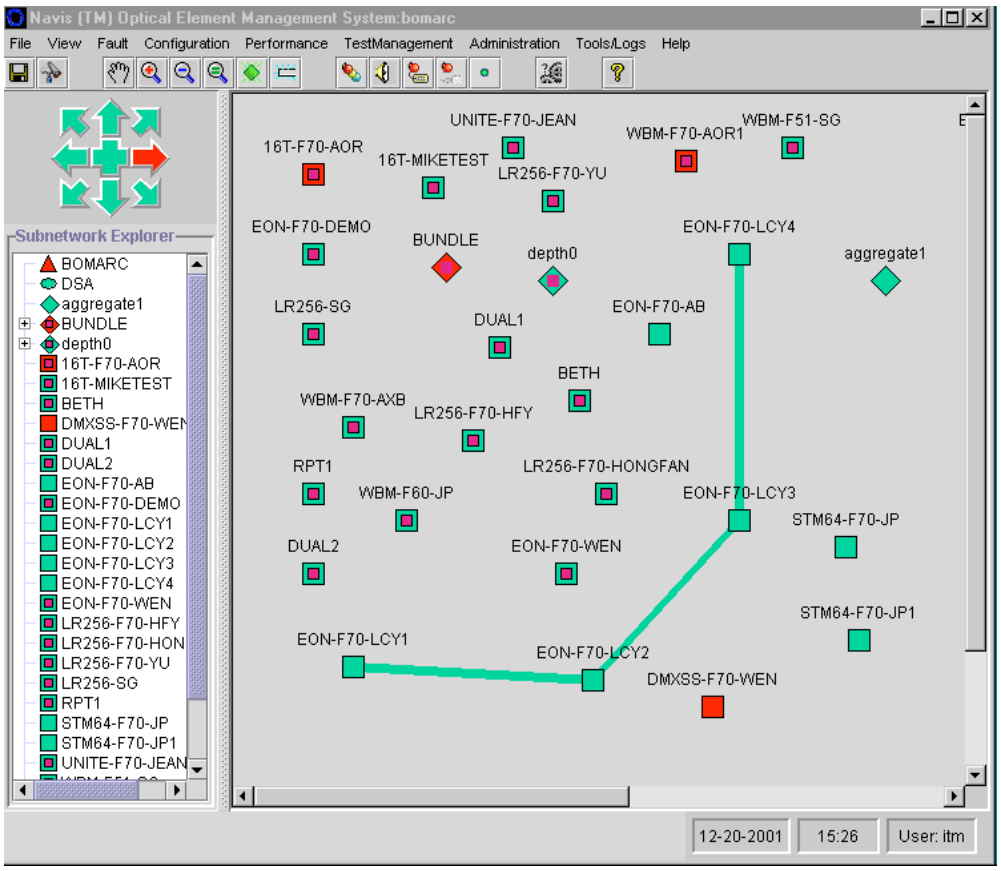
Overview

After you have logged into the Navis™ Optical EMS, the Map window is displayed. This window provides access to all of the Navis™ Optical EMS functions and features.

The Map window

The following figure shows the Navis™ Optical EMS Map window.

Figure 10-2 The Map Window



Parts of the Map window

The Map window is divided into several different but interrelated areas. It consists of:

- A main menu bar— located just below the Map window label, it provides access to all the main Navis™ Optical EMS functions. The main functions are summarized in "The Map window menu" (10-13).
- A toolbar— a series of buttons just below the main menu bar that control the Map view and provide a shortcut way of accessing some of the Navis™ Optical EMS functions. For more details, see the "Map Window toolbar" (10-14) section.
- A status bar—a text bar at the bottom of the window that displays messages related to system activity, the current date/time, and the User ID of the user currently logged in.
- An Alarm Directional button—an icon used to indicate that an alarm exists in some portion of the map that is currently not visible.
- The Subnetwork Explorer—an explorer tree that is used to show a textual list of the aggregates and NEs in a subnetwork, along with the subnetwork's hierarchy.
- The Map pane—the portion of the Map window that provides a graphical representation of the network, displaying the NEs, aggregates, and trails between them.

There are three buttons in the upper-right hand corner, in the label portion of the Map window. These buttons are, from left to right:

- the window minimize button
- the window restore button
- the window close button

The Map window menu

All of the main Navis™ Optical EMS functions are accessed through the main menu bar on the Map window. When you select a main functional menu (for example, Configuration), this displays an associated drop-down menu, which lists a series of related options for you to select.

The following summarizes each of the main functional menu categories:

- ***File***—this menu provides access to a set of options for saving, restoring, and copying user preferences, constructing a TL1 Macro Builder File, and logging out of Navis™ Optical EMS.
- ***View***—this menu provides access to a set of options for setting Alarm Severity and Alarm Indications, for viewing the Trail Alarm List, for clearing the Map window status line, for viewing the Alarm Tally window, for zooming in/out of the Map view, and for setting user preferences.
- ***Fault***—this menu provides access to the set of Fault Management options for monitoring alarms and conditions in the network.
- ***Configuration***—this menu provides access to the set of Configuration Management options for viewing and/or modifying Network Element, port, and line parameters.
- ***Performance***—this menu provides access to the set of options for collecting and viewing Performance Monitoring (PM) data.
- ***Test Management***—this menu provides access to a set of functions for creating, viewing, and deleting cross-connection loopbacks for testing purposes.
- ***Administration***—this menu provides access to the set of options for Security Management and Network Element administration.
- ***Tools/Logs***—this menu provides access to the set of options for viewing logs generated by the Navis™ Optical EMS that track network and EMS performance and activity.
- ***Help***—this menu provides access to the set of online Help options.

Map Window toolbar

These series of buttons allow you to control the Map view and provide a quick way to access many of the frequently used GUI functions. The toolbar, from left to right, provides a:

- Save User Preferences button—details about this function are provided in "Save Preferences/Map Positions" (2-21) in Chapter 2, "Getting Started"
- View User Preferences Window button—details about this function are provided in "Modify User Preferences" (2-18) in Chapter 2, "Getting Started"

- Turn On/Off Map Pan button—this button is used to enable or disable use of the Map Pan feature to reposition the Map view. Single-click on this toolbar button to enable manual “panning” or maneuvering of the map view in the Map pane. Single-click this toolbar button again to disable Map panning.
- Zoom In on the Map Window button—to zoom into a portion of the Map pane display, position the mouse pointer over this button and single-click the mouse select button.
- Zoom Out on the Map window button—to display an enlarged view of the portion of the Map pane display, position the mouse pointer over this button and single-click the mouse select button.
- Reset the Zoom on the Map Window button—to reset the Map pane view, position the mouse pointer over this button and single-click the mouse select button.
- Add an Aggregate button—details about this function are provided in Add an Aggregate in Chapter 7, “Traffic Provisioning”.
- Clear the Status Line button—details about this function are provided in “Clearing status messages” (10-25) in this chapter.
- Alarm Severity button—click on this button to change the severity level of active alarms displayed on the Map window. The number and the color of the balls shown on the toolbar button indicate the type and severity of alarms currently being displayed on the Map window. You can also change the alarm severity level of displayed alarms using the Preferences function. For details, see “Modify User Preferences” (2-18) in Chapter 2, “Getting Started”.
- Audible Alarms button—details about this function are provided in “Audible alarms” (10-22) in this chapter.
- Global Acknowledge button—to acknowledge all active alarms for an NE or aggregate, single-click on this button. A Choose an NE/Aggregate window is displayed. Double-click on the NE or aggregate in the list to select it and click the OK button. All active alarms for the selected NE or aggregate are acknowledged. For more details about this function, refer to Acknowledge/Unacknowledge All Alarms for an NE and the Alarm indication and acknowledgement section in the *Navis™ Optical EMS Maintenance Guide*.

- Global Unacknowledge button—to unacknowledge all active alarms for an NE, single-click on this button. A Choose an NE/Aggregate window is displayed. Double-click on the NE or aggregate in the list to select it and click the OK button. All active alarms for the selected NE or aggregate are unacknowledged. For more details about this function, refer to Acknowledge/Unacknowledge All Alarms for an NE and the Alarm indication and acknowledgement section in the *Navis™ Optical EMS Maintenance Guide*.
- Transient Condition Event Browser—to display a list of transient condition (TC) events that occur in the host's NE network. Transient events do not require a clear message by the NE because they do not change the NE's condition over an extended period of time. For more details about this function, refer to Display the Transient Condition Event Browser in the *Navis™ Optical EMS Maintenance Guide.*
- Status Dialog button—details about this function are provided in "Status window" (10-28) in this chapter.
- Help button—single-click on this button to bring up an on-line help window which explains the Map window.

To access a toolbar function, position the mouse pointer over the button and single-click the mouse select button.

Alarm directional button

A monitored network can be larger than can be viewed on the Map pane at any one time and alarms can occur on network objects that are not currently being displayed. The Alarm Directional button, which is located in the left-hand portion of the Map window, above the Subnetwork Explorer, shows the relative location and highest severity alarm of the area not visible. When an alarm exists, an arrow point is lit with the color of the alarm level, showing the direction to go on the Map pane to view the map item in an alarm state.

The subnetwork explorer

The Subnetwork Explorer, located in the left-hand portion of the Map window, is a tree diagram that shows the content and hierarchical relationship of aggregates and NEs in the portion of the network currently being viewed on the Map pane.

Improving the display of the subnetwork explorer

If the TID/alias of one or more NEs/aggregates in the Explorer is obscured, use the scroll bars below and to the right of the Explorer to

view the complete TID/alias of the item. If the display of the Explorer list is still obscured by Map pane, position the mouse pointer on the window bar just to the right of the Explorer. A two-sided arrow is displayed in place of the mouse's arrow pointer. Click and hold the left (select) mouse button, and drag the two-sided arrow symbol to the right until the desired view of the Explorer is obtained. Then, release the mouse button. If the NE TID/alias listing is in complete view, the scroll bars disappear. You can adjust the display by clicking and dragging the bar between the Map pane and the Explorer to the left or right, as desired.

Element labels

NEs and aggregates are labeled by their Target Identifier (TID), by default. The label format can be changed through the Preferences option from the View menu on the Map window menu bar.

Selecting an item

To select an item on the Subnetwork Explorer, position the mouse pointer on the item and click the mouse select button. The selected item is highlighted.

Expanding/collapsing an item

To expand an item (such as an aggregate) in the Subnetwork Explorer, single-click on the plus ("+") sign next to the item.

To collapse the item, single-click on the minus ("-") sign next to the expanded item.

Pop-Up menu

A pop-up menu of Navis™ Optical EMS functions for the NE or aggregate can be accessed by positioning the mouse pointer and clicking the menu mouse button.

Minimizing/restoring a Navis™ Optical EMS GUI window

The Navis™ Optical EMS GUI function/feature windows (except for the Alarm Notification window) can be minimized by clicking the minimize button, which is the left most button in the right hand corner of the window label bar. The window will be minimized as a block in the task bar at the bottom of your PC's monitor screen. To restore the window, click on the minimized window (block). The window cannot be restored by re-selecting the menu option from the Map window toolbar or the right mouse pop-up menu.

Map pane display

Any change on the Subnetwork Explorer, such as expansion or contraction of an aggregate, causes a corresponding change in the network display on the Map pane.

Related Tasks

Select an Item in the Subnetwork Explorer in Chapter 2, Getting Started explains how to select an item in the Subnetwork Explorer portion of the Map window.

Expand or Collapse an Item in the Subnetwork Explorer in Chapter 2, Getting Started explains how to expand or collapse an item (such as an aggregate) in the Subnetwork Explorer portion of the Map window.

The Map pane

The Map pane displays a graphical representation of the network automatically when you log into Navis™ Optical EMS and the Map window is brought up.

Map pane preferences

The system defaults for different characteristics of the Map pane display, such as NE symbol sizes, shapes, alarm colors, and NE/aggregate labels, can be changed through the Preferences option on the View menu. See “Map preferences” (10-26) for more information on changing characteristics of the Map pane display.

Network elements

Each square on the Map pane represents an NE in your Target Group. A square is the default shape for NEs. The shape used to represent NEs can be changed through the Shapes panel on the Preferences window.

By positioning the mouse pointer over a specific NE symbol on the Map pane, you can display the NE type and alias of the NE. If tooltips help is enabled via the Preferences option, the NE type and alias is displayed as a callout and in the status bar at the bottom of the Map window. If tooltips help is disabled, the NE type and alias are just displayed in the status bar on the Map window.

Important! The WaveStar® OLS 400G NE has been renamed and is referred to (as of Release 6.0) as the WaveStar® OLS 1.6T. The WaveStar® OLS 1.6T R2.0 to R5.0 NEs support a CMISE message interface. The WaveStar® OLS 1.6T R6.0 NE supports a TL1 message interface. On the Map window, if the OLS 400G internal NE type is CMISE, the GUI displays an NE type of “400G”. If the

WaveStar® OLS 1.6T R6.0 NE type is TL1, the GUI displays an NE type of “1.6T”.

“Modify User Preferences” (2-18) in Chapter 2, “Getting Started” explains how to select or change certain characteristics of the Map window display, such as enabling or disabling tooltips help.

Aggregates

The diamond-shaped symbols on the Map pane represent aggregates. The diamond shape is the default for aggregates; this can be changed through the Shapes panel of the Preferences window. Aggregates are collections of NEs that do not necessarily correspond to any physical connectivity or other NE attributes. An aggregate can consist of a group of related NEs, such as a subnetwork, or a group of co-located NEs that are not necessarily in the same subnetwork. An aggregate can be moved under another parent aggregate on the Map pane or Subnetwork Explorer by selecting it and then dragging it to the parent aggregate symbol.

Non-managed devices

A non-managed device is an NE or other telecommunications entity that is part of the network of NEs that communicate with Navis™ Optical EMS but is not managed by the system. These NE types are treated as “non-managed devices” and appear on the Map pane display as circles (the default shape) about the same size as the squares that represent managed NEs.

Non-managed devices that are discovered are added to the Navis™ Optical EMS database to complete the network map and to avoid retries by the Navis™ Optical EMS to log into a non-managed device.

Certain non-managed devices can only be manually added using the Add an NE window on the GUI, specifying it as a non-managed device, when the Navis™ Optical EMS is not communicating with the NE. You can also change the NE type to a non-managed device through the Modify an NE window. Once a non-managed device has been added, the Navis™ Optical EMS does not attempt to log into it.

EMS alarm icon

The Map window pane contains an additional triangle-shaped icon, labeled with the Navis™ Optical EMS host name, that displays the highest severity alarm present on the host. Although this icon looks similar to the NE symbols, it cannot be included in an aggregate or have trails connected to it.

The EMS Alarm icon receives alarms from various application processes and monitors the communication links between the Navis™ Optical EMS host and the NEs. It indicates, for example, whether a file system has exceeded capacity, whether there are remote printer problems, or whether the UNIX message queues are getting full. The icon is shown with the machine name of the host that is running the EMS application.

Like NEs and aggregates, colors are used on the EMS Alarm icon to show the current state of the application or its communications links. The default colors are the same as for NEs (see the "Alarms" (10-20) section). The icon shows the current highest severity alarm for the application. Alarm clearing methods used for NEs and aggregates also apply to the EMS application alarms.

DSA icon

If the EMS-based DSA feature has been enabled, the upper right portion of the Map window pane contains an oval-shaped icon, below the EMS Alarm icon, that represents the Directory Services Agent (DSA) providing NE directory information to Navis™ Optical EMS. An oval shape is the default; it can be changed through the Shapes panel of the Preferences window. This icon is labeled "DSA". This icon cannot be included in an aggregate or have trails connected to it.

The only pop-up menu function that is available for the DSA icon is the manual DNO feature for Subnetwork Discovery on the DSA.

Like NEs and aggregates, colors are used on the DSA icon to show the current alarm state. The default colors are the same as for NEs (see the "Alarms" (10-20) section). The icon shows the current highest severity alarm for the application. Alarm clearing methods used for NEs and aggregates also apply to the DSA alarms.

Trails

The lines that run between NEs and/or aggregates represent trails. Trails are physical links between NEs or aggregates. If there is more than one trail between two NEs, the phrase "Multiple Trails" is displayed when you position the mouse cursor on the trail line in the Map pane.

Alarms

The color of a map item symbol or trail indicates the level of the most severe active alarm.

Table 10-1, "Default System Colors for Alarm Severity Levels and Communication Status of NEs" (10-21) lists the default alarm colors for the Map pane display.

Table 10-1 Default System Colors for Alarm Severity Levels and Communication Status of NEs

Alarm Color (default)	Alarm Severity Level (SONET)	Alarm Severity Level (SDH)
Red	Critical	Prompt
Yellow	Major	Prompt
Cyan	Minor	Deferred
Gray	Throttled	
Green	No Active Alarms	
Magenta	Loss of Communications	
White	Not Alarmed state	Information

The center of an NE symbol may show a different color than the border of an NE/aggregate symbol. When more than one alarm type has occurred, the NE symbol shows the highest severity alarm that has occurred. Communication alarms are always top priority and always color the center of the NE symbol; the border shows the next highest severity alarm. If alarms are being throttled for an NE, the throttled alarm color (gray) is always shown in the center of the symbol, with the color indicating the severity of the last occurring alarm shown in the border. If automatic alarm throttling is enabled, the alarm throttling color is not displayed until the alarm throttling threshold has been passed.

When the color of an NE is white on the Map window (the default color), this indicates that the NE is in a "Not Alarmed" state, or has received one or more Standing Condition (SC) events which require clearing by the NE. This can occur, for example, during an NE data restore operation (see "Restore NE Data" (9-18) in Chapter 9, "Software Upgrade" for more details). SC events which occur against the NE are counted in the alarm tallies on the Alarm Notification window. When the SC event has been cleared by the NE, the color of the NE returns to green, indicating that there are not active alarms present and the NE is communicating.

If the NE symbol on the Map window turns transparent (where the Map pane background can be seen through the NE symbol), this

indicates that the information about this NE previously returned by the designated Directory Services Agent (DSA) via the SONET Directory Services (SDS) feature to autodiscover this NE is no longer contained in the local T1.245 Directory Information Base (DIB) of the designated DSA. Further details about the SDS feature and the role of the DSA in autodiscovering NEs are provided in Chapter 11, "Management Communications Setup Concepts". Information about the NE is still stored in the Navis™ Optical EMS database.

The default Alarm display colors shown in the above table can be modified through the Preferences option of the View menu on the Map window main menu bar. For more details, see "Modify User Preferences" (2-18) in Chapter 2, "Getting Started".

A flashing (blinking) NE symbol indicates that there are one or more unacknowledged alarms against that NE or aggregate. See the *Navis™ Optical EMS Maintenance Guide* for more details about alarm acknowledgement/unacknowledgement.

Audible alarms

A speaker-shaped symbol in the middle of the toolbar on the Map window indicates whether the Audible Alarm feature is enabled or disabled. This symbol has a slash through it if the Audible Alarm feature is disabled. To enable the Audible Alarms feature, click on the symbol. The slash is removed from the symbol. To disable the Audible Alarm feature, click on the symbol again. A slash appears on the speaker-shaped symbol.

The Audible Alarm feature can also be enabled or disabled by selecting **Fault** from the main menu bar on the Map window and then selecting **Audible** from the displayed sub-menu. If the Audible Alarm feature is currently enabled, selecting **Audible** disables the feature. If the Audible Alarm feature is currently disabled, selecting **Audible** enables the feature.

When the Audible Alarm feature is enabled, an audible sound is triggered each time a new alarm occurs on the network. Once triggered, the audible alarm will sound for a short time and then repeat until the alarm is cleared or it is silenced through the GUI. The sound characteristics of the audible alarm correspond to the most severe prevailing alarm condition (Critical, Major, Minor). A Critical alarm beeps three times. A Major Alarm beeps twice. A Minor Alarm beeps once. See the *Navis™ Optical EMS Maintenance Guide*for more details about the Audible Alarms feature.

Selecting NEs and aggregates

To select a single NE or aggregate on the Map pane, position the mouse pointer over the NE or aggregate icon and click the select mouse button. For more information on selecting NEs and agregates see "Selecting NEs and Aggregates" (10-32).

Pop-Up menus

A pop-up menu of Navis™ Optical EMS functions for the NE or aggregate can be accessed by positioning the mouse pointer on the Map pane icon and clicking the menu mouse button. For information on moving NEs and aggregates see "Moving NEs and Aggegates" (10-33).

Expanding and collapsing aggregates

To expand an aggregate and show its member NEs on the Map pane, position the mouse pointer over the aggregate symbol and click the left (select) mouse button to select the aggregate. Then, click the right (menu) mouse button. A pop-up menu is displayed. Select **Expand** from the displayed pop-up menu. The aggegate is expanded to show the member NEs on the Map pane.

To collapse the expanded aggregate, select one of the member NEs and double-click on it. The aggregate is collapsed and the aggregate symbol replaces the member NEs on the Map pane display.

Moving an NE to the TOP aggregate level

To move an NE out of an aggregate to the TOP level (which includes all NEs), make sure the aggregate is expanded and then select the NE. Once the NE is selected, click the right (menu) mouse button to display a pop-up menu. Choose **Return to TOP**. The NE is brought to the TOP aggregate level and is taken out of the aggregrate.

Zooming the Map view

The GUI allows you to zoom into (enlarge) a portion of the network on the Map pane to focus on a few NEs or aggregates, or zoom out of the Map pane to show more of the network. The Zoom functions are available through the View menu on the Map window main menu bar.

See "Zoom the Map View" (2-15) in Chapter 2, "Getting Started" for specific instructions on zooming the Map view.

Related tasks

"Select an Item in the Map Pane" (2-11) in Chapter 2, "Getting Started" explains how to select a single item or group of items on the Map pane portion of the Map window.

"Move an Item on the Map Pane" (2-12) in Chapter 2, "Getting Started" explains how to move a single item or group of items on the Map pane portion of the Map window.

"Expand or Collapse an Item in the Subnetwork Explorer" (2-10) in Chapter 2, "Getting Started" explains how to expand or collapse an aggregate on the Map pane portion of the Map window.

"Zoom the Map View" (2-15) in Chapter 2, "Getting Started" explains how to zoom the Map pane view in or out on the Map window.

Overload indicator

The Navis™ Optical EMS can display an Overload Indicator button, located in the bottom right hand corner of the Map window. When this button is displayed, it indicates that the system is in an overload condition.

An overload condition occurs when the number of alarm messages generated by an NE, as during an alarm storm, or high performance monitoring activity exceeds the capacity of the system to process these type of messages. When this happens, the Overload Controller process in the system issues a notification that the system is in overload and suspends the following activities:

- the processing of Threshold Crossing Alerts (TCAs) during an alarm storm
- the updating of the Transient Condition Event Browser
- collection of new PM data and display of historical PM data

The system also suspends the processing of certain user-initiated transactions that involve multiple data transfers, such as NE data backups, software downloads, DNOs, data transfers to other OSs and periodic maintenance functions such as database and file purges.

The Overload Indicator button on the Map window provides a visual indication of when the system is in an overload condition. When the system is in overload, the color of the "Overload" Indicator button text changes to red.

If you click on the Overload Indicator button, the Navis™ Optical EMS displays an information dialog box with a message indicating

that the system is in overload condition, and that the system will remain in overload until the number of outstanding alarms drops below the "low watermark" over the pre-defined level as set by the Navis™ Optical EMS administrator. PM data collection is suspended until the system is no longer in overload mode.

To close the information dialog window, click the Close button.

The definition of when the system is in an overload condition is determined by the setting of certain limits for the Fault Management module. See the *Navis™ Optical EMS Maintenance Guide* for details about these limits for Fault Management processing of alarms/TCAs.

When the system is no longer in an overload condition, it resumes processing of alarms and user-specified transactions (both on-demand and scheduled).

Related information

For more information about how Navis™ Optical EMS behaves during high load conditions, see the following sections:

- Scheduling Tasks in Chapter 17, Software Upgrade Concepts
- Dynamic Network Operations in Chapter 11, Management Communications Setup Concepts
- Software Management in Chapter 17, Software Upgrade Concepts

Finding a network element

The Navis™ Optical EMS assists you in locating an NE on the Map window if you cannot find it on the Map pane display or Subnetwork Explorer. For more information see "Finding a Network Element or Aggregate" (10-34).

Related tasks

"Find a Network Element" (2-16) in Chapter 2, "Getting Started" reviews how to use the Find an NE function as a shortcut way to locate NEs on the Map window.

Clearing status messages

Status messages that are displayed in the status bar on the Map window can be cleared at any time.

To clear the status bar message display, select View from the main menu bar on the Map window and then select Clear Status Line from the View menu. The message area in the status bar is cleared. The

Status line can also be cleared by using the Clear Message Line button on the Map window toolbar.

Related tasks

"Clear Status Messages" (2-17) in Chapter 2, "Getting Started" reviews how to clear status messages from the status bar portion of the Map window.

Map preferences

There are system defaults for how map items are displayed. Navis™ Optical EMS allows you to change certain characteristics of the Map pane display, such as NE size, NE labels, NE/aggregate shapes, and alarm colors, to suit your own needs. The appearance of Map items on the Map pane can be changed through the Preferences option on the View menu. Preferences are stored on a per-user basis.

The Map Preferences window can be accessed through the View option on the main menu bar of the Map window or by clicking the Map Preferences button on the Map window toolbar.

"Modify User Preferences" (2-18) in Chapter 2, "Getting Started" explains how to change user preferences for the Map window display.

The Preferences window has six categories:

Nodes & Lines	Allows you to choose NE size and thickness of trail lines between NEs
Labels	Allows you to choose the size, content, and alignment of Map item labels
Colors	Allows you to choose colors associated with alarms and cross-connections
Shapes	Allows you to choose the shapes used for Map items
Background	Allows you to choose a background for the Map window display (such as a geographic map of the world) contained in a file

Fault	Allows you to set preferences associated with how alarms are displayed in the Map and Alarm Notifcation windows. You can select the severity level of alarms displayed and the definition of alarm levels as Critical/Major/ Minor (SONET) or Prompt/Deferred/ Information (No Alarm) (SDH), the Alarm Tally Popup option (controls whether the Alarm Notification window is brought to the forefront when a new alarm is received), and the Alarm Latching Readiness option.
Other	Allows you to turn tooltips on and off, to set the date format for items in the Map, alarm lists, and tallies to mm-dd-yyyy or dd-mm-yyyy format, to enable/disable display of port alias labels, and to set the display of Bidirectional Line Switched Ring (BLSR) Protected Port Groups on the Cross-Connect View window to be singly or in pairs (***Note: the BLSR display option is currently not supported***).

Saving and restoring user preferences

Your chosen preferences for the Map pane display can be saved or restored for each time you log into the Navis™ Optical EMS and bring up the Map window.

"Modify User Preferences" (2-18) in Chapter 2, "Getting Started" explains how to save user preferences. "Restore Preferences/Map Positions" (2-22) in Chapter 2, "Getting Started" explains how to restore previously saved user preferences.

Copying user preferences

Map display preferences can be copied from another user.

"Copy Preferences/Map Positions" (2-23) in Chapter 2, "Getting Started" describes how to copy user preferences and/or Map positions from another user.

Restoring defaults for the Map display

User defaults for the Map window display can be restored from the View Preferences window by clicking the Get Defaults button in the window and then applying them to the current GUI session or saving them. See "Restore Preferences/Map Positions" (2-22) in Chapter 2,

"Getting Started" for complete instructions on setting user preferences for the Map display.

Saving the Map view

Navis™ Optical EMS allows you to save the positions of NEs and aggregates on the Map pane and/or user preferences for characteristics of the Map display, such as node size, labels, line size, and alarm colors. You can also restore previously saved settings or copy settings from another user. Map positions and preferences are saved on a per-user basis.

"Save Preferences/Map Positions" (2-21) in Chapter 2, "Getting Started" describes how to save user preferences and/or Map positions.

User preferences can also be saved directly from the Preferences window by clicking the Save button in the window. See "Modify User Preferences" (2-18) in Chapter 2, "Getting Started" for complete instructions on setting user preferences for the Map display.

"Restore Preferences/Map Positions" (2-22) in Chapter 2, "Getting Started" describes how to restore previously saved user preferences and/or Map positions.

Printing the Map window

You can print one or more copies of the Map window display. To print the Map window, choose **File** from the main menu bar. The File sub-menu is displayed. Choose **Print Screen** from the File sub-menu. A pop-up Print window is displayed, which allows you to select the printer destination, number of copies to print, and other print parameters. When you are finished making your selections, click the OK button on the Print pop-up window. The copy(ies) of the Map window displayed is printed to the selected printer destination.

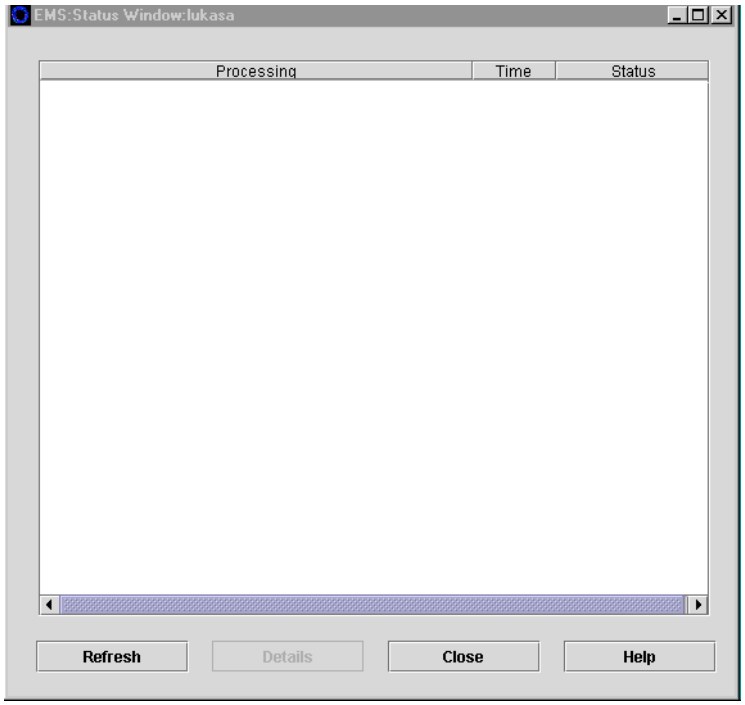
Status window

The Navis™ Optical EMS provides a Status window, which allows you to check on the status of on-demand functions you requested to be performed by the system, such as a manual DNO on an NE or manual addition of an NE. The status dialog window is also displayed after the completion of certain GUI functions.

The Status window can be accessed at any time, by clicking the Status Dialog toolbar button on the Map window toolbar, or by selecting **View** from the main menu bar on the Map window, and then selecting Status Window from the View sub-menu.

Example of the status window

The following figure shows an example of the Status window.



The Status window is a single table with three columns:

- Processing—this column contains a text string which describes the function that is being performed.
- Time—this column indicates the host time, in hours/minutes, that the function was requested.
- Status—this column indicates the status of the requested function.

The status of a function is labeled as shown in the following table:

Status	Meaning
Working	A simple operation is still in progress. When the request has finished processing, the status of the operation changes to show the result, as Completed, Incomplete, or Failed.

Status	Meaning
Completed	The function has completed successfully. If it is a multi-step function, such as a backup or restore, the percentage of the function completed successfully is shown. Example: 25%
Incomplete	The function is still in the process of being completed, or the function did not complete due to non-communicating NE or another problem.
Failed	The function did not complete successfully due to some problem or error.
Aborted	The function was aborted by the user.

Items on the Status window are shown in the order requested, with the most recent function requested shown at the top of the list. Successfully completed items are removed from the list when you click the Close or Refresh button on the window. Click the Close button to close the Status window.

Many of the functions in the Navis™ Optical EMS can be performed on a single NE or a group of NEs, including aggregates. To view the status of a function being performed on a group of NEs, double-click on the row in the Status Dialog window table that refers to the aggregate or group of NEs. A second window is displayed, which shows the status of operations for individual NEs in the aggregate or group.

Help

The Navis™ Optical EMS provides various types of online information to assist you in using the system's functions and features. The types of help available are:

- Tooltips help
- Window help
- Online documentation
- Product information

Tooltips help

Tooltips help assists you in identifying a toolbar button on the Map window toolbar, the function of a window button, or the alias and NE type of a network element on the Map window pane.

To identify a toolbar button, window button, or network element, position the mouse button on the item. The item is identified either by a message in the status bar or a message callout to the right of the item.

Tooltip help can be enabled or disabled through the Preferences option accessible through either the Map window toolbar or through the **View** option on the main menu. See "Modify User Preferences" (2-18) in Chapter 2, "Getting Started" for instructions on how to enable/disable tooltip help.

Window help

Window help provides specific information about the window's purpose or function.

Window help is accessed by clicking the Help button on any functional window in the Navis™ Optical EMS.

On-line documentation

Complete on-line versions of the *Provisioning Guide*, *Maintenance Guide*, *Administration Guide*, and *Installation Guide* are available to view online through Adobe Acrobat Reader.

An on-line version of any of the Navis™ Optical EMS documents is accessed by selecting **Help** from the main menu bar on the Map window and then selecting ***the appropriate Guide*** from the Help sub-menu.

Product information

General information about the Navis™ Optical EMS, including the full product name, copyright information, the product release number, and other related information is available at any time from a pop-up window that is accessed by selecting **Help** from the main menu bar on the Map window and then selecting **About the EMS** from the Help sub-menu.

To close the Product Information window, click the "x" button in the right hand corner of the window.

□

Selecting NEs and Aggregates

Selecting NEs and aggregates

To select one or more NEs or aggregates on the Map pane:

1 Position the mouse pointer over a portion of the background adjacent to the items to be selected.

2 Click the mouse select button and drag the mouse pointer. As you drag the mouse pointer, an outlined box appears over the selected area As items in the Map pane are selected, they change color. Release the mouse select button. The items are selected.

To deselect a selected item in the Map pane, position the mouse pointer over the item and single-click the mouse select button. To deselect a group of items, position the mouse pointer within the boxed region and single-click the mouse select button. Any item in the box that is already selected becomes deselected.

END OF STEPS

□

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See notice on first page

Moving NEs and Aggegates

Moving NEs and aggegates

To move a single NE or aggregate on the Map pane:

1. Position the mouse pointer over the icon to move.
2. Press and hold the select mouse button.
3. Drag the icon to the new position.
4. Release the select mouse button.

END OF STEPS

To move a group of NEs or aggregates on the Map pane:

1. Select a group of NEs or aggregates by positioning the mouse pointer in an area of the background adjacent to the items, clicking the left (select) mouse button and dragging the mouse pointer (a solid box appears) to surround the items, and release the mouse select button. The chosen items are highlighted.
2. Position the mouse pointer on one of the selected items. Press and hold the left (select) mouse button.
3. Drag the icons to the new position.
4. Release the left (select) mouse button.

END OF STEPS

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Finding a Network Element or Aggregate

To find an NE or aggregate::

1 Select **View** from the main menu bar on the Map window.

Result:

A sub-menu is displayed.

2 Select **Find an Agg/NE** from the displayed sub-menu.

Result:

The Find an Aggregate or NE window is displayed.

3 Enter the TID and/or alias of the NE or name of the aggregate.

4 Click the Find button.

Result:

The Map pane display is repositioned to show the NE/aggregate and the NE/aggregate is selected in the Map pane and Subnetwork Explorer. If more than one match is found, a list of network elements that match the criteria is displayed. If you select one of the NEs from the displayed list, the NE is highlighted in the Subnetwork Explorer and the Map pane. If the NE is contained in an unexpanded aggregate, the aggregate is expanded and the NE is highlighted in the Map pane.

5 Click the Close button to close the Find an Aggregate and/or NE window.

END OF STEPS

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Network Element Explorer

Overview

The Network Element Explorer is a tool displayed on the Port Provisioning, Cross-Connections, and Equipment Configuration windows that provides a graphical, step-down, hierarchical view of the equipment to be provisioned. The Network Element Explorer consists of a tree diagram that shows the configurable hardware that comprises the Network Element, and the relationship between each hardware component.

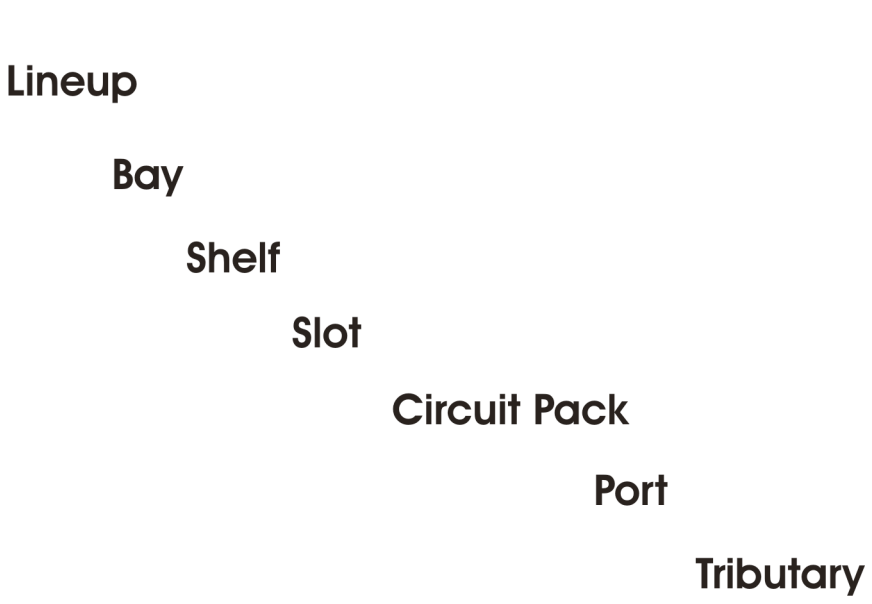
Using the network element explorer

The purpose of the Network Element Explorer is to graphically display the desired hardware component and then select it for provisioning purposes.

Equipment hierarchy

The following simple diagram shows the possible equipment levels that can be displayed and configured on the Network Element Explorer.

Figure 10-3 Equipment Hierarchy on Network Element Explorer



The content and relationship of equipment shown on the explorer varies by NE type. Not every NE contains every level of the hierarchy. Generally, access to a shelf provides access to circuit packs

that exist on the shelf. Ports exist on circuit packs, which are placed in slots. Slots are in shelves, shelves are in bays, and bays are in NEs.

Selecting an item

To select an equipment component on the Network Element Explorer, position the mouse pointer on the equipment component and click the mouse select button. The selected item is highlighted.

Expanding/collapsing an equipment component level

There are two ways of expanding or collapsing an equipment component level on the Network Element Explorer:

1. A select mouse button click on the plus (“+”) or minus (“-”) sign causes the branch associated with the component level to expand (“+”) or collapse (“-”).
2. A double-click on any equipment level selects it and expands to show the component parts. For example, if you double-click on a shelf in the explorer, the diagram expands to show the associated slots, by number.
3. A double-click on the next higher component collapses it back to that level, or just single-click on the minus (-) sign of the next higher component.

Equipment view display

Any change on the Network Element Explorer, such as expansion or collapse of the equipment level, causes a corresponding change on the Equipment View window.

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Window Buttons

Overview

All of the windows in the Navis™ Optical EMS from which you perform a function have standard buttons that work the same way regardless of the function.

Types of window buttons

The following table lists the standard window buttons and their function on windows.

Table 10-2 Standard Window Buttons

Button	Function
OK	Accepts input on the window, validates the input, initiates the requested operation, and closes the window.
Apply	Accepts input on the window, validates the input, initiates the requested operation, but leaves the window open.
Cancel	Cancels the operation and dismisses the window. Any insertions or changes made during the use of the window are not saved.
Help	Accesses online help for information about a particular window, function, feature, or task.
Close	Closes the window without performing an operation.

Greyed-out buttons

If a button is greyed out (dimmed) on a window, it means that a function is not available. In some cases, an item has to be selected or data needs to be entered on the window before the dimmed button is activated.

Exclusive choice buttons

Exclusive choice buttons in the Navis™ Optical EMS let you choose one item or setting from a list of two or more settings. When you change an exclusive choice setting, the previous setting is automatically deactivated.

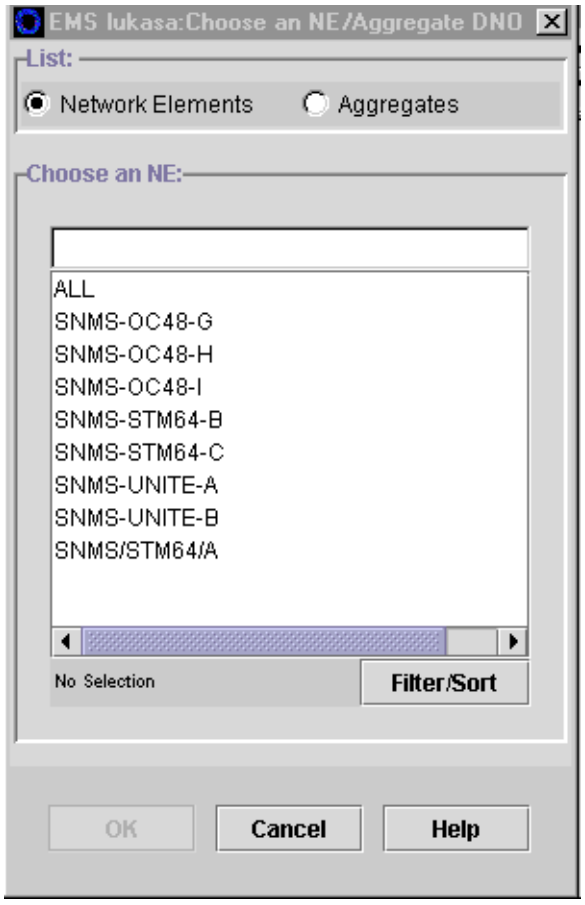
Exclusive choice buttons are also called “radio buttons” because they work like car radio preset buttons that let you change stations with the press of a button.

To change an exclusive choice setting, click the mouse select button with the pointer positioned on the button. Your choice is activated when the button is darkened.

Example: exclusive choice buttons

The following figure shows a window where one of the exclusive choices (radio buttons) has been selected.

Figure 10-4 Example of Exclusive Choice Button Selection



Push buttons

Some of the function windows in the Navis™ Optical EMS have push buttons that are used to transfer one or more items (such as NEs) between lists on the window.

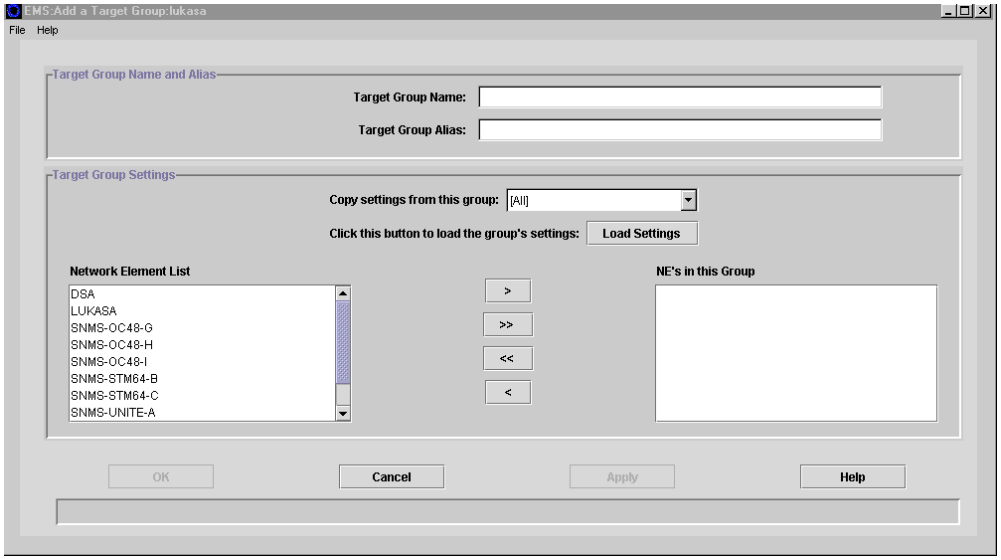
The following table shows each push button label, its name, and its purpose.

Table 10-3 Push Buttons on List Windows

Push Button Label	Push Button Name	Purpose
>	Push Right	When this button is clicked, the selected item is transferred to the list on the right and removed from the list on the left
>>	Push All Right	When this button is clicked, all items on the corresponding list on the left are transferred to the corresponding list on the right
<	Push Left	When this button is clicked, the selected item is transferred to the list on the left and removed from the list on the right
<<	Push All Left	When this button is clicked, all the items on the corresponding list on the right are transferred to the corresponding list on the left

Example: push buttons The following figure shows a sample window where push buttons are used to transfer items between lists.

Figure 10-5 Example of Push Buttons on Window



Using Lists

Overview

A majority of the Navis™ Optical EMS functions are performed by picking a function to perform (for example, Cut-Through) and then selecting the item (such as a specific NE) on which to perform the function, from a list of similar items.

To select an item from a list, position the mouse pointer over the item(s) and click the select mouse button. The selected item(s) is highlighted. On the type-ahead lists, it may be necessary to double-click the select mouse button to select the item and perform the operation.

The Navis™ Optical EMS provides different methods of locating items on lists to narrow the search to only the item(s) you want. These methods are:

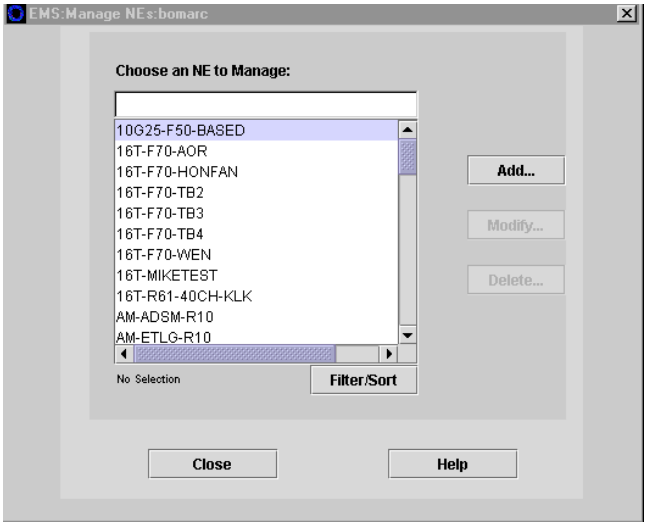
- Scrollable lists
- A filtering/sorting function
- A type ahead field

Scrollable lists

When a window in the Navis™ Optical EMS cannot display all of the information available to you, the information is presented in a scrollable list. The information that you cannot see is available by paging through the scrollable list.

Example: scrollable list window

The following figure shows an example of a scrollable list window in the Navis™ Optical EMS.



Using a scrollable list

The vertical bar on the right side of the window is the scroll bar. The scroll bar consists of an up-arrow, a down-arrow, and an elevator box between the two arrows. The scroll bar on the window works as follows:

To:	Do this:
Display the next page	Put the mouse pointer under the elevator box and click the mouse select button.
Display the next line	Put the mouse pointer on the down-arrow and click the mouse select button.
Display the previous page	Put the mouse pointer above the elevator box and click the mouse select button.
Display the previous line	Put the mouse pointer on the up-arrow and click the mouse select button.
Display the bottom of the list	Put the mouse pointer on the elevator box, hold down the mouse select button, move the mouse downward (dragging the elevator box to the bottom of the scroll bar), and release the mouse select button.

To:	Do this:
Display the top of the list	Put the mouse pointer on the elevator box, hold down the mouse select button, drag the elevator box to the top of the scroll bar, and release the mouse select button.

You can select a single item from a scrollable list by positioning the mouse pointer over the item and clicking the mouse select button. This causes the item to become highlighted and indicates your selection.

Filtering and sorting items

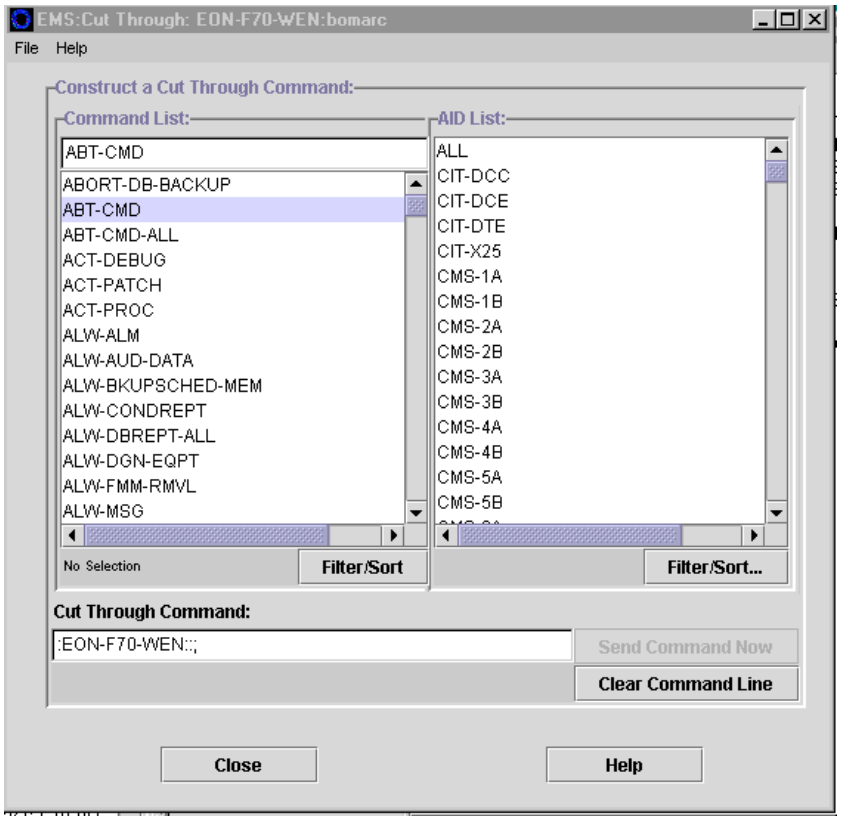
Navis™ Optical EMS has a filter/sort function to further narrow a list to only the item(s) you want. This function allows you to:

- Narrow a list by filtering out all items on the list that do not match all or part of the filename, NE/aggregate name, TID, or alias you supply.
- Sort a list by placing the items in ascending or descending order.

The Navis™ Optical EMS allows you to filter and/or sort the list. Many of the scrollable list windows in the Navis™ Optical EMS provide this function.

Example: filter/sort function

The following figure shows an example of a scrollable list window with the filter/sort function.

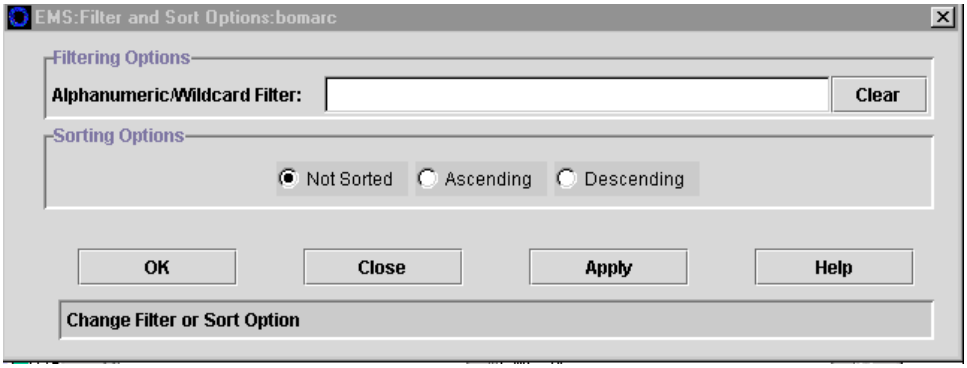


When you click the Filter/Sort button on a list window, a Filter and Sort Options window is displayed to allow you to filter and/or sort the list according to the criteria you specify.

Filter/sort window

The following figure shows a sample Filter and Sort Options window.

Figure 10-6 Example of Filter/Sort Window



You would fill in the following fields as needed:

- Alphanumeric/Wildcard Filter—This is a text field for entering all or part of the name/label to narrow the list to only those items that match these criteria. An asterisk (*) can be used as a wildcard character to match one or more characters in the name or label. Use the backspace key to erase what you have entered in this field.
- Sorting Option buttons—These exclusive choice buttons are used to determine the sort order of the list. Click on the Ascending button to display the list in ascending order. Click on the Descending button to display the list in descending order. Click on the Not Sorted button to leave the list as it is.
- OK—After making your filtering/sorting choices, click on the OK button to apply your criteria to the list and close the Filter/Sort window.
- Close—Click on this button to close the window without applying any filtering/sort criteria to the list.
- Apply—After making your filtering/sorting choices, click the Apply button to apply your criteria to the list and leave the Filter and Sort Options window open.
- Help—Click on the Help button to obtain online help for the Filter and Sort Options window.

Type ahead field

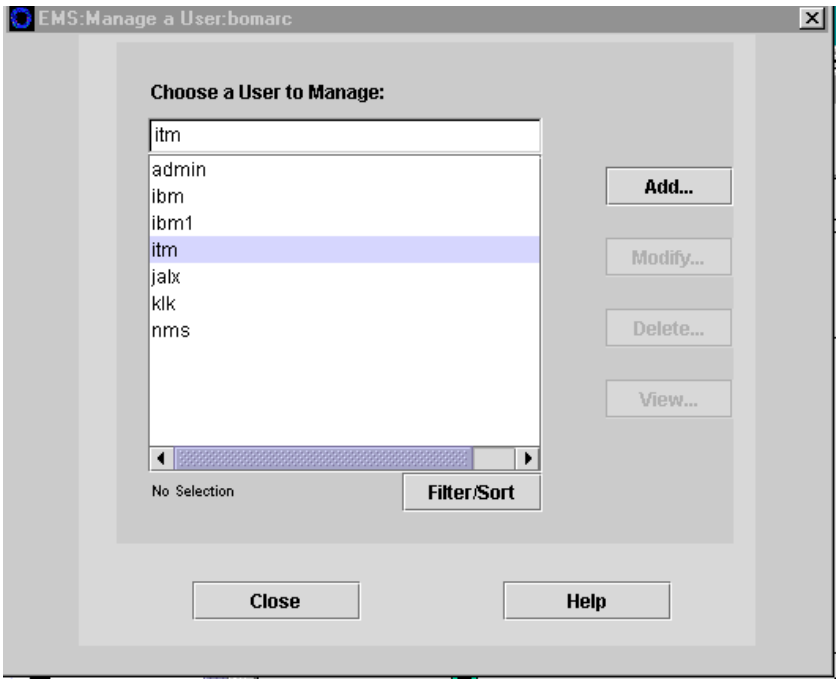
Many of the list windows have a “type ahead” field. This is a text field which is usually located above the first item in the list. As you start to type the item name or label in this field, the system automatically selects an item from the list that matches what you have typed. An asterisk (*) can be used in the type ahead field as a wildcard character to match one or more characters of the item name or label. You can also enter the entire name of the item in the type ahead field to expedite the search and selection of an item on the list.

If you select an item from the list, the name of the item appears in the type ahead field.

The status bar on the list window indicates whether the list has also been filtered.

Example: type ahead list

The following figure shows an example of a list where the type ahead field has been used to expedite the search for an item on the list.



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Sorting Tables

Overview

Some of the data that the Navis™ Optical EMS retrieves from its managed NEs, such as alarm data, is displayed in multi-column tables. Data is displayed in tabular format on many windows, including the:

- Alarm Summary
- Trail Alarm Summary
- Alarm List
- Trail Alarm List
- Scheduled Activity Lists

The Navis™ Optical EMS allows you to sort and display data displayed in tables in the exact order that you need it.

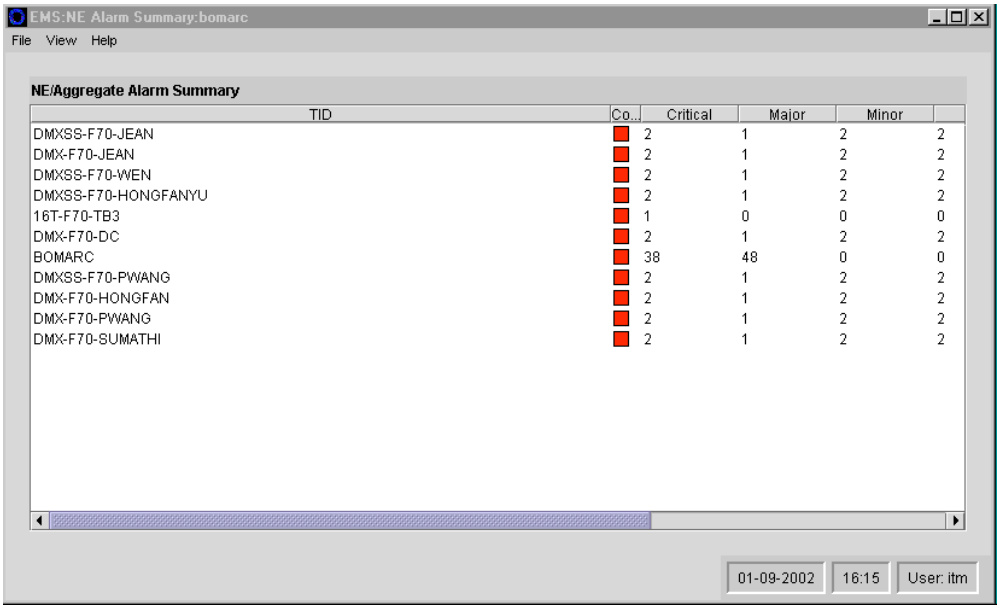
Moving and dragging table columns

To change the display order of columns in a table, position the mouse pointer on a column heading, click and hold the select (left) mouse button, and drag the column to a different position in the table.

Example: sorting a table

The following figure shows a sample Alarm Summary window where you may want to change the order of the alarm summary data.

Figure 10-7 Example of Alarm Summary Window

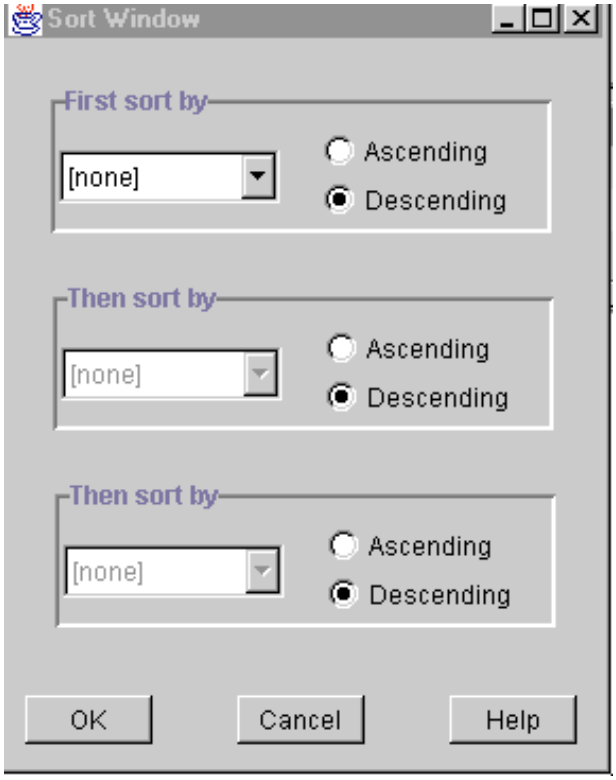


The default order for data on the Alarm Summary window to be displayed is by Critical, Major, and Minor alarms. To change the sort order in which alarm data is displayed on this type of window, you would click on one of the column headers or select the Sort option on the View sub-menu for the Alarm Summary window.

Either action brings up a Sort window. The following figure shows an example of the Sort window.

Example: sort window

The following figure shows an example of the Sort window.



The Sort window allows you to select three categories from the table list on which to sort. Each category consists of a drop-down list that contains all of the column names (in column order) from the table list on which to sort, and two exclusive choice radio buttons, labeled Ascending and Descending.

To sort a table, choose a column name from the “First sort by” drop-down list. The item you select becomes the primary sort key for the table list. Then, click the Ascending radio button next to the first drop-down list to sort the table by this item in ascending order or

click the Descending radio button to sort by this item in descending order. Ascending order is the default.

To further sort the table data, choose an item from the first **Then Sort By** drop down list and then the second **Then Sort By** drop down list. Choose **none** from the drop down list to indicate no sort at this level. For each level, choose whether to sort the item in Ascending or Descending order. Ascending order is the default.

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Cut-Through

Overview

In order for the user to execute NE native commands that may not be explicitly supported by a particular release of the Navis™ Optical EMS, a cut-through capability has been developed. In addition, with the command builder and broadcaster, TL1 cut-through gives the user powerful capabilities. See "Perform Cut-Through Commands" (2-25), "Build TL1 Commands" (2-27), and "Broadcast TL1 Commands" (2-29) in Chapter 2, "Getting Started" for instructions on performing TL1 functions. Two additional points to remember are:

- The Navis™ Optical EMS allows the user access to only the NEs and associated commands defined by the Target and Command groups for which the user is validated.
- Not all TL1 commands displayed in the Cut-Through window can be executed. The capability to execute commands depends on the subnetwork equipment. If the equipment uses CMISE, such as the Release 5.0 and earlier of the WaveStar® OLS 1.6T, Cut-Through is not available.

Instructions about actual TL1 commands are beyond the scope of this user documentation (which focuses on the GUI and its administration), but see your Lucent Technologies account representative for operations guides that contain complete information about all TL1 commands.

Initiating an NE cut-through session

The NE Cut-Through window, accessed through the Configuration menu on the Map window main menu or via an NE's pop-up menu, allows you to access and communicate with an NE, using the TL1 command set. You can submit TL1 cut-through commands to the NE directly. (For specific NE command information, see the appropriate NE documentation.)

Commands such as `rlogin` and `act-user` are disabled, but they are not needed since the Navis™ Optical EMS is already logged into the NEs.

Related information

See "Perform Cut-Through Commands" (2-25) in Chapter 2, "Getting Started" for how to initiate and perform cut-through.

Building TL1 commands

The TL1 macro builder allows you to create a TL1 command file to assist in performing maintenance and provisioning activities on one or more NEs (such as download of standard configuration), without having to manually enter a set of TL1 command strings. This feature both reduces the amount of manual entry needed to create TL1 command strings and allows for the reuse, at a later time, of the commands built on the same NE or other NEs of the same type.

Related information

See "Build TL1 Commands" (2-27) in Chapter 2, "Getting Started" for how to build TL1 commands.

Broadcasting TL1 commands to NEs

The broadcasting TL1 commands feature allows you to perform maintenance and provisioning activities (such as download of standard configuration) on one or more NEs, utilizing the TL1 command files created by the TL1 macro builder feature, and broadcasting those files to multiple NEs of the same type. This feature saves you time by performing similar tasks on multiple NEs in one step, and by reducing the manual entry required in the creation of TL1 command strings.

Related information

See "Broadcast TL1 Commands" (2-29) in Chapter 2, "Getting Started" for how to broadcast TL1 commands.

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Equipment Display

Overview

Different NE types are of varying complexity and configurability, ranging from single-shelf NEs at a single location to multi-bay and multi-shelf NEs that are flexible in their arrangements and may be distributed between rooms and floors of a central office or even distributed across central office locations and remote sites. The equipment window gives a set of hierarchically arranged equipment views. The shelf view is the lowest level view. There may also be a system view and a bay/line-up view, depending on how large and complex the NE is. The Equipment Configuration window also allows you to "drill down" into the NE equipment hierarchy.

Equipment graphical display

To graphically depict the varying NE types effectively, the Navis™ Optical EMS decomposes them into different numbers of hierarchically arranged graphical displays. For example, with a single-shelf system only a single display at the shelf level is needed, and this shelf level display is also a system-level display. Navis™ Optical EMS displays the bay/shelf equipment hierarchy for all types of NEs. On the other hand, a system such as the WaveStar® BWM is composed of multiple bays containing multiple shelves, and the bays are typically arranged into multiple aisles. To effectively depict the WaveStar® BWM requires several levels of display: system (one or more line-ups), line-ups (one or more adjacent bays, with each bay containing one to three shelves), and shelves (each containing many circuit packs).

LambdaRouter equipment configuration

The LambdaRouter™ 128/256 AOS is an optical cross-connect (OXC) product that can contain two or three bays. The two-bay layout contains one Optical Interface (OXI/OXF) bay and one System Controller (SYSCTL) bay and supports a 128-channel configuration. The three-bay layout contains two OXI/OXF bays and an SYSCTL bay and supports a 128-channel or 256-channel configuration. The OXI/OXF bay houses the OXI shelf, the HVDAC shelf, and the Switch shelf. The SYSCTL bay is equipped with a single SYSCTL shelf. The OXI shelf handles incoming and outgoing customer traffic and contains the OXI and OSWIC circuit packs. The HVDAC shelf supports the HVDAC circuit packs that supply the control voltages required to steer the individual mirrors found in the Switch shelf's mirror arrays. The Switch shelf is an optical switch fabric. Information about bays in the LambdaRouter are inferred from the System Controller information (two-bay or three bay layout) returned by the NE. The two-bay layout contains one Switch shelf and one Optical Interface shelf. The three-bay configuration contains two Switch Fabric shelves and two Optical Interface shelves. Also, determination of whether a circuit pack in the Optical Interface shelf is an OXI or OSWIC circuit pack is inferred from the prefix of the entity's AID retrieved from the NE by the Navis™ Optical EMS.

Circuit packs on equipment display

If the Navis™ Optical EMS does not recognize a circuit pack on the requested shelf, the window shows that slot filled with unknown equipment. Circuit packs may not be recognized when the vendor firmware is nonstandard or when the board is a new release that is not yet supported.

Several NE types allow pre-provisioning of slots in the shelf through the Navis™ Optical EMS to accept a certain type of circuit pack and provision the physically absent circuit pack to accept a certain type of service. This is referred to as pre-provisioning, or establishing of equipment through the Navis™ Optical EMS.

In a shelf view on the Equipment View window, the Navis™ Optical EMS graphically indicates, through a combination of colors, stripes and slanted lines the presence or absence of circuit packs and whether the circuit pack has been pulled or is not communicating. The shelf view may show:

- an unequipped slot, not provisioned
- an unequipped slot, pre-provisioned

- a slot equipped with a provisioned circuit pack
- a slot from which a circuit pack has been pulled or contains a non-communicating circuit pack

The following table summarizes the various slot/circuit pack states and how they are represented graphically on the Equipment View window in the shelf view.

Slot/circuit pack state	Graphical representation
unequipped slot, not provisioned	slot is dark grey with lighter grey vertical stripes
unequipped slot, provisioned	image of circuit page faceplate with thin grey diagonal lines
slot equipped with circuit pack	image of circuit pack faceplate
slot with pulled circuit pack	circuit pack faceplate with red-colored notch and diagonal lines
slot with non-communicating circuit pack	circuit pack faceplate with round dot indicating, by color, that an alarm has been generated and the level of alarm
area of shelf that does not accept equipment or report information	shelf area is light grey and not labeled
standby circuit pack of two-pack configuration (for LambdaRouter™ 128/256 AOS SYSCTL shelf). The active circuit pack automatically switches over to the standby circuit pack in the event of failure	standby circuit pack faceplate with thin grey lines slanted to left

Ports on equipment display

Ports are graphically represented as small squares in the bottom of circuit packs on the Equipment View window. Port alarms are visually indicated in the same manner as for circuit packs. The color of the small port square indicates the highest severity alarm currently on the port, or the absence of an alarm. Port alarms are updated dynamically. See the "Alarm status on equipment display" (10-55) section in this chapter for more details about display of alarms on equipment components.

The Equipment List or Equipment Details for a port can be obtained by positioning the mouse cursor on the port, clicking the right mouse button to display a pop-up menu, and choosing the appropriate menu option.

Alarm status on equipment display

The Navis™ Optical EMS indicates whether an alarm has been generated by a bay, shelf, slot (circuit pack), or port in the NE on the graphical display of equipment, and what level of alarm it is.

The status of slot/circuit pack alarms is updated dynamically in the Equipment View window and propagated to the higher equipment levels in the equipment hierarchy, so the indication of the alarm status graphically on the slot/circuit pack level is also reflected at the bay/shelf level in the Equipment View. On the Equipment View window, a round dot is displayed on the selected piece of equipment with the color indicating the alarm state. The color of the dot indicates the level of alarm that has been issued by the selected equipment component, or if there have been no alarms issued. The default colors for the alarm levels are:

Alarm Color (default)	Alarm Severity Level (SONET)	Alarm Severity Level (SDH)
Red	Critical	Prompt
Yellow	Major	Deferred
Cyan	Minor	
Green	No Active Alarms	No Active Alarms

Related information

See "View NE Equipment" (2-31) in Chapter 2, "Getting Started" for instructons on how to view NE equipment on the Equipment View window.

The default Alarm display colors shown in the above table can be modified through the Preferences option of the View menu on the

Map window main menu bar. For more details, see “Modify User Preferences” (2-18) in Chapter 2, “Getting Started”.

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11 Management Communications Setup Concepts

Overview

Purpose

This chapter provides general information about setting up communications with network elements managed by Navis™ Optical EMS and manually adding network elements using Navis™ Optical EMS GUI functions and the Dynamic Network Operation (DNO) feature for subnetwork discovery and database update.

Objectives

This chapter discusses the following topics:

- the basic definition of a network element (NE) managed by the Navis™ Optical EMS and how to manually add network elements to the Navis™ Optical EMS GUI Map window to reflect the physical network
- the different types of Data Communication Networks (DCNs) for NEs managed by Navis™ Optical EMS
- the SONET Directory Services (SDS) feature for obtaining NE directory/addressing information through a Directory Services Agent (DSA)
- Subnetwork discovery of NEs in Navis™ Optical EMS
- the Dynamic Network Operation (DNO) feature

Contents

Network Element Administration	11-3

Data Communications Interfaces	11-5
Dynamic Network Operations	11-51

Network Element Administration

Overview

The Navis™ Optical EMS system administrator inputs subnetwork and network element information so the GUI Map window reflects the physical network. With this information, the Navis™ Optical EMS application constructs a network model, which is its working view of the physical network.

Subnetworks

A subnetwork is a group of interconnecting and interrelated network elements using a common data communications protocol, usually Open Systems Interconnection (OSI). The most common connotation is a SONET or SDH subnetwork, in which the network elements have Data Communications Channel (DCC) connectivity. For Dense Wave Division Multiplexer (DWDM) network elements, this connectivity is established through the network element's supervisory channel. The concept of a subnetwork is of particular importance when using either X.25 packet-switched networks (PSNs) or TCP/IP LANs/WANs to connect the Navis™ Optical EMS and the NEs. In those configurations, a Gateway Network Element (GNE) is used to serve as the gateway between the X.25 PSN or TCP/IP LAN/WAN and the set of OSI-connected NEs; the subnetwork represents the set of NEs that are accessible from a given GNE.

The Network Model

Creating a network model allows the Element Management System (EMS) to communicate with the network and each of its components. When network elements are configured through the Navis™ Optical EMS configuration windows, the network model is assembled dynamically by the EMS Dynamic Network Operations (DNO) feature.

Network elements

A network element (NE) is the basic telecommunications entity managed by Navis™ Optical EMS. An NE is a grouping of physical equipment that provides communications services over a network. An NE is both a node in a larger network of NEs and a complex network system itself. The software in an NE must manage both the physical (equipment) components of the NE and the network system provided by the NE.

NEs can be added, modified, or deleted through the Navis™ Optical EMS GUI. When any NE changes to the network are made, DNO must be run to update the Navis™ Optical EMS database. For information about the DNO feature, refer to the "Dynamic Network Operations" (11-51) section.

Types of NEs

NEs vary by size, equipage, function, communications protocol supported, signalling/transmission rates, interoperability, number and types of physical/electrical interfaces (ports), and cross-connection capabilities.

The NE/device types supported by this EMS include:

- Lucent Technologies' WaveStar® OLS 1.6T
- Lucent Technologies' WaveStar® BWM
- Lucent Technologies' WaveStar® TDM 2.5G
- Lucent Technologies' WaveStar® TDM 10G
- Lucent Technologies' FT-2000 Large Capacity Terminal (LCT)
- Lucent Technologies' WaveStar® NCC
- Lucent Technologies' LambdaRouter™ 128/256 AOS
- Lucent Technologies' Metropolis™ DMX
- Lucent Technologies' Metropolis™ EON
- Lucent Technologies' Metropolis™ DMXpress
- Lucent Technologies' LambdaUnite ™ MSS

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Data Communications Interfaces

Overview

The Navis™ Optical EMS communication interface is partitioned into two parts: one that connects with NEs (southbound) and one that connects with external OSs (northbound).

Northbound communications

The northbound communication provides a connection for an external OS to communicate with the Navis™ Optical EMS. All northbound communication is via the Common Management Information Service Element (CMISE) and CORBA over TCP/IP.

Southbound communications

The southbound interface supports Open System Inteconnect (OSI) over TCP/IP, X.25, OSI, and pure TCP/IP connections to NEs.

WaveStar® and Metropolis™ NEs support X.25, OSI , an OSI over TCP/IP-based network interface (via a transport bridge), or a direct TCP/IP interface with Navis™ Optical EMS.

The Navis™ Optical EMS supports concurrent X.25 and OSI-based communications with NEs. Depending on the NE types, the communications can be either X.25 or LAN-based TCP/IP over OSI, but not at the same time, to the same subnetwork.

X.25-based communications

The Navis™ Optical EMS supports both X.25 direct and remote terminal (RT) network connections to FT-2000 LCT NEs. While direct X.25 connectivity is supported, Navis™ Optical EMS to NE communications are generally done through an NE in a subnetwork serving as the Gateway Network Element (GNE), over an X.25 Packet Switched Network (PSN). The customer chooses the type of link concentration equipment which forms the X.25 PSN necessary for communications with the GNEs.Navis™ Optical EMS supports a TL1 over X.25 southbound interface that uses an assigned GNE to provide the protocol conversion from TL1 over an X.25 short stack to encapsulated TL1 over the 7-layer OSI stack using the SONET DCC.

Gateway network element for X.25-based communications

A Gateway Network Element (GNE) is an NE that acts as the “gateway” or intermediary node for establishing communications between Navis™ Optical EMS and the other NEs in a subnetwork. The GNE has X.25-based communications with the Navis™ Optical EMS host. When a message is received from the Navis™ Optical EMS host, the GNE sets up OSI associations with its associated NEs and

forwards the addressed message to the intended NE. The GNE is also used by the Navis™ Optical EMS to autodiscover all NEs in the OSI-based subnetwork with DCC connectivity.

User-definable virtual circuits

When you add a GNE using the Navis™ Optical EMS, or delete an NE and re-add it back into the Navis™ Optical EMS host database as a GNE, you can select up to three supported three X.25 virtual circuits (VCs) for communications between the host machine and the GNEs.

Each of the VC connections may be set up as a permanent virtual circuit (PVC) or switched virtual circuit (SVC). You can also specify the purpose of each VC. The recommended configuration is two VCs—one for autonomous messages and one for command/response messages.

When the choice is to use three VCs, a separate VC can be configured for:

- command/response messages
- autonomous maintenance messages and alarm messages
- autonomous database change messages and provisioning commands/responses

Important! The NE has to be provisioned the same way as the Navis™ Optical EMS.

Either or both the autonomous maintenance message and autonomous database change/provisioning functions may share the command/response VC.

Cost-effective SVCs (instead of PVCs) can be configured for non-critical command/response functions.

The GNE maps its OSI associations to each of the subtending NEs so that they use the same VCs for the same functions as are used for the GNE. For example, if one VC is used form command/response messages to the GNE and another VC is used for autonomous messages from the GNE, those same VCs are used for messages to and from the NEs.

X.25 Subnetwork Discovery

When a GNE is added to the database and DNO is performed on the GNE, the Navis™ Optical EMS sends a TL1 RTRV-NEIGHBOR command (or its NE--based equivalent) to the GNE to discover any

NEs that are connected to the GNE. If the GNE reports connections to any NEs that are not currently in the Navis™ Optical EMS database, the Navis™ Optical EMS adds the NEs under ***that*** GNE and queries the newly discovered NEs recursively until all NEs with DCC connectivity are discovered to complete the network topology.

Any NEs that are not disovered through the DNO process or non-Lucent Technologies NEs must be manually added to the Navis™ Optical EMS database to complete the network model.

Non-managed devices

NEs that are not managed by Navis™ Optical EMS are treated as "non-managed devices" and are added during the autodiscovery process to complete the network model and to avoid repeated attempts by the Navis™ Optical EMS to log into these NEs. If Navis™ Optical EMS automatically discovers a non-managed device by identifying a discovered NE with an NE type that is not on the managed NE list in its database, the system stops any further login attempts and displays it on the Map window with a default icon (or any shape selected by the user via the Preferences option) for non-managed devices without any further processing.

Dual GNEs

The Navis™ Optical EMS can support a second, optional physical connection to a subnetwork for added reliability. For each subnetwork of NEs, a Navis™ Optical EMS administrator can add multiple GNEs and then identify a GNE association, consisting of a primary and secondary GNE pair of compatible GNEs, which operate in an active/standby arrangement. The secondary GNE takes over communications with the EMS host if there is a loss of communications with the primary GNE. The Navis™ Optical EMS monitors the status of its X.25 links and virtual circuit connections to each GNE. Navis™ Optical EMS automatically transfers communications to the standby GNE whenever an X.25 link to the active GNE is down.

The Navis™ Optical EMS administrator can also manually switch the active and standby GNEs.

The backup GNE in an association cannot have any RNEs assigned to it. If there are RNEs assigned to the backup GNE, they must be reassigned to another GNE in the subnetwork before designating the GNE as a backup in a GNE assocation.

GNE association management

The Navis™ Optical EMS administrator can add or delete GNE associations as needed. The administrator can also manually swap the primary GNE and secondary GNE in the association.

Deletion of GNE associations

The Navis™ Optical EMS administrator can remove the association (relationship) between GNEs. To delete either GNE in a GNE association, the administrator must delete the association first. When a GNE association is deleted, the RNEs in the subnetwork remain connected to the currently active GNE.

Multiple active GNEs

The Navis™ Optical EMS also supports multiple active GNEs (or multiple primary/secondary GNE associations) to avoid potential data traffic congestion in large X.25-based subnetworks with up to 256 NEs. Functions in the Navis™ Optical EMS GUI allow an administrator to manually add multiple GNEs to a subnetwork and then manually reassign the NEs in the subnetwork to GNEs for load balancing. A GUI function alllows an administrator to display the GNE/RNE relationships and move RNEs between GNEs of a subnetwork to redistribute the data traffic load.

Related information

See the related tasks in Chapter 3, “Management Communications Setup”.

OSI-based communications

The Navis™ Optical EMS IAO-LAN interface provides an OSI standard, higher-speed communcations path to NEs. It enables the reduction of performance bottlenecks by providing faster communications between the EMS and NEs. The OSI/LAN interface provides up to three high bandwidth communication paths, or OSI associations, to NEs. This communication model is based on the standard 7 layer OSI stack reference model.

For increased system availability, Navis™ Optical EMS supports IAO-LAN redundancy. Navis™ Optical EMS is connected to a subnetwork of NEs via two separate IAO-LAN connections/hubs. Both connections are active. In the event that one IAO-LAN connection fails, Navis™ Optical EMS detects the failure and automatically switches to the other connection.

OSI-Connected NEs and subnetwork discovery

When any NE with a direct OSI/LAN connection to Navis™ Optical EMS is manually added to the Navis™ Optical EMS database, it can be used as the "seed NE" through which Navis™ Optical EMS can automatically discover NEs in the subnetwork to complete the network model. When the NE is added and DNO is executed, the EMS issues a command to the NE and discovers all Lucent Technologies NEs and other devices connected to the network. Navis™ Optical EMS obtains the NE type from the device; in some cases, the device may be a router or similar equipment not managed by Navis™ Optical EMS.

WaveStar BWM NEs are either autodiscovered through the SONET Directory Services (SDS) feature or manually added to the Navis™ Optical EMS database.

Any NEs that are not disovered through the DNO process or non-Lucent Technologies NEs must be manually added to the Navis™ Optical EMS database to complete the network model.

The Navis™ Optical EMS can send messages to NEs that are not part of the same network as the "seed NE" by virtue of the TARP method of broadcasting messages and routing tables that are contained in each NE.

Non-managed devices

NEs that are not managed by Navis™ Optical EMS are treated as "non-managed devices" and are added during the autodiscovery process to complete the network model and to avoid repeated attempts by the EMS to log into these NEs. If Navis™ Optical EMS automatically discovers a non-managed device by identifying a discovered NE with an NE type that is not on the managed NE list in its database, the system stops any further login attempts and displays it on the Map window with a default icon (or any shape selected by the user via the Preferences option) for non-managed devices without any further processing. If a Directory Services Agent (DSA) is defined for SONET Directory Services (SDS), any of the PF2000 NEs (such as DDM-2000 or FT-2000) not managed by Navis™ Optical EMS can be registered with the DSA with an NE type of "T5GW" in the local or remote Directory Information Base (DIB) if T5 Gateways exist in the network. Navis™ Optical EMS changes the NE type to "Non-managed device" if the NE is discovered. For more details

about the SDS feature, refer to the "SONET directory services" (11-23) section in this chapter.

TCP/IP-based communications (RFC1006)

The Navis™ Optical EMS supports OSI connections with NEs over a TCP/IP backbone network. In OSI over TCP/IP communications, a WaveStar® Network Communication Controller (NCC) device or WaveStar® OLS 1.6T NE is required to perform OSI protocol conversion, as a transport bridge, for messages/responses handled to/from the Navis™ Optical EMS and the NEs. NEs with a direct TCP/IP interface with do not require a transport bridge device.

If an NE has a direct OSI/LAN connection with the Navis™ Optical EMS and is not communicating over a TCP/IP network, a transport bridge is not needed.

Network communication controller

Important! The Navis™ Optical EMS currently supports Release 1.0 through Release 3.2 of the WaveStar® NCC. Future releases of the WaveStar® NCC may not be supported by the Navis™ Optical EMSand the WaveStar® NCC product will be eventually phased out. The Directory Services Agent (DSA) functionality provided by the WaveStar® NCC will be assumed by the Navis™ Optical EMS. The TCP/IP Gateway NE (GNE) functionality currently provided by the WaveStar® NCC will be assumed by a WaveStar® BWM, a WaveStar® TDM 2.5G, or aWaveStar® TDM 10G, respectively, for these NE types to communicate with the Navis™ Optical EMS host.

A WaveStar® NCC is an Intel Pentium-based single-board computer running Microsoft Windows NT. It has no video display, keyboard, or mouse. The system is equipped with an on-board hard disk drive as the primary Non-Volatile Memory (NVM), and a removable PCMCIA disk for use in loading software, backup, and restore. A WaveStar® NCC uses a single 10BaseT LAN connection for both OSI and TCP/IP.

In other cases, the NCC is a single board computer residing in a Multi-Function Server (MFS) shelf. The MFS shelf comprises a card cage supporting 8-12 single board computers (SBCs) in a vertical slot arrangement, with shared power supplies, shared fan unit(s), and one alarm unit. Only power, ground, and fault/alarrm signals cross segments.

A WaveStar® NCC can be provisioned to serve two main functions:

- Directory Services Agent (DSA) for SONET Directory Services (SDS)
- Transport bridge for TCP/IP to OSI protocol conversion for OSI-connected WaveStar NEs communicating with the Navis™ Optical EMS over a TCP/IP backbone network

A WaveStar®WaveStar®NCC can be designated as a DSA and/or transport bridge.

Security management

The WaveStar® NCC has basic local security features similar to an NE. It has user logins, passwords, privileges, a user activity log, and detection of security violations.

Function activation

Each WaveStar® NCC can handle a variety of functions that can be provisioned through the GUI or via the CIT by a system administrator. These functions include:

- T1.245 DSA
- T1.245 Registration Manager (RM)
- TCP/IP transport bridge
- MFS Alarm Monitor
- Notification of directory additions/deletions

Directory system agent

SONET Directory Services (SDS) provides for name/address resolution for WaveStar® NEs communicating with Navis™ Optical EMS through an OSI or OSI over TCP/IP network. An NCC provisioned as the Directory Services Agent (DSA) or the EMS-based DSA provides the directory of NEs to the Navis™ Optical EMS.

Before the Navis™ Optical EMS can communicate with the NE, the NSAP address of the NE's system controller is provisoned through the Craft Interface Terminal (CIT), and the NE is registered in the T1.245 directory. The NCC serving as the DSA or the EMS-based DSA stores the T1.245 directory. If an NCC is serving as the DSA, it also performs the Registration Manager (RM) function. If the DSA is EMS-based, and a WaveStar® OLS 1.6T NE present, the 400G can be provisioned to have RM functionality. The Navis™ Optical EMS, acting as the Directory User Agent (DUA), obtains the address information from the DSA for sending and receiving

commands/responses, instead of requiring manual provisioning of this information.

Transport bridge

A WaveStar® NCC or WaveStar® 1.6T NE defined as a transport bridge allows associated NEs and Navis™ Optical EMS to communicate over a TCP/IP backbone network by performing TCP/IP to OSI protocol conversion in both directions. The selected NE or NCC bridges connection layers of OSI running over TCP/IP between the upper and lower layers of the OSI protocol stack.

If the Navis™ Optical EMS has a direct OSI/LAN connection or an OSI/LAN to a Wide Area Network (WAN) connection with a WaveStar® NE, transport bridges are not needed.

When a transport bridge is added to the network, it is set up to communicate via OSI over TCP/IP.

In the environment where transport bridges are needed, at least one transport bridge should be manually added, or, if the WaveStar® NCC/WaveStar® OLS 1.6T is autodiscovered when the DNO process is run, should be defined as a transport bridge via the Modify NE window in the GUI before the NEs it supports are added to the Navis™ Optical EMS database.

Port configuration for transport bridges

The Navis™ Optical EMS uses a calling port number when initiating communcations with the transport bridge and a listening port number as a responder from the transport bridge. These two port numbers are configurable during installation time (via the installation script) so the system can keep track of these port numbers in case the NE changes these numbers in the future.

Primary and secondary transport bridges

During the subnetwork discovery process, the Navis™ Optical EMS automatically assigns NEs to a single primary transport bridge if the Routing Domain of each device's Network Service Access Point (NSAP) address is the same as that of the transport bridge. A secondary transport bridge can be manually assigned through the Navis™ Optical EMS GUI added to provide transport bridge redundancy. If communications are lost with the primary transport bridge, a secondary transport bridge can be designated to take over automatically.

Important! In a large network of WaveStar® OLS 1.6T NEs, detection and automatic switchover to a secondary transport bridge may take a long time. If this is the case, tuning some of the "watchdog" (keep alive) function parameters may aid in detecting failure and performing automatic transport bridge switches earlier. The system's "watchdog" function periodically checks on the health of each NE managed by Navis™ Optical EMS by sending a keep-alive message at the application level. The following watchdog parameters can be modified by editing the UNIX file */snc/etc/CM_Server.cfg*: WDTIME—The frequency used to send watchdog requests. By making this number smaller, communication failures can be detected earlier, but increases the system activity if there are many NEs. If this number is too large, the system takes a long time to discover network and NE problems. WDRETRYTIMES—This sets a retry interval for re-establishing an association in the event of communication failures. The default number of attempts is 3. The default is 0 minutes for the first attempt, and 3 minutes between the second and subsequent (user-specified) number of retries. Setting this parameter to 0 (minutes) invokes the system to detect failures earlier, but if the system becomes slow at some point, the watchdog function could timeout and the system will disconnect from the NE. WDTIMEOUT—This parameter controls how long to wait for a watchdog response. WDLOOKBACK—This parameter controls the time interval for the system to send a keep alive message to the NE to check on its health if there has been no active communication with the NE in this user-specified period. The default for this parameter is 10 minutes. This parameter should always be less than the WDTIME parameter. If there has been communication with the NE during the interval specified, no watchdog request is sent, the system considers the connection with the NE healthy and waits for the next specified watchdog interval. Changes to the WDTIME, WDRETRYTIMES, WDTIMEOUT, and WDLOOKBACK parameters should be made by an experienced user, as there are performance consequences if the values for these parameters are changed. A primary and secondary transport bridge can be initially assigned to the NE through the Add an NE window in the Navis™ Optical EMS GUI. Reassignment of transport bridges to NEs can be done through the Management Transport Bridges window in the Navis™ Optical EMS GUI.

Important! A primary transport bridge must be reassigned manually to NEs to invoke an actual switch of the transport bridge. The switch

of a primary transport bridge may cause the link from Navis™ Optical EMS and the target NE to go down and up, which can trigger automatic alarm re-synchronization.

Assigning transport bridges

When a WaveStar® NCC or WaveStar® OLS 1.6T NE is added to Navis™ Optical EMS, it can be designated as a transport bridge. If the WaveStar® NCC or WaveStar® OLS 1.6T NE is added as a transport bridge, its IP address is required.

When an NE is added, and it communicates with the Navis™ Optical EMS over a TCP/IP backbone network, a primary (and, if desired, secondary) transport bridge needs to be assigned.

Managing transport bridges

Once all of the NEs and transport bridges have been added and/or defined and the network is brought up, the Navis™ Optical EMS system administrator can reassign NEs to transport bridges as needed to load balance the OSI over TCP/IP data traffic. The Navis™ Optical EMS switches traffic for the target NE(s) to the newly assigned transport bridge(s) once the reassignment(s) is made.

The Manage Transport Bridges function is available as an Administration menu option in the Navis™ Optical EMS GUI.

Related information

See the related tasks in Chapter 3, “Management Communications Setup”.

Direct TCP/IP communications

In a ring of “pure” TCP/IP-connected NEs, each NE can have an IP address and a direct TCP/IP network connection to the Navis™ Optical EMS. Therefore, every NE in the ring may be accessed in the same way through the network and each NE could serve as a gateway network element for routing messages on behalf of the other NEs in the ring to/from the Navis™ Optical EMS. However, a single NE in the ring can be designated as the GNE for the subnetwork, via the Add/Modify an NE window in the GUI. An TCP/IP-connected GNE supports a TID/NSAP mapper to allow for routing of messages to other NEs, and Navis™ Optical EMS uses TIDs in messages to designate the destination NEs. NSAP addresses are used within the OSI-based Supervisory channels between NEs in a directly connected TCP/IP ring.

When an NE is manually added to the Navis™ Optical EMS database, you can specify whether the NE communicates through direct TCP/IP connection with the system or via a GNE.

All of the GNE provisioning that applies to X.25-connected NEs is also available for TCP/IP-connected GNEs, such as primary/backup GNE associations and multiple GNE designations in the same subnetwork for load balancing assignment of NEs (see the "X.25-based communications" (11-5) section). A major difference is that the Navis™ Optical EMS does not automatically identify a discovered TCP/IP-connected GNE because each NE in an TCP/IP ring of NEs can have an IP address and perform as a GNE. The TCP/IP-connected GNE(s) must be manually added as such to the Navis™ Optical EMS database or modified to be designated as a GNE.

Related information

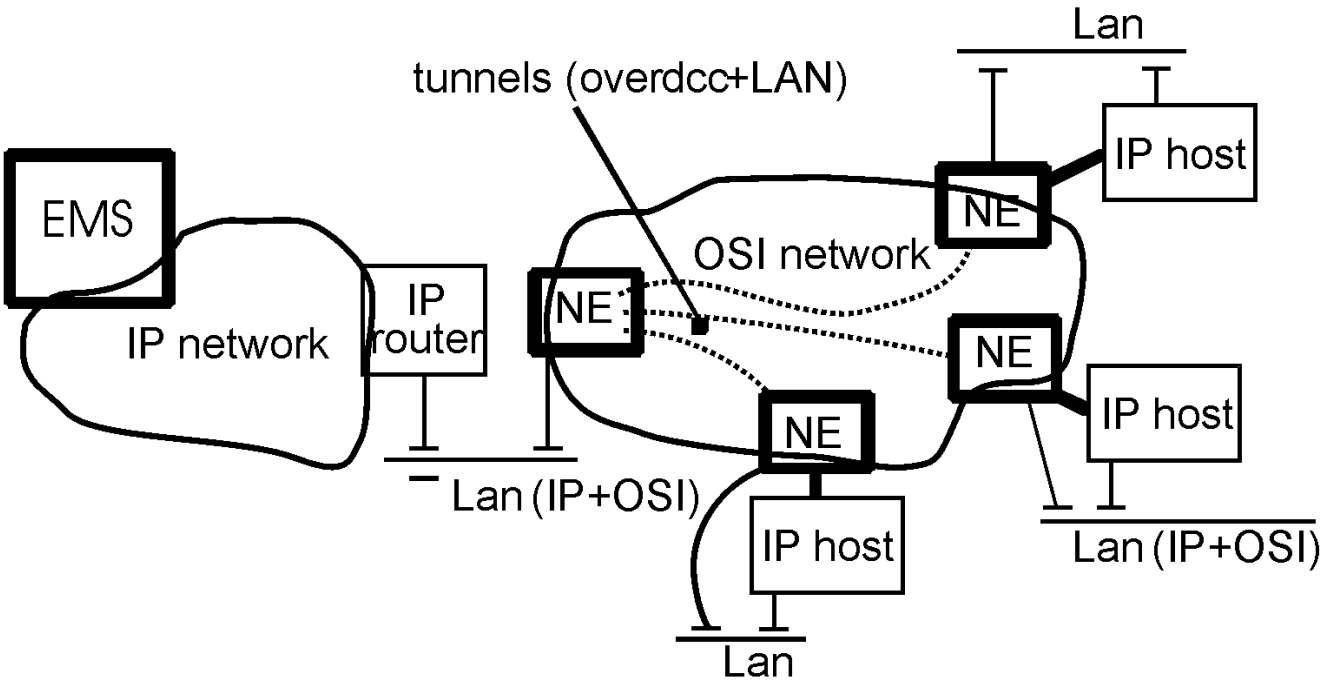
See the related tasks in Chapter 3, "Management Communications Setup".

IP tunneling

IP tunneling provides a way to manage IP-connected NEs through an OSI-based data communications network. With this concept, NEs that have a Dual Stack with Tunneling (DSwT) Configuration (for handling both OSI and IP traffic) are provisioned to deliver IP packets of data encapsulated in ConnectionLess Protocol (CLNP) Protocol Data Units (PDUs) across the OSI subnetwork and routed to other DSwT NEs accepting IP traffic at the edge of the OSI network, to pass along to IP-connected NEs in IP subnetworks.

The IP tunneling network topology

The following figure illustrates, at a high level, the use of IP tunneling in an OSI subnetwork of DSwT NEs.



IP Gateway NE

To facilitate the IP tunneling concept, a DSwT NE in each OSI subnetwork is selected as the IP Gateway NE. The IP Gateway NE:

- creates and hold entries in the TCP/IP subnetwork application context map. This map lists the IP addresses or host names of operations systems (OSs) and maps them to an OS application service/context (such as TL1 MAINTENANCE, TL1 MEMORY ADMINISTRATION) and allows these OS application services to be forwarded over a TCP/IP LAN connection through the IP Gateway NE to the OSI network of NEs to IP-connected managed devices in an IP subnetwork.
- To support the above function, the IP Gateway NE function is enabled on the selected IP Gateway NE, to allow pure TCP/IP to OSI conversion.

Each of the DSwT NEs with IP tunneling enabled has a second network layer entity (the IP router) add alongside the existing OSI

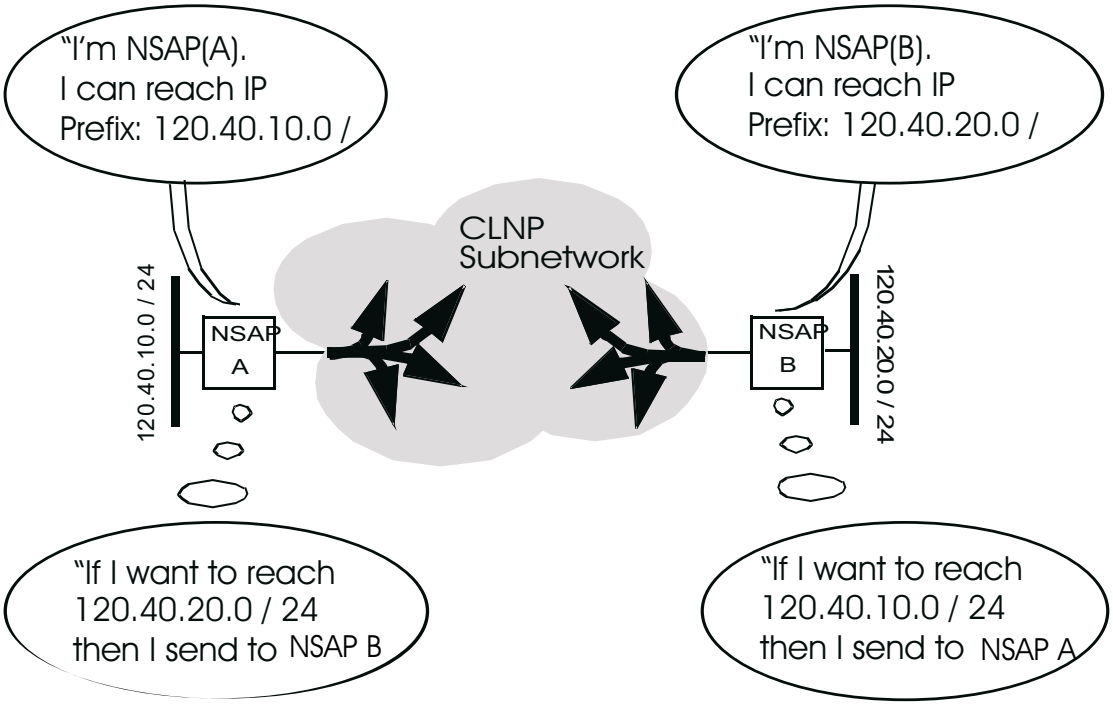
network layer entity (CLNP). The IP router entity has several “ports”, which, in the Dual Stack configuration, are attached to the DCC and LAN interfaces. These ports are defined logically on the DCC circuit pack when setting up the IP Gateway NE and each port number corresponds to a different access encoding method: Length Value, Raw, Telnet.

IP routing tables

Each NE involved in IP tunneling must have a table that determines the path (route) that an addressed data packet must follow to reach its destination NE. Unlike the CLNP network layer entity, which has the routing tables and the mechanisms to automatically populate them, the IP routing tables used for routing data packets through IP tunneling must be manually provisioned by the Navis™ Optical EMS system administrator through the IP Tunneling Provisioning window in the GUI. Each entry in the IP routing table defines the next hop NE and destination NE. To minimize the manual provisioning effort, a Lucent Technologies proprietary mechanism called Tunnel Auto Provisioning (TAP) is used. TAP allows IP routes known by DSwt NEs at the edge of the OSI network to be “advertised” across the OSI network to other DSwT NEs, which can then insert these IP route entries into their own routing tables.

The IP routing process

The following figure illustrates how IP routes are advertised using the TAP method.



Example of 2 DSwT nodes advertising the IP networks they can reach. Each Node learns the others advertised routes it hears and places them in its Routing Table.

Routing Table in A

Destination	Next Hop	
	Subnetwork	Node
120.40.20.0 / 24	CLNP-Tunnel	NSAP(B)

Routing Table in B

Destination	Next Hop	
	Subnetwork	Node
120.40.10.0 / 24	CLNP-Tunnel	NSAP(A)

Manual tunnel provisioning

IP tunnel routes that link multiple OSI areas must be provisioned manually by a Navis™ Optical EMS administrator to allow bidirectional communication between the manager in area 1 and the IP hosts in area 2, as well as all DSwT NEs in area 2.

Selection of the same IP prefix of the subnetwork address for all NEs in the same area, when defining the manual route, can allow all IP

subnets that are connected to area 2 to be reached through the same tunnel.

IP tunneling provisioning

There are three aspects of provisioning IP tunneling:

- Provisioning of the IP Gateway NE with IP tunneling enabled
- Enabling IP tunneling on each DSwT NE to allow IP data packets to be delivered through the OSI network, along with learning and advertising of the TAP routes and route properties
- Manually provisioning one-directional tunnel routes between NEs to link OSI areas

Related tasks

See the following related tasks in Chapter 3, "Management Communications Setup".

- "Provision an IP Gateway Network Element (for IP Tunneling)" (3-92)
- "Provision IP Tunnel Parameters" (3-96)
- "Manually Provision IP Tunnel Routes" (3-100)
- "Modify IP Tunnel Route Entries" (3-104)
- "Delete an IP Tunnel Route Entry" (3-107)

Ethernet services

Some NEs managed by the Navis™ Optical EMS, such as the Metropolis™ DMX and Metropolis™ DMX***press***, provide Ethernet services. These NE types can be equipped with either Gigabit Ethernet (1GbE) circuit packs, where the incoming signal is at 1B, or Fast Ethernet (FE) circuit packs, where the incoming signal can be at 10MB or 100MB. These circuit packs perform layer 2 IP switching in point-to-point and multipoint (spanning tree) configurations.

Ethernet ports

Ethernet circuit packs have two types of ports: Ethernet (LAN) and Virtual Concatenation Groups (VCGs). The number of Ethernet and VCG ports vary by circuit pack.

Ethernet ports (EPORTs) interface with the data network and receive the Ethernet packets. An Ethernet packet switch routes the packets to the appropriate VCG port(s). The VCGs encapsulate the Ethernet packets in a standard frame for transmission over the SONET/SDH network and assembles the packets into STS-1 groups that can then be

sent through the SONET/SDH network. The VCGs interface with the SONET network via cross-connections from the VCG tributaries to TDM tributaries.

Tagging modes

Each Ethernet data frame is "tagged" with addressing/routing data to determine its path through the appropriate ports to reach its destination.

There are three tagging modes used in Ethernet connections:

- IEEE 802.1q tagging mode
- Transparent mode
- No Tag (Private Line) mode

The IEEE802.1q tagging mode, which is supported by both 1GbE and FE circuit packs in Metropolis™ DMX and Metropolis™ DMX***press*** NEs, assigns a Virtual LAN (VLAN) ID to EPORTs and VCGs. The relationship between ports and VLANs is many-to-many and is user provisionable. The VLAN tag is part of the Ethernet frame received by the EPORT. In order for an Ethernet data packet to be routed to a port (EPORT or VCG), that port must be enabled for the VLAN. If the VLAN is not enabled for the port, the Ethernet packet is dsicared. A VLAN must be assigned to both an incoming EPORT and outgoing VCG to successfully transmit the data packet or it is discarded.

IEEE802.1q tagging mode supports untagged traffic by allowing a default VLAN value to be assigned to the EPORTs. If a default VLAN is assigned, the EPORt assigns the default VLAN to all untagged frames and the Ethernet switch in the circuit pack routes the data using this default value. A default VLAN of value "0" indicates that there is no default valueset and untagged frames are rejected.

Transparent tagging mode maps associated EPORTs and VCGs to a Port Tag. The Port Tag addresses the data and provides routing instructions. A single default Port Tag is assigned to EPORTs. All traffic routed to the associated EPORTs are assigned the default Port Tag, whether or not the data already has a VLAN assigned to it or not, and is routed through the circuit pack's Ethernet switch using the Port Tag (instead of the VLAN). The switch routes a packet to the VCG appropriate for the destination only if the Port Tag of the packet is enabled for that VCG. If the Port Tag is not enabled for the port, the Ethernet data packet is discarded.

No Tag (Private Line) Mode is only applicable for 1GbE circuit packs. In No Tag Mode, EPORT #1 is automatically connect by the NE to VCG #1 and EPORT #2 is automatically connected to VCG #3. VCG #2 and VCG #4 are not used. The connections between EPORTs and VCGs cannot be provisioned.

Related tasks

- "Provision an Ethernet Connection (IEEE.1Q Tagging Mode)" (3-125)
- "Add a Spanning Tree Group" (3-132)
- "Provision a Virtual Switch" (3-110)

Virtual switch

A virtual switch is provisioned to define the LAN/WAN usage of the subnetwork. A virtual switch is a logical grouping of ports that partitions the Ethernet ports on a circuit pack so that there is only connectivity between ports within a virtual switch.

The IEEE 802.1q and Transparent tagging modes require provisioning of virtual switches. Virtual switches are not used for the No Tag tagging mode.

DCC management

The Data Communicatons Channels (DCCs) are designated overhead bits on SONET/SDH optical ports. These overhead bits can be used by a customer (or the NE) as low bandwidth communication channels to the remote NE that terminates the optical fiber.

For most NE types, a DCC circuit pack in a shelf controls all DCC channels for fibers terminated by that shelf. For each fiber controlled by the DCC circuit pack, the Navis™ Optical EMS allows you to configure:

- whether the DCC channel on the associated fiber is enabled or disabled
- whether the DCC channel is a network or user side connection (similar in concept to the Data Terminating Equipment (DTE)/Data Connecting Equipment (DCE)

The Navis™ Optical EMS allows you to view and configure:

- Protocol properties of the DCC channel for different OSI management layers (Physical Layer/LAN, Network Layer)
- TID Address Resolution Protocol (TARP) properties used on the DCC channels to communicate with remote NEs
- the DCC optical port parameters for terminating and originating points on the DCC circuit packs

Related tasks

See the following related tasks in Chapter 3, "Management Communications Setup":

- "Provision DCC Configuration" (3-79)
- "Provision DCC Terminations" (3-86)
- "View DCC Terminations" (3-90)

NE application services

All NEs (with the exception of the WaveStar pre-Release 6.0 WaveStar® OLS 1.6T NE) are managed by the Navis™ Optical EMS through the issue and receipt of alarm, provisioning, and autonomous event messages in the form of TL1 commands.

Release 5.0 and earlier of the WaveStar® OLS 1.6T NE sends and receives requests from the Navis™ Optical EMS application using Common Management Information Service Element (CMISE) application service requests in Common Management Information Protocol (CMIP) message format.

TL1 messages

For TL1-based communications, southbound TL1 command/responses from the Navis™ Optical EMS to the NEs are handled by the TL1 Manager.

CMISE/CMIP messages

For NEs that use CMISE services, such as Release 5.0 and earlier of the WaveStar® OLS 1.6T, messages that are exchanged between the NE and the Navis™ Optical EMS must be "mapped" to their Management Functional Area (MFA) service/request through the QA Adaptor process.

The Connection Manager process

The Connection Manager (CM) process centralizes the functions of sending, receiving, and routing messages, and managing the

connections needed for responses and autonomous messages going in, and coming from, the CMISE and TL1 Southbound subsystems.

The Gateway process

The Gateway process receives requests from the Connect Manager and forwards them to the QA Adaptor process.

The Q-Adaptor process

For CMISE messages, the Q-Adaptor process identifies the object class or attribute contained in the CMISE message and translates it into the TID or AID of the NE or Alarm Issuing Point (AIP) and forwards the command to the NE. Responses from the NE to the EMS are also handled.

SONET directory services

The Navis™ Optical EMS supports the SONET Directory Services (SDS) feature. This feature allows the Navis™ Optical EMS to obtain directory/addressing information about a new NE through an intermediate device or "agent" with a centralized directory of NE data as soon as the NE is discovered, rather than having to contact the NE directly.

Components of the SDS feature

Important! The Navis™ Optical EMS currently supports Release 1.0 through Release 3.2 of the WaveStar® NCC. Future releases of the WaveStar® NCC may not be supported by the Navis™ Optical EMSand the WaveStar® NCC product will be eventually phased out. The Directory Services Agent (DSA) functionality provided by the WaveStar® NCC will be assumed by the Navis™ Optical EMS. The TCP/IP Gateway NE (GNE) functionality currently provided by the WaveStar® NCC will be assumed by a WaveStar® BWM, a WaveStar® TDM 2.5G, or aWaveStar® TDM 10G, respectively, for these NE types to communicate with the Navis™ Optical EMS host.

There are various processor roles performed by an NE, the EMS (Navis™ Optical EMS), or a WaveStar® NCC in the exchange of

directory information during the SDS process. The various processor roles are:

- ***Directory Services Agent (DSA)***—The DSA accesses the T1.245 Directory (the centralized directory of NE addressing information) on behalf of a “user”. In this case, the “user” is an NE registering with the T1.245 Directory or the EMS querying the T1.245 Directory.
- ***Directory User Agent (DUA)***—The DUA represents the “user” during interactions with a DSA. In this case, the “user” is an NE registering with the T1.245 Directory or the EMS querying the T1.245 Directory.
- ***Directory Information Base (DIB)***—A DIB is the set of information managed by the T1.245 Directory. Information is stored in the DIB as a tree structured database.
- ***Registration Agent (RA)***—The RA is an application process that determines, from the Registration Manager (RM) process, the address of the appropriate DSA for registering with a T1.245 Directory, plus its T1.245 Directory DIB Prefix. The DIB Prefix is a sort of “area code” for locating and identifying the addresses of NEs in the T1.245 Directory. Via its associated DUA, the RA initiates registration with the appropriate DSA for entry into the T1.245 Directory.
- ***Registration Manager (RM)***—The RM communicates with RAs in its OSI Level 1 area to provide the RA with the address of the appropriate DSA with which to register, plus its T1.245 DIB Prefix.

The DUA uses Directory Access Protocol (DAP) to contact the designated DSA to obtain directory information.

Designated DSA

Important! The Navis™ Optical EMS currently supports Release 1.0 through Release 3.2 of the WaveStar® NCC. Future releases of the WaveStar® NCC may not be supported by the Navis™ Optical EMSand the WaveStar® NCC product will be eventually phased out. The Directory Services Agent (DSA) functionality provided by the WaveStar® NCC will be assumed by the Navis™ Optical EMS. The TCP/IP Gateway NE (GNE) functionality currently provided by the WaveStar® NCC will be assumed by a WaveStar® BWM, a WaveStar® TDM 2.5G, or aWaveStar® TDM 10G, respectively, for these NE types to communicate with the Navis™ Optical EMS host.

An NCC or the Navis™ Optical EMS application itself can serve as the DSA. The DSA accesses the T1.245 Directory (DIB) for NE directory information.

Whether the T1.245 Directory with the DIB Prefix information resides in a WaveStar® NCC or Navis™ Optical EMS itself depends on which is going to be provisioned to serve as a DSA. The SDS process varies, depending on whether an NCC or the EMS itself is serving as the DSA. The processing details for each are provided in the "SDS with an NCC as DSA" (11-25) and "SDS with Navis™ Optical EMS as DSA" (11-27) sections that follow.

The Navis™ Optical EMS administrator has two choices for designating a DSA:

- A WaveStar® NCC with DSA functionality enabled
- An EMS-based DSA in the same Navis™ Optical EMS application

Overwriting NE directory information by SDS

If the NE directory information returned by the designated DSA (in response to an SDS query by Navis™ Optical EMS) includes an NE that has already been manually added to the Navis™ Optical EMS T1.245 DIB, Navis™ Optical EMS overwrites the Local DIB information for that NE with the directory information obtained by the DSA process.

The RA function

The Navis™ Optical EMS currently does not support the RA function, which means that the DSA must be selected manually through the Navis™ Optical EMS GUI.

SDS with an NCC as DSA

Important! The Navis™ Optical EMS currently supports Release 1.0 through Release 3.2 of the WaveStar® NCC. Future releases of the WaveStar® NCC may not be supported by the Navis™ Optical EMSand the WaveStar® NCC product will be eventually phased out. The Directory Services Agent (DSA) functionality provided by the WaveStar® NCC will be assumed by the Navis™ Optical EMS. The TCP/IP Gateway NE (GNE) functionality currently provided by the WaveStar® NCC will be assumed by a WaveStar® BWM, a WaveStar® TDM 2.5G, or aWaveStar® TDM 10G, respectively, for these NE types to communicate with the Navis™ Optical EMS host.

This section describes how SDS works with a WaveStar® NCC serving as the DSA for obtaining NE directory information. The process described assumes an OSI-based network of NEs. However, the process would be similar in a TCP/IP-based network.

The process is as follows:

1. At least one WaveStar® NCC is installed and brought into service with DSA functionality enabled, using TL1 commands issued to the NCC through a Communications Interface Terminal (CIT). The T1.245 DIB is set up with its T1.245 DIB Prefix information and the DSA address information in the RM process, which resides in the WaveStar® NCC.
2. The Navis™ Optical EMS is installed and brought into service with DSA disabled through an option in the installation program (for more details about intallation procedures, refer to the *Navis™ Optical EMS Installation Guide*). It is provisioned with the T1.245 DIB Prefix information which is used to query the designated DSA.
3. A user adds the WaveStar® NCC/DSA into the Navis™ Optical EMS using the Add an NE window in the GUI.
4. A user selects the WaveStar® NCC/DSA using the Provision DSA window in the Navis™ Optical EMS GUI to be used by the Navis™ Optical EMS to obtain directory information from the T1.245 Directory.
   The WaveStar® NCC/DSA must be manually selected through the GUI because the Navis™ Optical EMS does not currently provide RA functionality.
5. As NEs are brought into service, the RM process in the NCC recognizes that a new NE has been added to the OSI Level 1 area.
6. The WaveStar® NCC, serving as the RM, communicates with the RA in the new NE and provides the NE's RA process with the appropriate DSA address.
7. The RA in the new NE uses its DUA process to communicate, using DAP, to communicate with the DSA/NCC and send the directory data to the NCC/DSA.

8. The DSA process in the NCC registers the NE in the NCC's T1.245 Directory (DIB). The NCC issues a REPT-DBCHG message to the Navis™ Optical EMS, indicating that there has been a change to the DIB.
9. The DUA in the Navis™ Optical EMS contacts the DSA/NCC using DAP and retrieves the directory information to store in its Local DIB.

The WaveStar® NCC/DSA periodically checks whether any new NEs have been discovered (registered) in the T1.245 DIB. If it discovers a new NE, the WaveStar® NCC/DSA notifies the Navis™ Optical EMS that there has been an update to the T1.245 Directory. Navis™ Optical EMS, serving as a DUA, queries the WaveStar® NCC/DSA for the updated information. The WaveStar® NCC/DSA retrieves the updated information and sends it to the Navis™ Optical EMS to store in its Local DIB. The EMS Local DIB contains the NEs from the WaveStar® NCC's T1.245 DIB which are associated with the Navis™ Optical EMS DIB Prefix, as well as any NEs that have been manually added through the GUI.

NCC-based DSA alarms

Alarms generated by the WaveStar® NCC/DSA are the same as alarms generated by any other NE and are shown in the alarm summary for the NCC.

SDS with Navis™ Optical EMS as DSA

This section describes how SDS works when the designated DSA is the application residing in the Navis™ Optical EMS application itself and the T.1245 DIB containing directory information for registered NEs resides on the Navis™ Optical EMS host. The process described assumes an OSI-based network of NEs.

The process is as follows:

1. The Navis™ Optical EMS is installed and brought into service. During installation, the Navis™ Optical EMS DSA is activated. The T1.245 Directory (DIB) residing with the Navis™ Optical EMS application is provisioned with the DIB Prefix information used to query the EMS-based DSA process for directory information.
2. The EMS-based DSA will be the default in the Provision DSA window in the Navis™ Optical EMS GUI to be used to obtain directory information about trhe NEs from the T1.245 Directory.

3. The administrator must provision one NE in an OSI Level 1 area serving as the RM with the EMS-based DSA address and the T1.245 DIB Prefix of the NE. Navis™ Optical EMS does not support RM functionality.
4. As NEs are brought into service, the RM process in an NE recognizes that a new NE has been added to the OSI Level 1 area.
5. The RM process in the designated Level 1 NE communicates with the RA application in the newly added NE(s) and provides the NE's RA process with the appropriate DSA address(es) (DIB Prefix) and the T1.245 DIB Prefix of the DSA for registration.
6. The RA in the new NE uses the DUA functionality co-resident in the NE to communicate with the DSA application in Navis™ Optical EMS to register the NE in the EMS-based T1.245 Directory (DIB).
7. The DUA in Navis™ Optical EMS contacts the DSA process in the EMS using DAP and sends the directory information to store in the Navis™ Optical EMS Local DIB.

The DSA process in the Navis™ Optical EMS application periodically checks whether any new NEs have been discovered (registered) in the T1.245 DIB. If it discovers a new NE, the DSA process detects the the DIB change and notifies the other apppropriate subsystems in the application that there has been a change in the T1.245 DIB. The Navis™ Optical EMS then queries the DSA process for the newly discovered NE(s) in the DIB using the T1.245 DIB Prefix in its directory. The information is sent to the DUA process of the EMS to update the EMS Local DIB. The Local DIB contains NE information discovered through the SDS process as well as any NEs that have been manually added through the Navis™ Optical EMS GUI.

Related information

See the related tasks in Chapter 3, "Management Communications Setup".

Manually adding NEs into the T1.245 directory

NEs can be manually added to the Navis™ Optical EMS T1.245 DIB. NE information can also be modified or deleted from the EMS-based DIB.

Related information

See the related tasks in Chapter 3, “Management Communications Setup”.

EMS-based DSA and the Add an NE window

If the EMS-based DSA process is enabled, the Add an NE window in the GUI is disabled. In this case, NEs and associated directory information must be manually added into the Navis™ Optical EMS T1.245 DIB. FT-2000 LCT NEs are not added to the T1.245 DIB through this process, but can be manually added through the GUI using the Add an NE window.

Subnetwork discovery and SDS

This section provides a high-level overview of the Navis™ Optical EMS Subnetwork Discovery and SDS capabilities. This section also provides a series of examples of how the Navis™ Optical EMS can discover NEs that communicate with the Navis™ Optical EMS via a variety of interfaces.

There are three methods that Navis™ Optical EMS can use to discover the subnetwork of NEs it manages:

- Discovery via SDS
- Discovery via Subnetwork Dynamic Network Operations (DNO)
- Manual addition of NEs

Under the SDS scenario, NEs automatically register with the SDS Directory Services Agent (DSA), are registered via another NE using T5GW functionality, or are manually added to the DSA. The DSA functionality can be located in a WaveStar® NCC NE or in the Navis™ Optical EMS itself.

The following table describes the DSA registration capabilities of each NE type supported by the Navis™ Optical EMS. Note that these NE capabilities to register with a DSA apply to both an NCC-based and the Navis™ Optical EMS-based DSA. Using its Directory User Agent (DUA) functionality, the Navis™ Optical EMS queries the DSA to discover the NEs. The Navis™ Optical EMS then logs into each discovered NE, inventories the NE via DNO, and discovers the network topology via Subnetwork DNO.

NE Type	Automatically Registers with DSA?	Manual Registration
WaveStar® BWM (R. 2.0)	Yes	Yes
WaveStar®NCC	Yes	Yes
WaveStar® OLS 1.6T	Yes	Yes
WaveStar® TDM 2.5G	Yes*	Yes
WaveStar®TDM 10G	No	Yes
FT-2000 LCT R. 4.0	No	No
Metropolis™ EON	No	No
LambdaRouter™ 128/256 AOS	No	No
Metropolis™ DMX	No	No

Notes:

1. * Requires Registration Manager (RM) from another NE

Under the Subnetwork DNO scenario, the user manually adds one NE per subnetwork to the Navis™ Optical EMS and the Navis™ Optical EMS then automatically discovers the other NEs via its Subnetwork DNO capability. After the first NE is manually added to the Navis™ Optical EMS, the system logs into that NE, inventories the NE via DNO, and discovers its neighbors via Subnetwork DNO. The Navis™ Optical EMS then logs into the neighbors of the first NE, logs into those NEs, and repeats the process until all NEs within the subnetwork are discovered. This method does not work currently with WaveStar® BWM NEs because they do not return the System Controller NSAP to the Navis™ Optical EMS. Thus, Navis™ Optical EMS must use TARP to obtain the proper NSAP address. Subnetwork discovery and automatic logging into WaveStar®WaveStar® BWM NEs is not available if a WaveStar® NCC is being used as a transport bridge, because TARP does not work with a TCP/IP network.

Under the Manual Addition scenario, the user manually adds NEs to the Navis™ Optical EMS via the Add an NE window in the GUI. As

NEs are added, the user either can manually trails between the NEs or can invoke Subnetwork DNO to automatically discover trails.

It is possible to use a combination of each of the above three scenarios to fully discover all of the NEs managed by the Navis™ Optical EMS.

Subnetwork discovery and NE password aging (WaveStar® BWM and WaveStar® TDM 10G NEs)

WaveStar® BWM and WaveStar® TDM 10G NEs have a password aging feature for security reasons. When a software upgrade is performed for one of these NE types, one of the default NE passwords used to log into the NE to perform the upgrade automatically expires upon first use, and must be changed by the CIT. These default NE passwords are used by the Navis™ Optical EMS to log into the NE and obtain information during the subnetwork autodiscovery process. The default NE passwords changed by the CIT during the software upgrade may not be known by the Navis™ Optical EMS. However, as long as the second default NE password remains the same, the Navis™ Optical EMS will be able to use it to log into the NE during subnetwork autodiscovery.

Once the Navis™ Optical EMS has been able to log into a WaveStar® BWM or WaveStar® TDM 10G NE using the unchanged default NE password, you should use the Global Password Administration feature described in this task to manually change the NE password of the Super User Login that was changed by the CIT during installation. Then, the Navis™ Optical EMS has access to both Super User NE logins/passwords to log into WaveStar® BWM and WaveStar® TDM 10G NEs.

If one or both passwords that the Navis™ Optical EMS used to successfully log into a WaveStar® BWM or WaveStar® TDM 10G NE expire, Navis™ Optical EMS issues an `ed-PID` command to change the passwords of the NE Super User logins to SNC+01 and WBM+01. If either or both of these NE passwords have expired, the Navis™ Optical EMS uses the secondary passwords SNC+02 and WBM+02.

If both NE passwords have been changed through the CIT, and you do not know what the new NE passwords are, use the Modify an NE window in the Navis™ Optical EMS GUI to change/modify the NE passwords. You do not have to know the existing passwords that were defined through the CIT.

The password aging feature for WaveStar® BWM and WaveStar® TDM 10G NEs can be turned off via the CIT or by issuing the appropriate TL1 command through the Navis™ Optical EMS Cut-Through feature. Refer to the NE hardware documentation for the TL1 command needed to turn off the password aging feature.

Southbound communications

Southbound communications refers to the interface between the Navis™ Optical EMS and the NEs it manages. The type of Southbound communications interface used can affect the Navis™ Optical EMS Subnetwork Discovery procedures.

The Navis™ Optical EMS supports four types of Southbound interfaces

- Pure (7-layer) Open System Interconnection (OSI)
- OSI over Transmission Control Protocol/Internet Protocol (TCP/IP)
- Pure TCP/IP
- X.25

The following table indicates, by NE type, the interfaces supported to an operations system (OS).

NE Type	Pure OSI	OSI over TCP/IP	Pure TCP/IP	X.25
WaveStar® BWM	Yes	Yes*	No	No
WaveStar® NCC	Yes	Yes	No	No
WaveStar® OLS 1.6T	Yes	Yes*	No	No
WaveStar® TDM 2.5G	Yes	Yes*	No	No
WaveStar® TDM 10G	No	Yes*	No	No
FT-2000 LCT	No	No	No	Yes
Metropolis™ EON	Yes	No	No	No
LambdaRouter™ 128/256 AOS	No	No	Yes	No
LambdaUnite™MSS	Yes	No	No	No
Metropolis™ DMX***press***	No	No	Yes	No

Notes:

1. * Requires an external transport bridge (WaveStar®NCC or NE with Transport Bridge capability enabled)

Subnetwork discovery examples

The following subsections describe the steps needed for the Navis™ Optical EMS to discover a subnetwork of NEs under various scenarios related to the type of Subnetwork Discovery coupled with the Southbound interface type.

SDS discovery using Navis™ Optical EMS-based DSA via OSI southbound interface

For the purposes of this example, it is assumed that each NE in the subnetwork can automatically register with the DSA.

1. Using the NE Craft Interface Terminal (CIT), NEs are configured with the minimum system configuration, including the NSAP address.
2. The Navis™ Optical EMS-based DSA is activated during installatIon and the Directory Information Base (DIB) Prefix is provisioned. The Navis™ Optical EMS-based DSA is provisioned as the designated DSA for this Navis™ Optical EMS application using the Provision DSA window in the GUI.
3. The OSI Data Communications Network (DCN) is provisioned and the Navis™ Optical EMS is connected to one or more NEs in each NE subnetwork.
4. One Registration Manager (RM) in an NE is activated per OSI Level 1 area. The RM is provisioned with the DSA address of the Navis™ Optical EMS (the Navis™ Optical EMS NSAP address) and the same DIB Prefix as provisioned in the Navis™ Optical EMS.
5. The RM communicates with the Registration Agent (RA) functionality in each of the NEs in its OSI Level 1 area, and provides them with the DSA address (the Navis™ Optical EMS NSAP) and the DIB Prefix. Each NE registers with the Navis™ Optical EMS-based DSA under the DIB Prefix provided by the RM. Each NE registers with information including its TID and NSAP address.

6. The Navis™ Optical EMS DUA queries the Navis™ Optical EMS-based DSA for all NEs under the DIB Prefix provisioned within Navis™ Optical EMS. The Navis™ Optical EMS-based DSA responds with information on each NE that has registered the appropriate DIB Prefix.
7. The Navis™ Optical EMS establishes an association with each discovered NE and logs into each NE. Upon successful login, Navis™ Optical EMS inventories the NE using DNO and discovers the neighbors of the NE via Subnetwork DNO. The NE neighbor information is used to automatically discover trails between the NEs because the DSA information does not include any network topology information.

SDS discovery using NCC-Based DSA via OSI southbound interface

Important! WaveStar® TDM 10G (STM-64) NEs currently cannot automatically register with the DSA. You must manually add this type of NE to the T1.245 directory; the Navis™ Optical EMS database is periodically resynched with the NE information in the T1.245 directory.WaveStar® OLS 1.6T NEs can be autodiscoverd through an NCC-based DSA if the WaveStar® NCC is also serving as a transport bridge in an OSI over TCP/IP backbone network or if they communicate via straight OSI with no WaveStar® OLS 1.6T NE serving as a transport bridge.

For the purposes of this example, it is assumed that each NE in the subnetwork can automatically register with the DSA.

1. Using the NE CIT, NEs are configured with the minimum system configuration, including the NSAP address.
2. The DSA function is enabled in one WaveStar® NCC NE in the subnetwork. A DIB Prefix is provisioned in the WaveStar® NCC-based DSA, where this DIB Prefix is the same as the one used by the Navis™ Optical EMS DUA (see step 4).
3. The OSI DCN is provisioned and Navis™ Optical EMS is connected to one or more NEs in each NE subnetwork.
4. The WaveStar® NCC with DSA enabled is manually added to the Navis™ Optical EMS using the Add an NE window in the GUI. This WaveStar® NCC is also designated as DSA for this Navis™ Optical EMS application by the user via the Provision DSA window in the GUI. The Navis™ Optical EMS is provisioned with the same DIB Prefix as used in the NCC DSA.

5. One RM in an NE is activated per OSI Level 1 area. The RM is provisoned with the DSA address of the WaveStar®NCC with DSA enabled (the NCC NSAP address) and the same DIB Prefix as provisioned in the NCC DSA.
6. The RM communicates with the RA functionality in each of the NEs in the its OSI Level 1 area, and provides them with the DSA address (the NcC NSAP) and DIB Prefix. Each NE registers with the NCC-based DSA under the DIB Prefix provided by the RM. Each NE registers with information, including its TID and NSAP address.
7. The NCC sends the Navis™ Optical EMS a `REPT-DBCHG` TL1 message indicating that there has been a change to the WaveStar® NCC-based DSA (specifically, one or more new NEs have registed with the WaveStar®NCC-based DSA).
8. The Navis™ Optical EMS DUA queries the NCC-based DSA for all NEs under the DIB Prefix provisioned within the Navis™ Optical EMS. The NCC-based DSA responds with information on each NE that has registered under the appropriate DIB Prefix.
9. The Navis™ Optical EMS establishes an association with each discovered NE and logs into each NE. Upon successful login, the Navis™ Optical EMS inventories the NE using the DNO and discovers the neighbors of the NE via Subnetwork DNO. The NE neighbor information is used to automatically discover trails between the NEs because the DSA information does not include any network topology information.

SDS discovery using the Navis™ Optical EMS-Based DSA via OSI over TCP/IP southbound interface

Important! WaveStar® TDM 10G (STM-64) NEs currently cannot be automatically register with the DSA. You must manually add this type of NE to the T1.245 directory; the Navis™ Optical EMS database is periodically resynched with the NE information in the T1.245 directory.

The RM in WaveStar® BWM NEs cannot be provisioned with both the NSAP address of the transport bridge and the IP address of Navis™ Optical EMS. If a WaveStar® BWM NE is set up as an RM, WaveStar® BWM NEs registration will only work with the Navis™

Optical EMS-based DSA if they communicate through straight OSI (with no transport bridge).

1. Using the NE CIT, NEs are configured with the minimum system configuration, including the NSAP address.
2. The transport bridge function is enabled in one or more WaveStar® OLS 1.6T or WaveStar® NCC NEs in the subnetwork.
3. The Navis™ Optical EMS-based DSA is activated during installation and the DIB Prefix is provisioned. The Navis™ Optical EMS-based DSA is provisioned as the designated DSA for this Navis™ Optical EMS application via the Provision DSA window in the GUI.
4. The TCP/IP DCN is provisioned and the Navis™ Optical EMS is connected to one or more transport bridge NEs in each NE subnetwork.
5. At least one of the transport bridge NEs is manually added to the Navis™ Optical EMS using the Add an NE window in the GUI.
6. One RM in an NE is activated per OSI Level 1 area. The RM provisioned with the DSA address of the Navis™ Optical EMS (the Navis™ Optical EMS IP address and a transport bridge NE NSAP address) and the same DIB Prefix as provisioned in the Navis™ Optical EMS.
7. The RM communicates with the RA functionality in each of the NEs in its OSI Level 1 area and provides them with the Navis™ Optical EMS-based DSA address and the DIB Prefix. Each NE registers, via a transport bridge, with the Navis™ Optical EMS-based DSA under the DIB Prefix provided by the RM. Each NE registers with information including its TID and NSAP address.
8. The Navis™ Optical EMS DUA queries the Navis™ Optical EMS-based DSA under the DIB Prefix provided by the RM. Each NE registers with information including its TID and NSAP address.
9. The Navis™ Optical EMS establishes an association with each discovered transport bridge NE and adds that NE to a list of transport bridge NEs.

10. For non-transport bridge NEs, the Navis™ Optical EMS automatically assigns a primary transport bridge to each NE using the rule that the NE should be in the same Routing Domain as its transport bridge. The Navis™ Optical EMS establishes an association with each discovered NE, via its primary transport bridge, and logs into each NE. Upon successful login, the Navis™ Optical EMS inventories the NE using DNO and discovers the neighbors of the NE via Subnetwork DNO. The NE neighbor information is used to automatically discover trails between the NEs because the DSA information does not include any network topology information.
11. The user can manually change primary transport bridge assignments in the Navis™ Optical EMS via the GUI for load-balancing purposes. For reliability purposes, the user can also manually add a secondary transport bridge to some or all of the NEs. It is noted that the Navis™ Optical EMS does not automatically assign secondary transport bridges to any NEs.

Subnetwork DNO discovery via OSI over TCP/IP southbound interface (no DSA)

This scenario cannot be used to automatically discover BWM NEs because the NSAP address reported for BWM NE neighbors is the NSAP address of the WaveStar® BWM input/output (I/O) shelf, not of the WaveStar® BWM System Controller; thus, the Navis™ Optical EMS is not able to log into WaveStar® BWM NEs discovered as a neighbor of the NE. Because the Navis™ Optical EMS cannot log into the BWM NEs discovered in this manner, these WaveStar® BWM NEs have a non-communicating NE status (shown on the Navis™ Optical EMS GUI network map as an NE icon color of magenta) and the Subnetwork DNO process is halted.

1. Using the NE CIT, NEs are configured with the minimum system configuration, including the NSAP address.
2. The transport bridge function is enabled in one or more WaveStar® OLS 1.6T or WaveStar® NCC NEs in the subnetwork.
3. The TCP/IP DCN is provisioned and the Navis™ Optical EMS is connected to one or more transport bridge NEs in each NE subnetwork. If the NE is located in a different subnetwork than the Navis™ Optical EMS host, a router is needed between the NE and Navis™ Optical EMS host.

4. One NE in each subnetwork is manually added to the Navis™ Optical EMS via the Add an NE window in the GUI. This includes manual assignment of a primary transport bridge to the NE.
5. The Navis™ Optical EMS establishes an association via the primary transport bridge with that NE and logs into the NE. Upon successful login, the Navis™ Optical EMS inventories the NE using DNO and discovers the neighbors of the NE via Subnetwork DNO.
6. The Navis™ Optical EMS assigns a primary transport bridge NE to each NE neighbor of the first NE using the rule that the NE should be in the same Routing Domain as its transport bridge, establishes an association via the primary transport bridge with each NE, and logs into each NE. Upon successful login, Navis™ Optical EMS inventories the NEs and invokes Subnetwork DNO again to find new NE neighbors.
7. If an NE neighbor of the first NE is a transport bridge, the Navis™ Optical EMS adds that NE to the list of transport bridge NEs.
8. The process continues until no new NE neighbors are discovered via the Subnetwork DNO process.
9. The user can manually change primary transport bridge assignments in the Navis™ Optical EMS via the GUI for load-balancing purposes. For reliability purposes, the user can also manually add a secondary transport bridge to some or all of the NEs. Note that the Navis™ Optical EMS does not automatically assign secondary transport bridges to any NEs.

Subnetwork DNO discovery via pure TCP/IP southbound interface (no DSA)

This scenario currently applies only to “pure” TCP/IP-connected NEs.

1. Using the NE CIT, NEs are configured with the minimum system configuration, including the NSAP address.
2. The pure TCP/IP DCN is provisioned and the Navis™ Optical EMS is connected to one or more NEs in each NE subnetwork. If the NE is located in a different subnetwork than the Navis™ Optical EMS host, a router is needed between the NE and Navis™ Optical EMS host.

3. One NE in each subnetwork is manually added to theNavis™ Optical EMS using the Add an NE window in the GUI, including the NE's IP address. This NE is defined as a Gateway Network Element (GNE).
4. The Navis™ Optical EMS establishes an association with the GNE and logs into the GNE. Upon successful login, the Navis™ Optical EMS inventories the GNE using DNO and discovers the neighbors of the GNE via Subnetwork DNO.
5. The Navis™ Optical EMS associates these NE neighbors (called Remote Network Elements [RNEs]) with the GNE, establishes an association via the GNE with each neighbor of the GNE and logs into each RNE. Upon successful login, the Navis™ Optical EMS inventories the RNEs and invokes Subnetwork DNO again to find new NE neighbors.
6. The process continues until no new NE neighbors are discovered via the Subnetwork DNO process.

To simplify the above scenario, a single GNE is assumed per subnetwork. For reliability purposes, multiple GNEs can be assigned to each subnetwork where some RNEs communicate with the Navis™ Optical EMS via one GNE and other RNEs communicate with the Navis™ Optical EMS via another GNE. If one GNE loses communications with Navis™ Optical EMS, the RNEs using that failed GNE can communicate using the other GNE.

Subnetwork DNO discovery via X.25 southbound interface (no DSA)

This scenario currenly only applies to FT-2000 LCT NEs.

1. Using the NE CIT, NEs are configured with the minimum system configuration, including the NSAP address.
2. The X.25 DCN is provisioned and Navis™ Optical EMS is connected to one or more NEs in each NE subnetwork. This Navis™ Optical EMS-to-NE connection can be via X.25 Permanent Virtual Circuits (PVCs) or X.25 Switched Virtual Connections (SVCs).
3. One NE in each subnetwork is manually added to Navis™ Optical EMS via the Add an NE window in the GUI, including assignment of one or more PVCs or SVCs to the NE. This NE serves as the GNE.

4. The Navis™ Optical EMS uses an SVC or PVC to communicate with the GNE and logs into the GNE. Upon successful login, the Navis™ Optical EMS inventories the GNE using DNO and discovers the neighbors of the GNE via Subnetwork DNO.
5. The Navis™ Optical EMS associates these NE neighbors (called Remote Network Elements [RNEs]) with the GNE, establishes an association via the GNE with each neighbor of the GNE and logs into each RNE. Upon successful login, Navis™ Optical EMS inventories the RNEs and invokes Subnetwork DNO again to find new NE neighbors.
6. The process continues until no new NE neighbors are discovered via the Subnetwork DNO process.

NSAP address entry

The following table lists the NSAP address fields, indicates field defaults, character widths, and which fields are editable in the GUI.

Field Name	Notes	NE(s)	Default	Octet Size	Editable?
AFI	Area Format Identifier.	All	0x39	1	Yes
IDI + pad	Initial Domain Part.	All	0x840 0xF	2	Yes
DFI	Domain Format Identifier. Specifies format for rest of address.	All	0x80	1	Yes
Operator ID		All	0x000000	3	Yes
Reserved	Currently not used. Reserved for future use.	All	0x0000	2	No
Routing Domain	NSAP unique Routing Domain within an administrative domain.	WaveStar® NCC, WaveStar®BWM, WaveStar®OLS 1.6T	0x0000	2	Yes

Field Name	Notes	NE(s)	Default	Octet Size	Editable?
Area	NSAP Area Identifier. Identifies NEs in the same area.	All	0x0000	2	Yes
System ID	System Identifier. This field is used to guarantee that NSAP address is globally unique.	All	no default	1	Yes
SEL	NSAP Selector. Used to differentiate multiple NSAP addresses associated with same End System.	All	0x1D*	1	No

Notes:

1. *The value of the SEL field is 1D hex when TP4 is run over CLNP.

The System ID field is not defaulted, but is mandatory.

Important! All of the NSAP address fields, except for the Reserved and SEL fields, are editable on the Add a Network Element to the DIB window in the GUI.

Non-managed devices

NEs that are not managed by the Navis™ Optical EMS are treated as "non-managed devices" and are added as such in the Navis™ Optical EMS database after the autodiscovery process to complete the network model and to avoid repeated attempts by the Navis™ Optical EMS to log into these NEs.

Network topology quick reference

This section summarizes the communication protocols, methods of adding NEs to the Navis™ Optical EMS database (manual addition, DNO subnetwork discovery, DSA) and Data Communications Network (DCN)/network design choices for NEs supported by Navis™ Optical EMS.

The following table summarizes which communication protocols are supported by each NE type. Note that not all NEs support all protocols. Navis™ Optical EMS can support one, all, or any combination of protocols as long as the necessary software and hardware have been installed.

OSI	TCP/IP (RFC 1006)	X.25	DSA Support
WaveStar® BWM		FT-2000 LCT	OLS 400G
WaveStar® OLS 1.6T	WaveStar®OLS 1.6T*		BWM
WaveStar® TDM 2.5G*	WaveStar®NCC		
WaveStar® TDM 10G* (STM-64, OC-192 2F)			
WaveStar® TDM 2.5G(OC-48 2F)			

Notes:

1. *A WaveStar® OLS 1.6T NE (for other WaveStar® OLS 1.6T NEs) or WaveStar® NCC needs to be set up as a transport bridge. A transport bridge performs TCP/IP to OSI protocol conversion.

Supported protocols southbound from the Navis™ Optical EMS

See the above table for protocols supported for each NE type. Remember, the Navis™ Optical EMS can support any combination of protocols or all protocols as long as the software and hardware is

installed. For example, for X.25 communications, the MUX interface panel must be installed.

- OSI—Open Systems Inteconnection. This is the 7 layer stack protocol.
- TCP/IP (RFC 1006)—This is OSI over TCP/IP; in other words, OSI encapsulated into a TCP/IP packet.
- X.25—this is a Switched Virtual Circuit (SVC) or Permanent Virtual Circuit (PVC)

Is the SONET Directory Service (SDS)/Directory Services Agent (DSA) method going to be used?

DSA=NO If the SDS/DSA method is ***not*** going to be used, then you have to manually add the point of attachment (POA) NE and discover the rest of the NEs via subnetwork discovery. Subnetwork discovery is done when DNO is performed automatically when the POA NE is manually added to the the Navis™ Optical EMS database. You can also perform subnetwork discovery through the POA NE by right-clicking on this NE in the Map window and selecting the Subnetwork Discovery option.

DSA=YES If the SDS/DSA method ***is*** going to be used, then when the NEs have been provisioned (registered under the same DIB Prefix as the Navis™ Optical EMS-based DSA or NCC-based DSA), the NEs are automatically displayed on the the Navis™ Optical EMS GUI Map window. One NE is provisioned as the RM for the OSI Level 1 area and registers all the NEs in its area in the DSA's directory. The Navis™ Optical EMS, via the DSA, retrieves this information from the RM and automatically databases the NEs.The DSA can be either local (Navis™ Optical EMS) or via an NCC. The DSA registers each NE with:

- The DSA's IP or NSAP address
- The same DIB Prefix (Country, Org, SubOrg). For example: Country=US, Org=Lucent, SubOrg=NID

Network element provisioning

Each NE offers choices for setting up a Data Communications Network (DCN) and communicating with the Navis™ Optical EMS.

Each scenario is dependent on the type of NE and the available communications protocol(s) (see the above table.)

- OSI without DSA—for the point of attachment NE, you have to configure the NSAP address (Org, Routing Domain, Area, and Level 1 or 2 Router)
- TCP/IP without DSA—this DCN requires a transport bridge (for WaveStar® OLS 1.6T NEs). If you want to use TCP/IP to communicate with a WaveStar® BWM or WaveStar® TDM 2.5G or WaveStar® TDM 10G NE, you need a WaveStar®NCC set up as a transport bridge, located on the same LAN segment as the WaveStar® BWM, WaveStar®TDM 2.5G, or WaveStar® TDM 10G NE. For WaveStar® BWM, and WaveStar® TDM 2.5G, or WaveStar® TDM 10G NEs, you select the WaveStar® NCC as the primary transport bridge when you are databasing the NE. When the Navis™ Optical EMS attempts to communicate with these NE types, it sends the request to the WaveStar® NCC via TCP/IP. The WaveStar® NCC (or transport bridge) converts the message to OSI and passes the request to the NE.
- OSI with DSA—the NE provisioned to be the Registration Manager (RM) in an OSI Level 1 area has to be configured with the NSAP address of the Navis™ Optical EMS-based or NCC-based DSA (Org, Routing Domain, Area, and Level 1 or 2 Router). The RM NE has to be set up under the same DIB Prefix as provisioned for the DSA. The DSA's NSAP address must be configured (either the MAC address of the NCC or the MAC address of the Navis™ Optical EMS southbound LAN card).
- TCP/IP with DSA—a transport bridge is needed for WaveStar® OLS 1.6T NEs. If you want to use TCP/IP to communicate with a WaveStar® BWM, WaveStar® TDM 2.5G, or WaveStar® TDM 10G NE, you need a WaveStar® NCC set up as a transport bridge, located on the same LAN segment as the WaveStar® BWM, WaveStar®TDM 2.5G, or WaveStar® TDM 10G NE. For WaveStar® BWM, WaveStar® TDM 2.5G, and WaveStar® TDM 10G NEs, you select the WaveStar® NCC as the primary

transport bridge when you are databasing the NE. When the Navis™ Optical EMS attempts to communicate with these NE types, it sends the request to the WaveStar® NCC via TCP/IP. The WaveStar® NCC (or transport bridge) converts the message to OSI and passes the request to the NE.

- The NE provisioned to be the Registration Manager (RM) in an OSI Level 1 area has to be configured with the NSAP address of the Navis™ Optical EMS-based or NCC-based DSA (Org, Routing Domain, Area, and Level 1 or 2 Router). The RM NE has to be set up under the same DIB Prefix as provisioned for the DSA. The DSA's NSAP address must be configured (either the MAC address of the NCC or the MAC address of the Navis™ Optical EMS southbound LAN card).

Metropolis™ EON NEs and subnetwork discovery

The Navis™ Optical EMS cannot automatically discover and start to communicate with Metropolis™ DMX NEs in a subnetwork, because this NE type does not support TARP, does not return NSAP information when it is added, and does not support the SDS feature.

There are two alternatives for adding Metropolis™ DMX NEs to the Navis™ Optical EMS:

- Manually added each of the Metropolis™ DMX NEs using the Add an NE window in the Navis™ Optical EMSGUI
- Manually add one Metropolis™ DMX NE per Metropolis™ DMX subnetwork using the Add an NE window in the Navis™ Optical EMS GUI and then perform subnetwork DNO against that NE to discover the TIDs (but not the NSAP) of all of the other NEs in the subnetwork.

When this NE type is added manually or through discovery, the color of the NE symbol on the Map window is magenta, because the Navis™ Optical EMS is unable to communicate with this NE type without the NSAP information. To correct this, you must use the Modify an NE window to manually add the NSAP information for each added NE.

PF-3000/PF-2000 interworking

The Navis™ Optical EMS supports and recognizes mixed networks consisting of both WaveStar NEs (also referred to as the "PF-3000" class of NEs) and the "PF-2000" class of NEs, which include the DDM-2000 OC-3, DDM-2000 OC-12, FT-2000 and FiberReach. Navis™ Optical EMS does not manage the PF-2000 class of NEs, but recognizes them to provide a more comprehensive view of a customer's network.

The type of mixed network currently supported by the Navis™ Optical EMS is based on a subnetwork of WaveStar NEs and another subnetwork of PF-2000/FLM NEs. Navis™ Optical EMS is able to support OSI or OSI over a TCP/IP backbone for the WaveStar NEs while supporting OSI for the PF2000 NEs.

A group of PF2000 NEs can be discovered through a "sponsor" WaveStar NE when it is manually added to the Navis™ Optical EMS database or when the PF2000 NEs are registered in the DSA through the SDS feature.

When the Navis™ Optical EMS discovers a "sponsor" WaveStar NE, it issues the TL1 command RTRV-MAP-NEIGHBOR to obtain information about NEs and trails in the associated group of PF-2000 NEs. The WaveStar NE's response to the RTRV-MAP-NEIGHBOR command contains only neighbor PF-2000 NE NSAPs (for OSI-connected NEs). The PF-2000 NEs' response to the RTRV-MAP-NEIGHBOR command may contain the TIDs and NSAPs of the neighbor NEs. There is no neighbor port ID information passed by the PF-2000 NEs for constructing trails between the WaveStar NE and PF-2000 NEs.

If the PF-2000 NEs are registered in the DSA as a "T5GW" NE type (provided T5 Gateways exist in the network), Navis™ Optical EMS discovers the NEs from the DSA, recognize them as the "T5GW" NE type, and change the NE type to "Non-managed device".

PF-2000 NEs discovered through a WaveStar NE or through the DSA are treated as non-managed devices and placed on the Map to complete the network topology. The Navis™ Optical EMS user can manually add trails between managed NEs and non-managed PF-2000 NEs on the Map window, but the Navis™ Optical EMS does not attempt to log into these NEs and no alarm/event information is collected.

Adding NEs

The following table shows the information that must be identified before adding an NE to the EMS, by communication type.

Table 11-1 Required Information for Adding an NE

OSI-Connected NE	OSI over TCP/IP	X.25 (via GNE)	X.25 GNE	TCP/IP (via GNE)	TCP/IP GNE
TID	TID	TID	TID	TID	TID
Alias (optional)	Alias (optional)	Alias (optional)	Alias (optional)	Alias (optional)	Alias (optional)
NE Type	NE Type	NE Type	NE Type	NE Type	NE Type
Valid NE login/password	Valid NE login/password	Valid NE login/password	Valid NE login/password	Valid NE login/password	Valid NE login/password
Valid backup NE login/password	Valid backup NE login/password	Valid backup NE login/password	Valid backup NE login/password	Valid backup login/password	Valid backup login/password
Number and Type of OSI Associations	Number and Type of OSI Associations	GNE TID	X.25 interface	GNE TID	IP address
NSAP Address	NSAP Address		Subnetwork		Subnetwork
	Primary and secondary transport bridges		Remote NE Login/Password • same as GNE • default for RNEs • default for GNE type		Remote NE Login/Password • same as GNE • default for RNEs • default for GNE type
	IP address for transport bridge				

Selecting communications for an NE type

The following table shows which communication types are available for each NE type. The communication type is selected in the Communicate Via field on the Add/Modify an NE window in Navis™ Optical EMS.

NE Type	Available Communication Type (Communicate Via Field on Add/Modify an NE window)
FT-2000 LCT	PSN, GNE
WaveStar®OLS 1.6T	OSI, OSI over TCP/IP*
WaveStar® BWM	OSI, OSI over TCP/IP*
WaveStar® TDM 2.5G (OC-48 2F)	OSI, OSI over TCP/IP*
WaveStar®TDM 10G	OSI, OSI over TCP/IP*
WaveStar® TDM 10G (OC-192 2F)	OSI, OSI over TCP/IP*
LambdaRouter™ 128/256 AOS	TCP/IP
Metropolis™ EON	OSI
Metropolis™ DMX	OSI,OSI over TCP/IP*,TCP/IP

Notes:

1. * A transport bridge is needed for protcol conversion between TCP/IP and OSI using the RFC 1006 method. An NSAP address is needed for the OSI portion of the connection.

Running DNO and manually adding NEs

DNO must be run to update the Navis™ Optical EMS database with complete information about a newly added NE. When manually adding an NE, the Navis™ Optical EMS prompts if you want to perform DNO on the newly added NE to update the database. You can run DNO immediately, initiate DNO manually, or schedule DNO to be performed at a later time, to update the database for the added NE.

Related information

See the related tasks in Chapter 3, “Management Communications Setup”.

Modifying NEs

Some of an existing NE’s parameters can be modified in the Navis™ Optical EMS database. The following table shows which fields can be modified, by NE communications type.

Table 11-2 Modify NE Fields

OSI-Connected NEs	OSI over TCP/IP-connected NEs	X.25-connected NEs	TCP/IP-connected NEs
Alias	Alias	Alias	Alias
NE logins/passwords	NE logins/ passwords	NE logins/ passwords	NE logins/ passwords
Time zone	Time zone	Time zone	Time zone
number of OSI associations	number of OSI associations		
	Transport bridge setting		
NSAP address (except for Reserved and SEL fields)			

Related task

See the "Modify a Network Element" (3-28) task in Chapter 3, "Management Communications Setup".

Deleting NEs

An NE should be deleted only when it is to be physically removed from the network. To "hide" an NE from a group of users, you can remove the NE from the users' Target Groups. Removing an NE from a Target Group causes the NE to be removed from the Map window, Alarm Summary window, and other windows that are used by the Target Group users, but the NE remains in the EMS database and is accessible to other Target Groups.

If you are deleting an NE designated as the GNE for a group of NEs, and the GNE currently has remote network elements (RNEs) assigned to it, you must first delete all RNEs from the Navis™ Optical EMS database or reassign all of the associated RNEs to another GNE in the same subnetwork before deleting the GNE.

Related task

See the “Delete a Network Element” (3-30) task in the Chapter 3, “Management Communications Setup”.

□

Dynamic Network Operations

Overview

The Dynamic Network Operations (DNO) feature performs two major functions in the Navis™ Optical EMS:

- Subnetwork discovery
- Database synchronization

Subnetwork discovery

The DNO feature retrieves the internal configurations of NEs and external connectivity relationships. This allows the system to discover all NEs in a subnetwork as well as the trails between NEs where available. As a result, the subnetwork topology (NEs and trails) is automatically displayed on the Map window as soon as it is discovered.

When the subnetwork discovery aspect of DNO is executed on a per-NE basis, the neighbors of the target NE are also discovered. The system uses the DNO feature to query the SONET Directory Service (SDS) to discover these node types. When subnetwork discovery is initiated with the SDS, the system queries the DSA of the chosen SDS for discovering NEs, then sends commands to neighboring NEs for discovering trails.

Database synchronization

The DNO feature synchronizes the system database with current configuration data from the NEs. The information that DNO gathers from NEs includes:

- NE parameters
- NE equipment inventory
- NE port parameters
- NE port protection groups
- NE cross-connections
- NE tributary reservation data (for WaveStar BWM NEs only)
- Optical associations (OLS 400G NEs only)

As part of subnetwork discovery, the system retrieves an NE's current equipment configuration and stores this information in the system database. NE equipment data can include bays, shelves, and circuit packs.

For certain NEs, such as the WaveStar BWM, you can select an NE and any single bay or shelf within the NE through the Network Element Explorer on the Manual DNO window, and then invoke DNO to retrieve the NE's current equipment configuration for that bay or shelf to update the system database. For a single bay or shelf, you can update the database for equipment or NE port parameters. This simplifies DNO when bays and shelves are added to an existing NE such as the WaveStar® BWM.

Log-Based Synchronization (OLS 400G only)

The Log-Based Synchronization method (LBS) is used for Navis™ Optical EMS database synchronization when the Navis™ Optical EMS loses communication with the NE. LBS retrieves the NE log data that contains the history of the database change notifications. Using this, the Navis™ Optical EMS database can be resynchronized locally instead of sending TL1 retrieval commands to the NE database to synchronize data.This allows a more efficient DNO operation.

The LBS method applies only to WaveStar® OLS 1.6T and runs automatically under the following conditions:

- The communication to the target NE was lost and restored again.
- Control of the log-based DNO has been enabled.

Important! The automatically triggered DNO operation can be enabled or disabled by setting a parameter in a configuration flat file. The setting of this control is primarily done by the Navis™ Optical EMS customer technical support team. It is not recommended that this parameter setting be done by a Navis™ Optical EMS user.

Once the LBS is enabled, it consists of the following steps:

1. Record the last notification before the link went down.
2. Retrieve the NE History Log that contains the database change notifications.
3. Determine the usability of the NE Log for recovery of the lost notifications.
4. Assure the chronological order of the retrieved logged notifications.
5. Update database based on both logged and received real-time notifications.

Ways to initiate DNO

There are three ways that the DNO feature is initiated in the system:

- Automatically—The DNO subnetwork discovery/database synchronization process is initiated automatically when an NE is discovered or added manually to the Navis™ Optical EMS database.
- Manually—The DNO subnetwork discovery/database synchronization process is executed for the NE, when you request it. When you request a manual DNO for an aggregate, DNO is executed for all NEs in the aggregate.
- Scheduled—You can schedule DNO to be performed for one or more NEs on a daily, weekly, or monthly basis.

DNO options

You can invoke DNO to perform automatic subnetwork discovery or database synchronization for one or more of the following: NE parameters, equipment inventory, port parameters, port protection groups, cross-connections, reservations. You can also invoke DNO to perform subnetwork discovery and resynchronize the system database for all data types.

Load management and DNO requests

The Navis™ Optical EMS has a Load Manager process that determines how the system behaves during high load conditions. The Load Manager coordinates the processing of transactions initiated by Navis™ Optical EMS users that involve multiple data transfers and performs acts as a “gatekeeper” that intercpets command notifications to the appropriate backend process that actually performs the data transfer.

The Load Manager checks whether the average CPU utilization (at that instant) exceeds a set value or whether there is an overload condition in effect. If either of these condition is true, new commands are delayed until the CPU utilization is below the set value or the system is no longer in overload.

The Load Manager checks the following activities:

- NE backups
- NE software downloads
- DNOs
- Data transfers to other OSs
- Periodic maintenance activities (such as database and file purges)

If the average CPU utilization exceeds a Delay Threshold of 70% of the total CPU capacity (the pre-set default), any/all of the above activities are suspended until this is no longer true and the system is not in overload.

The system resumes processing of transactions, on a first-in, first-out basis, in the following order:

1. All transactions requested by users in “ad hoc” (on demand) mode
2. All scheduled NE data backups
3. All other scheduled tasks.

Related tasks See the related tasks in Chapter 3, “Management Communications Setup”.

□

12 Equipment Provisioning Concepts

Overview

Purpose

This chapter provides general information about provisioning system parameters, network element ports, and network element equipment in Navis™ Optical EMS.

Objectives

This chapter explains how to do the following:

- Provision or pre-provision network element equipment
- Provision network element ports

Contents

Equipment Provisioning	12-2
Port Provisioning	12-4

Equipment Provisioning

Overview

Older generation NE types have little or no configurability of their equipment entities (their bays, shelves, slots, or circuit packs). New generations of NEs, however, can be expected to have an increasing amount of configurability in this area. The Navis™ Optical EMS supports equipment provisioning as needed for each NE type.

Different NE types are of varying complexity and configurability, ranging from single-shelf NEs at a single location to multi-bay and multi-shelf NEs that are flexible in their arrangements and may be distributed between rooms and floors of a central office or even distributed across central office locations and remote sites. The equipment window gives a set of hierarchically arranged equipment views. The shelf view is the lowest level view. There may also be a system view and a bay/line-up view, depending on how large and complex the NE is. The Equipment Configuration window also allows you to “drill down” into the NE equipment hierarchy.

Equipment discovery and inventory maintenance

Upon discovery of an NE, the Navis™ Optical EMS automatically retrieves an NE’s current equipment configuration and maintains this information in its database. This is the automatic discovery portion of DNO. An NE’s equipment includes any item that it is able to report; for example, bays, shelves, and circuit packs. For network elements managed via TL1, the network element’s current equipment configuration is obtained through TL1 RTRV-EQPT commands. For network elements managed using CMISE, the network element’s current equipment is obtained through CMISE M-GET commands.

In addition to the equipment information (bays, shelves, slots, and circuit packs), the WaveStar® OLS 1.6T NE also provides information on the set of equipment associations required to specify optical channels and the equipment connections for optical lines. The Navis™ Optical EMS retrieves and maintains these optical channel and line associations in its database.

Control point and scan point parameters (WaveStar® OLS 1.6T)

As part of equipment inventory management for WaveStar®OLS 1.6T NEs, the Navis™ Optical EMS retrieves and maintains in its database the NE's current attribute values for control and scan points. Control points are used to control external devices associated with the managed system, while scan points are used to monitor external conditions related to the managed system.

Provisioning of WaveStar® BWM, WaveStar® TDM 2.5G, and WaveStar® OLS 1.6T equipment

Some of the attributes reported on WaveStar® BWM equipment are provisionable. In addition, the WaveStar® BWM, WaveStar® TDM 2.5G, and WaveStar® OLS 1.6T NEs allow users to manually provision new bays, shelves, and circuit packs. The WaveStar® BWM therefore has establish and remove functions that apply to bays, shelves, and circuit packs; and attribute modification functions for shelves, slots, and circuit packs. New bays and shelves are created by specifying and provisioning new bay and shelf IDs. New circuit packs are created by associating a circuit pack type and/or circuit pack qualifier with a circuit pack slot. New bays are also implicitly created by creating new shelves with Shelf IDs that imply a bay that does not currently exist. For example, if a shelf with ID 10-1 is added and there is not currently a bay with the Bay ID 1 in the system, that bay is automatically created and reported by the WaveStar BWM.

Provisioning of LambdaRouter™ 128/256 AOS equipment

The LambdaRouter™ 128/256 AOS allows you to establish (pre-provision) a shelf, circuit pack, or port. Pre-provisioning of bays is not available.

Related information

For instructions on viewing NE equipment configurations, see "Provision NE Equipment Information" (4-13) in Chapter 4, "Equipment Provisioning".

□

Port Provisioning

Overview

Lucent Technologies NEs can change the state of ports without issuing a *rept-dbchg* message. The Navis™ Optical EMS therefore cannot detect these changes. To ensure that you receive an accurate list of available Access Identifiers (AIDs) when selecting ports to provision, first do a manual DNO on the single NE or group of NEs that you plan to provision (see information about the DNO feature, refer to the "Dynamic Network Operations" (11-51) section in Chapter 11, "Management Communications Setup Concepts".

Port aliases on GUI

The Navis™ Optical EMS has an option which allows you to specify whether port AIDs or port labels/aliases are used to represent ports on GUI windows, such as in explorer lists on the Cross-Connection or Provisioning windows. The port label/alias values must be unique for all ports within an NE.

Cross-connections and the port provisioning list

When cross-connections are added or deleted, the AID list in the port provisioning window is not updated automatically. To ensure that the AID list information is accurate, perform a manual DNO on the NEs that have had cross-connections added or deleted prior to any port provisioning.

Port configuration discovery

There is generally a fixed relationship between circuit packs and their number and type of ports. Upon discovery of an NE, for ports of a fixed type, the Navis™ Optical EMS may automatically retrieve an NE's current set of ports and their type, or it may automatically retrieve an NE's current equipment and derive the set of ports and their type. (This is the automatic discovery portion of DNO.) Deriving the port information from the equipment is the preferred method. Regardless of the method of obtaining the information, the system maintains the ports and their type in its configuration management database.

For NEs managed via TL1, obtaining the port information directly from the NE is done via TL1 RTRV-***rr*** commands (where ***rr*** represents the various port types). For NEs managed using CMISE, the NE's current port configuration is obtained via CMISE M-GET commands. The responses to these commands include the NE's current ports and their attributes.

Port configuration provisioning

The Navis™ Optical EMS provides a GUI-based function to enable you to select an NE and port or tributary, and view the current values of that port's or tributary's attributes.

Related information

See the related tasks in Chapter 4, "Equipment Provisioning"

□

13 Topology Management Concepts

Overview

Purpose

This chapter provides general information about the definition of aggregates and trails in the Navis™ Optical EMS.

Objectives

This chapter explains how to do the following:

- define aggregates for display on the Map window and alarm monitoring purposes
- define trails between managed and non-managed network elements in the Navis™ Optical EMS

Contents

Aggregates	13-2
Trails	13-4

Aggregates

Overview

An aggregate is a collection of related NEs that is user-defined as needed to streamline system monitoring and other management functions. Aggregate definition allows a large number of NEs to be concisely displayed and monitored on the Map window's graphical representation of the network. Aggregates can "own" or contain other aggregates. All users using the same GUI client server can share aggregates. User access to certain NEs are defined by Target Groups. For information about Target Groups, see the .

Aggregate management

Aggregates can be added, modified, or deleted. To create an aggregate, you assign a name and an alias to the aggregate and then add NEs or other aggregates to the newly created one, using functions accessible by single-clicking on the NE on the Map pane and dragging the NE or aggregate into the newly created aggregate.

Aggregate alarms

The color shown in the center of an aggregate icon displayed on the Map window pane or Subnetwork Explorer indicates the highest severity alarm of a member NE or aggregate. If any member NE has the Alarm Throttling feature enabled, and the number of alarms has passed the Alarm Throttling level, then the color in the the icon reflects the level of alarms being throttled, with the last known highest severity alarm color shown in the aggregates's border.

Map window symbol for aggregates

The diamond-shaped symbols on the Map pane represent aggregates. The diamond shape is the default for aggregates; this can be changed through the Shapes panel of the Preferences window. Aggregates are collections of NEs that do not necessarily correspond to any physical connectivity or other NE attributes. An aggregate can consist of a group of related NEs, such as a subnetwork, or a group of colocated NEs that are not necessarily in the same subnetwork. An aggregate can be moved under another parent aggregate on the Map pane or Subnetwork Explorer by selecting it and then dragging it to the parent aggregate symbol.

Aggregates can be displayed on the Map pane display and can be expanded on the Map window pane or Subnetwork Explorer whenever necessary to display all of its members. You can generate

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See notice on first page

aggregate-specific alarm summaries, alarm logs, and command/response logs.

Related tasks

"Modify User Preferences" (2-18) describes how to modify user preferences for display of items on the Map window, including the symbol used for aggregates.

describes how to add an aggregate and how to add or change the members of the aggregate.

"Modify an Aggregate" (5-9) in Chapter 5, "Topology Management" describes how to change an aggregate's alias.

"Delete an Aggregate" (5-11) in Chapter 5, "Topology Management" describes how to delete an aggregate and reassign its members to another aggregate.

□

Trails

Overview

Trails are physical links between NEs or aggregates. They are represented graphically on the Map window pane display of the network as solid lines between the NE/aggregate symbols.

Autodiscovery of trails

Most optical trails between identical Lucent Technologies NEs are configured automatically by the DNO feature and autodiscovered when the network topology is displayed on the Map window after DNO is run. Creation of the network model —identifying the NEs, deriving the trails between them, and retrieving the internal configuration information—is performed automatically by the Navis™ Optical EMS through communication with the NEs.

User-defined trails

If the DNO process does not automatically discover trails between NEs, the trails must be manually entered through the GUI. User trails can be manually added between any two trail termination points (TTPs) on any type of NE. Generally, there are many more TTPs on all NE types than those for which trails are automatically discovered. For a WaveStar® OLS 1.6T NE, a trail can only be manually added to another WaveStar® OLS 1.6T NE.

Trails between managed and non-managed NEs

If there is DCC connectivity between a managed WaveStar NE and an NE/device not managed by the Navis™ Optical EMS (for example, a DDM-2000), the trail can still be add manually even if the AIDs of the non-managed device are not known or available to the Navis™ Optical EMS.

Representation of trails on the Map window

The lines that run between NEs and/or aggregates represent trails. Trails are physical links between NEs or aggregates. If there is more than one trail between two NEs, the phrase “Multiple Trails” is displayed when you position the mouse cursor on the trail line in the Map pane.

Deletion of trails

Autodiscovered trails cannot be deleted manually. Autodiscovered trails are deleted automatically if the link is physically disconnected in the network. User-defined trails have to be manually deleted through the GUI. However, if an NE at one end of a user-defined trail is deleted, the trail is removed from the Map window display but remains in the Navis™ Optical EMS database. In this case, the trail should be deleted; otherwise, the related NE information may still appear on the View Trail List window.

Trail alarms

Trails can generate alarms. When Access Identifiers (AIDs) for equipment in the NE are provided by Navis™ Optical EMS or selected when a trail is manually added, Navis™ Optical EMS receives alarms from the trail. Trail alarm data is available through the Trail Alarm Summary window and the Trail Alarm List.

Trail alarm data is not available for trails manually added between a managed NE and an NE not managed by Navis™ Optical EMS.

Related tasks

"Modify User Preferences" (2-18) in Chapter 2, "Getting Started" describes how to modify user preferences for display of items on the Map window, including trails.

"Add a Trail" (5-2) in Chapter 5, "Topology Management" describes how to manually add a trail.

"Delete a Trail" (5-4) in Chapter 5, "Topology Management" describes how to manually delete a trail.

□

14 Timing Provisioning Concepts

Overview

Purpose

This chapter provides general information about configuring the external timing reference and clock mode of a network element and synchronizing the date and time setting of network elements with the date/time settings of the Navis™ Optical EMS host.

Objectives

This chapter explains how to do the following:

- Configure the external timing reference and clock mode of a network element
- Manually set date/time synchronization for an NE.
- Make adjustments for the time zone and Daylight Savings Time in date/time synchronization
- Set up on-demand, automatic, and scheduled date/time synchronization for an NE

Contents

Network Element Timing Synchronization	14-2
Date/Time Synchronization	14-6

Network Element Timing Synchronization

Overview

Synchronous networks such as SONET and SDH use Time Division Multiplexing (TDM) in which the data generated at low bit rates from numerous sources are multiplexed into a higher bit data rate. This multiplexed data is then transported from one NE to another in frames that are transmitted at fixed time intervals. These fixed times at which frames are transmitted and received have to be consistent over the network for communications to work properly. As a result, SONET/SDH NEs must synchronize their timings by using accurate and reliable clock sources as references.

Timing clocks

The timing clocks in the NEs have two independently operable, synchronization units. Maintenance and repair is provided by using separately removable plug-in circuit packs. In case one fails, another unit can be used immediately.

Stratum levels

The timing clocks used in the SONET/SDH networks are classified as Stratum Levels, given as a number. Stratum 1 has the highest accuracy and the rest have the quality of accuracy in descending order.

Clock modes

Clocks are referenced by NEs based on their clock modes. The clock modes are:

- Free running mode
- Locked mode
- Holdover mode
- Fast start mode
- Through timing mode

Free running mode

In free-running mode, the system uses the internal stratum 3 (stratum 1 being the most accurate) clock as reference and disregards any external reference whether it is a higher quality or not. The internal clock controls the timing for all the transmitted OC-N, STM-N, and EC-1 signals.

Only the stratum 3 clocks are available for the WaveStar®TDM 2.5G and WaveStar® 10G (STM-64) NEs.

Locked mode

In locked mode, the system timing is locked to an external reference. NEs have the ability to have their timing synchronized to external references. If the external reference with stratum 1 or stratum 2 is not available, the NEs can use an internal oscillator which is of stratum 3 accuracy, which is provided by the Timing Management Group (TMG) circuit pack. The system locks into the external timing references only if they advertise a higher quality clock than the internal stratum 3 quality clock.

Holdover mode

In holdover mode, the NE automatically enters this mode when all external clock references fail. In this mode, the internal clock controls the timing for all the transmitted OC-N, STM-N, and EC-1 signals. The SONET internal clocks, at present, are stratum 3. Once the NE enters this mode, there is no difference between the holdover and free-running mode.

Fast start mode

In this temporary mode, the clock acquires phase-lock quickly before changing to “Normal mode” , in which the system clock is not operating in the fast-start mode. The system clock would be expected to operate in this mode for a temporary period of time, determined by the hardware design, clock stratum level, and other internal clock parameters, before transition to Normal mode.

Through timing mode

Through timing mode is used when the NE wants to transport the timing transparently across the NE and does not want to change the timing of the transported signal. In this mode, the transmitted “west” signal is timed by the received “east” signals and vice-versa. Echo-cancellers and signal repeater/regenerators use this mode.

Fast start mode and through timing mode are currently not supported by WaveStar® NEs.

Synchronization protection switching

WaveStar NEs provide duplicate circuit packs and multiple timing references, each with a user-provisionable priority level, for the purpose of synchronization protection switching.

The Navis™ Optical EMS supports the following types of timing synchronization protection switching:

- Timing Reference Switching
- Timing Mode Switching
- Hardware Switching

Timing reference switching

The timing reference switching requires that the clock should be able to accept at least two external synchronization references. In case of the active reference failure, the clock switches automatically to the alternate reference. If the NE switches over to holdover timing mode due to a failure of the timing references, it does not automatically swtich back to the failed timing reference once the problem has cleared.

Protection switches to the alternate timing reference can be forced, manual, or lockout.

A forced switch forces a switch to the selected timing reference in the event that the currently active timing reference fails.

A manual switch causes a switch back to the active timing reference from the protection (alternate) timing reference following an automatic protection switch due to failure occurs, because the NE does not revert back to the original timing reference even if the failure is cleared.

A lockout switch forces the selected timing reference to be locked out and cannot be used as a timing reference until the lockout is cleared.

Timing mode switching

The Navis™ Optical EMS supports a forced switch from locked mode to holdover mode. NEs automatically goes into holdover mode from locked mode when all timing references fail.

Releasing timing protection switches

The Navis™ Optical EMS provides a way to release (clear) any existing lockout, forced, or manual system timing reference switch or to release the forced request on the timing mode so it will return to the provisioned locked mode from the holdover mode.

You can select what type of switch to release (timing reference switch, system clock mode switch, external timing output switch) and the destination timing reference involved in the switch.

Related tasks

See the following related tasks in Chapter 6, “Timing Provisioning”:

- “Configure External Timing Port Parameters for NE Timing Synchronization” (6-3)
- “View External Timing Port Parameters for NE Timing Synchronization” (6-5)

- “Operate an External Timing Reference/Timing Mode Switch” (6-7)
- “Release an External Timing Reference/Clock Mode Protection Switch” (6-10)

□

Date/Time Synchronization

Overview

Periods of time when an NE is out of service, as during a software upgrade, can cause the NE's date/time setting to be out of sync with the Navis™ Optical EMS host and the other NEs in the network. Lack of date/time synchronization can create problems in determining the order in which alarms occurred on the network.

The Navis™ Optical EMS uses the Network Time Protocol (NTP) to ensure the accuracy of its internal clock. The Navis™ Optical EMS, in turn, provides centralized remote date/time synchronization between its internal clock and those of its managed NEs. Synchronization can be performed on a single NE, on an aggregate of NEs, or on all of the NEs in a user's Target Group. Synchronization can be performed on demand or set up on a periodic schedule using the Navis™ Optical EMS Scheduler. The transition from standard time to daylight savings time is also supported as a user selected option.

NE delay response

In synchronizing the Navis™ Optical EMS host's internal clock with the NE's internal clock, Navis™ Optical EMS allows you to take into the account the time delay in sending the synchronization message from the host to the NE and the time it takes to receive a response from the NE, by setting of an NE delay for this feature through a menu option on the GUI. You can set this NE delay threshold to be from 5-999 seconds. The default is 15 seconds.

Related task

"Set Network and NE Delay Threshold" (6-12) in Chapter 6, "Timing Provisioning" describes how to set the Network and NE Delay threshold for date/time synchronization.

NE time zone

As part of the date/time synchronization feature, Navis™ Optical EMS can take into account whether the NE is located in a different time zone from the system host.

The Time Zone parameter is one of the fields that can be defined or changed for an NE through the Add an NE window or Modify an NE window.

Related tasks

"Add a Network Element—X.25 Communications Via a Gateway Network Element" (3-4)

"Add a Network Element—OSI Communications" (3-8)

"Add a Network Element—TCP/IP Communications" (3-16)

"Modify a Network Element" (3-28)

Standard time and daylight savings time

You can use the Fall Back/Spring Forward option to have the Navis™ Optical EMS automatically make time adjustments for Daylight Savings Time (Spring Forward) and standard time (Fall Back) when doing date/time synchronization for an NE, a group of NEs, an aggregate, or all NEs under system control, 20 NEs at a time or more, depending on system load. The Fall Back/Spring Forward option can be enabled or disabled, as needed. This option is enabled, by default. If the option is disabled for an NE, the NE's time is always set to standard time.

The Spring Forward/Fall Back option should be set by the system administrator.

Related information

"Enable Fall Back and Spring Forward" (6-17) in Chapter 6, "Timing Provisioning" describes how to enable or disable the Fall Back/Spring Forward option for date/time synchronization.

Ways to perform date/time synchronization

NE Date/time synchronization can be performed in three ways:

- Scheduled—NE date/time synchronization can be scheduled to be performed on a daily, weekly, or monthly basis. A scheduled date/time synchronization will only be done if the time difference between the NE and the system host is more than 15 seconds.
- Automatically—You can have the system automatically perform date/time synchronization on an NE when it is manually added or autodiscovered by the system, or when communications between the NE and the system host are lost and then regained. Automatic date/time synchronization will be performed on an NE only if the time difference between the NE and system host is more than 15 seconds, or the drift threshold set via the Set Date/Time

Synchronization Drift window. The drift threshold is the maximum time difference allowed (in seconds) between the NE and the EMS host before date/time synchronization is performed automatically. Automatic date/time synchronization can be enabled or disabled; the default is enabled.

- Manually—Date/time synchronization can be performed on demand for an NE, a group of NEs, an aggregate, or all NEs under system control, up to 20 NEs at a time or more, depending on system load.

Automatic date/time synchronization

The NE date/time synchronization feature sets up the NE's date/time to match the date/time of the Navis™ Optical EMS host. The Navis™ Optical EMS system administrator, or a user with a privileged login, can enable or disable the Automatic Date/Time Synchronization feature. When this feature is enabled, the system performs date/time synchronization automatically when:

- An NE is added to the network or an NE is autodiscovered by the Navis™ Optical EMS for the first time
- Re-establishing communications with the NE after the communications link is down

Automatic date/time synchronization changes the date/time on the NE only if the time difference between the NE and the Navis™ Optical EMS is more than 15 seconds.

This feature can be enabled or disabled through the GUI. It is enabled, by default.

Automatic date/time synchronization should be enabled/disabled by the Navis™ Optical EMS system administrator or a user with a privileged login.

Related tasks

Scheduling Tasks in Chapter 14, "Timing Provisioning Concepts" provides additional information about scheduling NE date/time synchronizations.

"Enable/Disable Automatic Date/Time Synchronization" (6-22) in Chapter 6, "Timing Provisioning" describes how to enable/disable automatic date/time synchronization.

"Set Drift Threshold for Date/Time Synchronization" (6-20) in Chapter 6, "Timing Provisioning" describes how to set the drift threshold for automatic date/time synchronization.

"Set Network Element Date/Time Synchronization" (6-14) in Chapter 6, "Timing Provisioning" describes how to manually initiate date/time synchronization.

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15 Traffic Provisioning Concepts

Overview

Purpose

This chapter provides general information about cross-connections, optical associations, and optical connections, which can be defined through the Navis™ Optical EMS for network element traffic.

Objectives

This chapter explains how to do the following:

- Define optical associations and connections for WaveStar® 1.6T NEs
- View and provision cross-connections through the Navis™ Optical EMS GUI
- Define cross-connect loopbacks for testing port/tributary signal integrity

Contents

Optical Associations	15-2
Cross-Connections	15-5
Entering cross-connections	15-25
Deleting cross-connections	15-27

Optical Associations

Overview

Unlike other WaveStar NEs where physical ports correspond to the transmission interface they support (including the rate and format), the WaveStar® OLS 1.6T NE interface corresponds to optical physical interface ports, optical channel frequencies, and optical lines.

The Navis™ Optical EMS allows you to provision the optical equivalent of physical interface ports on a WaveStar® OLS 1.6T NE, or make a logical ***association***between the physical interface and the optical lines, optical channels, optical interface ports (low speed broadband and optical interfaces) and the supervisory channel, including the type/purpose of the optical component in signal transport.

Optical interface ports for OLS 400G/1.6T NEs

The optical physical interface port units for the OLS 400G/1.6T are:

- Optical Translator Unit (OTU)—SONET/SDH or low speed broadband (LSBB) signals are translated to optical channel wavelengths
- Optical Demultiplexing Unit (ODU)—a single optical line is separated into individual SONET/SDH LSBB signals
- Optical Multiplexing Unit (OMU)—individual SONET/SDH LSBB signals are combined into a single optical line
- Optical Amplifier (OA)—device used to amplify optical wavelength signal

Association types supported

Association types supported by NE type and node type are:

Assocation Type	NE Type	Node Type
Add	WaveStar® OLS 1.6T	All types
Drop	WaveStar® OLS 1.6T	All types
Terminal Add	WaveStar®OLS 1.6T	All types
Terminal Drop	WaveStar®OLS 1.6T	All types
External Add	WaveStar®OLS 1.6T	All types
External Drop	WaveStar®OLS1.6T	All types

Assocation Type	NE Type	Node Type
Terminal	WaveStar®OLS 1.6T R2.0-R2.1	All types

Capabilities

The Navis™ Optical EMS allows you to add or delete optical associations.

Optical connections

Optical associations in the Navis™ Optical EMS can be provisioned in groups to form ***connections***.

Connection types supported

Connection types supported by NE type and node type are:

Connection Type	NE Type	Node Type
Add	WaveStar® OLS1.6T	All types
Drop	WaveStar®OLS 1.6T	All types
Single OTU Thru and Two OTU Thru	WaveStar® OLS1.6T	• 2-Fiber Full Add/Drop Ring terminal 40 • 4-Fiber Add/Drop Ring terminal 40 • 2-Fiber Full Add/Drop Ring terminal 80 • 4-Fiber Full Add/Drop Ring terminal 80
Compatible Optics Add	WaveStar®OLS 1.6T	All types
Compatible Optics Drop	WaveStar®OLS1.6T	All types

Capabilities

The Navis™ Optical EMS allows you to add optical connections.

Related tasks See the related tasks in Chapter 7, "Traffic Provisioning" for instructions on adding or deleting optical associations and connections.

□

Cross-Connections

Overview

A cross-connection is a reconfigurable transmission path interconnection within a network element between or among input and output ports. Cross-connections are made at the ***logical*** level between inputs and outputs, not at a ***physical*** level. Cross-connections are normally made at the tributary level. A tributary is a logically configured transmission or reception point on a port, that has an Access Identifier (AID) and has been provisioned to carry a certain signal rate.

The LambdaRouter™ 128/256 AOS is a pure optical router with all optical ports that are bitrate-independent; therefore, the logical concept of tributaries carrying a designated signal rate does not apply and cross-connections in a Lambda Router are created only at a port level.

The Navis™ Optical EMS provides a graphical means of viewing and provisioning NE cross-connections via the Cross-Connection window. This window is designed to display connection termination points and cross-connections for a selected NE. This section provides information about cross-connection functionality and the Cross-Connection window.

Cross-connection functionality

The Navis™ Optical EMS provides the following major functions associated with the provisioning of cross-connections:

- Perform Dynamic Network Operation (DNO) on discovering NE.
- Discover cross-connections as part of DNO.
- Include cross-connections as part of the system database.
- Provision cross-connections on demand from the GUI.
- Provision cross-connections to and from all tributaries in a 2-fiber/4-fiber Bi-directional Line Switched Ring (BLSR) port protecton group or Unidirectional Path Switched Ring (UPSR)/Subnetwork Connection Protection (SNCP) topology (applies to both service tributaries and protection tributaries).
- Provision cross-connections from service tributaries in 1+1 line-protected port protection groups
- Display status of cross-connections on the GUI.
- List cross-connections, including input and output tributaries, topology of the cross-connection, and the presence or absence of reservations.

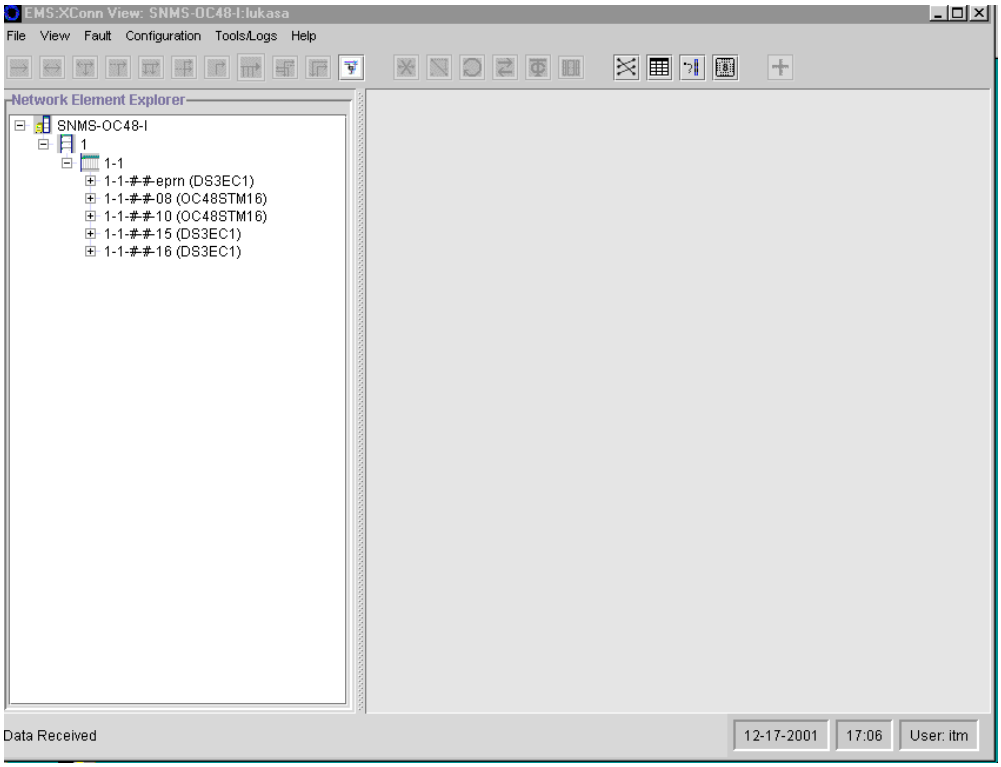
- Provision specific identifying parameters when adding cross-connections (cross-connection application, cross-connection number) through the GUI to simplify retrieval, modification, and deletion of multiple cross-connections that have established using the same set of input and/or output tributaries
- Modify cross-connections on demand from the GUI.
- Delete cross-connections on demand from the GUI.
- Establish, delete, modify, and retrieve tributary reservations on the GUI.
- Update the database upon receiving autonomous database messages from the NE on addition, deletion, and modification of cross-connections.
- Log all requests/responses and autonomous database update messages.
- Provide user access from the GUI.

The Cross-Connection window

The Cross-Connection window provides the user with access to all cross-connection features. It contains an interface tailored to the large, modern cross-connection fabrics supported by the system. The window consists of a menu bar, a toolbar, a status bar, a network element explorer, and a main view. The main view area is further broken down into four (or eight) port areas. This window is used for all cross-connection operations, including viewing, adding, modifying, and deleting cross-connections.

Example: Cross-Connection window

The following figure shows an example of the Cross-Connection window.



Toolbar

The Cross-Connection window contains a toolbar (starting at the upper left portion of the window) that contains a series of buttons used for specifying different types of cross-connections or tributary reservations. If you are unsure of the operation that a certain toolbar button will perform, point at it with the cursor and after two seconds a tooltip is displayed, showing the operation of that button. This information is also displayed in the Status bar.

After the cross-connection type buttons, the next button in the toolbar is used to access the Cross Connect Template, which brings up a special window for creating Compound cross-connections.

The next button in the toolbar is used to delete an existing cross-connection. (It is disabled until the user chooses a cross-connection that can be deleted.)

The next button is used to modify a cross-connection. (It is disabled until the user chooses a cross-connection that can be modified.)

The next button is used to roll an existing cross-connection. For additional instructions on how to use the Roll button to roll a cross-connection, see "Roll a One-Way Cross-Connection" (7-17) or "Roll a Two-Way Cross-Connection" (7-21) in Chapter 7, "Traffic Provisioning"chapter.

The next button is used to switch the working and protection legs of a path-protected cross-connection.

Important! This function is currently not available.

The next button is used to convert an existing one-way point-to-point cross-connection to a one-way path-protected or one-way adjunct cross-connection, or vice-versa.

Important! This function is currently not available.

The next button is used for the Reservation feature. Click this button after you have chosen a tributary to reserve. The system displays a pop-up window for selection of tributary parameters for the reservation.

Important! The Reservation feature is currently not available.

The next button is used to toggle between showing of cross-connection lines and hiding of cross-connection lines. Click this button to show cross-connection lines - click it again to hide the cross-connection lines.

The next button is used to obtain a list of existing cross-connections. If you click on the NE's TID in the explorer portion of the window, and click this button, a complete listing of all cross-connections for the NE is displayed. The listing shows the source and destination tributary AIDs, the cross-connect type, the rate, the TID of the source NE and the TID of the destination NE. Clicking on any equipment level in the explorer (such as a specific shelf or port), and then clicking this button, displays a list of cross-connections for the selected equipment in the NE.

The next button is for the Cancel function. Click this button when you have started a cross-connection and want to terminate the operation. (This button is disabled until you select a cross-connection type.)

The next button is for Toggle View. Click this button to change the number of port areas displayed in the view panel. Initially the view is

set to Toggle to Four, which shows four port areas (and the contents of the pop-up menus in the explorer accommodate all four ports). When you click the Toggle View button, the view changes to Toggle to Eight, which shows eight port areas (and the contents of the pop-up menus in the explorer accommodate eight ports).

Network Element Explorer

The Network Element Explorer portion of the Cross-Connection window displays all of the equipment for the selected NE in a hierarchical explorer tree.

The equipment hierachy shown in the explorer is as follows:

1. Each NE bay shows the shelf(ves) residing in the bay
2. Each shelf shows the circuit pack slot(s) existing on the shelf
3. Each circuit pack slot shows the port(s) existing on the circuit pack
4. Each port shows the tributaries available for cross-connection

Each equipment level of the explorer tree can be expanded to show the equipment components below the current level, or collapsed back to the current level. Clicking the plus (+) sign next to an equipment label in the explorer expands the explorer to show the subordinate equipment components. Clicking the minus (-) sign next to the expanded equipment view collapses the equipment display back to its previous state.

When the Cross-Connection is first brought up for an NE, the Network Element Explorer is automatically expanded to the slot (circuit pack) level.

For tributaries, the Network Element Explorer shows the rate, provisioned direction as source/receive or destination/transmit, and availability to be used as a source, destination, or both, for a cross-connection.

A small box containing one or two capital block letters (“S” “D”) that is displayed in front of the AID of the tributary in the Network Element Explorer tree indicates whether it is provisioned to carry bidirectional traffic, to be the source for traffic, or to receive traffic.

If the tributary is provisioned to be bidirectional, the small box contains “S D”.

If the tributary is provisioned only as a traffic source, the small box contains “S”.

If the tributary is provisioned only as a traffic destination, the small box contains “D”.

The color background of the block letters in the tributary display in the Network Element Explorer indicates whether a tributary is provisioned at a lower rate and whether it is currently being used as a source, destination, or both, for a cross-connection.

If a tributary is provisioned to be cross-connected at a lower rate, the background color of the block letters is grey.

If the tributary is currently being used as a source and/or destination in a cross-connection, the background color of the corresponding character (in a square block) is blue. For example, if the tributary is currently being used as the source of a cross-connection, the “S” (for source) in the block letters prefixed to the AID in the explorer is shown in a background color of blue. A background color of yellow for the letter indicates that the tributary is still available to be used as a source, destination, or both, for a cross-connection.

Status bar

The status bar, at the bottom of the Cross-Connections window, provides the following information:

- The source and destination AID and the cross-connection type of a selected cross-connection in the cross-connection view area.
- The cumulative information about a cross-connection being added, as it is selected by the user.
- Information about the status of add/delete/modify operations that have been requested.

When a port tributary is displayed in the Main View of the Cross-Connection window, and you position the mouse cursor on the tributary block, a message is displayed next to the tributary address in the status bar identifying it as a “Source” or “Destination” tributary. The “Source” and “Destination” literal displayed in the status bar is used to indicate whether the tributary could act as a “Source” or “Destination” , or both, for additional cross-connections.

Displaying ports

Ports are displayed on the Cross-Connection window between the arrow buttons surrounding the main view area. Top and Bottom port areas appear between the left and right arrow buttons, while Left and Right port areas appear between the up and down arrow buttons.

Cross-connection prerequisites for some NE types may prevent the user from provisioning a cross-connection to or from a tributary ***only*** if the port unit slot containing the tributary has already been provisioned (or pre-provisioned) with information that determines the number of ports and the rate of the ports in the port unit slot.

Tributary/port group blocks

Ports that are selected for cross-connection groups always expand into one of the following ***tributary/port group building blocks***.

- STS-1—contains only a single STS-1 worth of signal, with no access to lower-rate cross-connections
- STS-3—contains only a single STS-3 worth of signal, with no access to lower-rate cross-connections.
- STS-3/STS-1—this building block contains an STS-3 and allows access to the corresponding STS-1s that are accessible through that STS-3.
- STS-12/STS-3—this building block contains an STS-12 worth of signal, and allows access to both the STS-12 and the corresponding STS-3s. No access to the STS-1s is available.
- STS-12/STS-3/STS-1—this building block is the same as the previous, except access to the corresponding STS-1s is allowed.

Any building block that contains multiple layers has each layer of the building block as mutually exclusive to the layers above and below it. This means that if the building block is an STS-1/VT1.5, then the existence of a VT1.5 cross-connection makes the STS-1 unavailable, and any STS-1 cross-connection makes ***all*** of the VT1.5s unavailable.

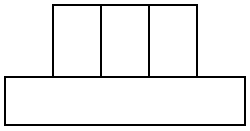
Furthermore, in the STS-12/STS-3/STS-1 building block, an STS-12 cross-connection disables all STS-3 and STS-1 ports. An STS-3 cross-connection disables the STS-12 and the three STS-1s that are part of the cross-connected STS-3. Any STS-1 cross-connection disables the entire STS-12 and the single STS-3 of which the STS-1 is a part.

The following explains how these various tributary building blocks are represented graphically on the Cross-Connection window:They are defined as follows:

STS-1
STS-3

This tributary group displays a single STS-1 or STS-3 for cross connection. The would be used when, for example, the port chosen supports only some number of STS-1 or STS-3 cross connection, but not a combination of the two.

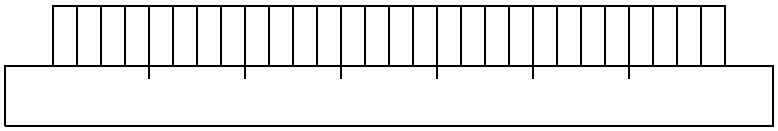
STS-3/STS-1



This tributary group is seen more often, and is used to display any STS-3 tributary that contains STS-1 tributaries that can also be cross connected. The larger box at the bottom of the graphic represents a single STS-3. The three smaller boxes on top each represent a single STS-1. This graphic is used whenever an STS-3 tribtuary can be cross connected at either STS-3 or as three STS-1s.

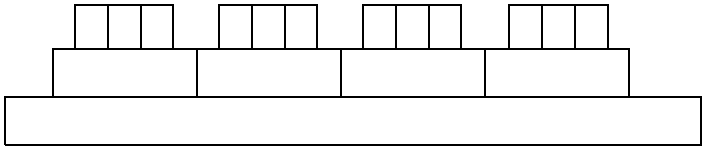
Note: All of the tributary groups that contain more than one level (as does the one above) represent two different rates of cross connections within a single tributary group. This means that the two different levels (the STS-3 and the STS-1, in this case), are mutually exclusive. You can ***either*** cross connect the STS-3 tributary, ***or*** the three STS-1 tributaries, but not both.

STS-1/VT1.5



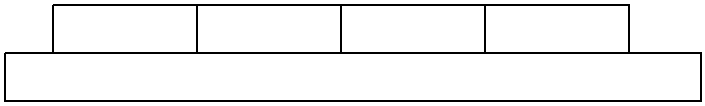
This graphic is used whenever a tributary can be cross connected at the STS-1 or VT1.5 rate. The large box at the bottom represents a single STS-1, and the 28 smaller boxes on top each represent a single VT1.5. A single tributary group (m-1, for instance) is dragged into the View Area and this graphic is displayed.

STS-12/STS-3/STS-1



This is the most complex of the graphics used in the cross connection window. The bottom box represents a single STS-12 tributary. The four boxes in the middle each represent a single STS-3 tributary. And the smaller boxes on top of each STS-3 each represent a single STS-1 tributary. This graphic is used to show an STS-12 tributary that can be cross connected at either STS-12, as four STS-3s or as a combination of STS-3s and STS-1s. This graphic will be shown when an STS-12 triburary is selected in a network element that allows cross-connections at all three rates.

STS-12/STS-3



This graphic is similar to the above graphic , but does not contain the STS-1 boxes. The bottom box represents a single STS-12 triburary and the four smaller boxes on top each represent single STS-3 tributaries. This graphic will be shown when an STS-12 tributary is selected and the network element only allows cross connections at the STS-12 and STS-3 rates.

The graphics are designed to provide an immediate visual indication of what is cross connected already and what is available for cross connection. Boxes that are yellow do not contain any cross connections. Boxes that are dark blue do contain cross connections. Boxes that are grey are not available for cross-connection.

For SDH configurations:

- An STS-1 building block is used for a VC-3 tributary.
- An STS-12/STS-3/STS-1 blocks are used for STM-4/STM-1/VC-3 or STM-1 ports/tributaries
- An STS-3/STS-1 blocks are used for STM-1/VC-4 ports/tributaries.

For SDH ports/port groups:

- A SONET DS-3 circuit pack can be used for SDH. In this case, the circuit pack supports 8 ports at the VC-3 cross-connection rate. Therefore, 8 STS-1 building blocks are displayed.
- An STM-16 is equal to an OC-48. You can make 4 VC-4/4c cross-connections (equal to STS-12), 16 VC-4 cross-connections (equal to STS-3) or 48 VC-3 cross-connections (equal to STS-1). Consequently, the breakdown to building blocks for an STM-16 is the same as the breakdown for the OC-48.
- An STM-4 is equal to an OC-12. You can make 1 VC-4/4c cross-connection (equal to STS-12), 4 VC-4 cross-connections (equal to STS-3), or 12 VC-3 cross-connections (equal to STS-1). Consequently, the breakdown to building blocks for an STM-4 is the same as the breakdown for the OC-12.
- An STM-1 is equal to an OC-3. You can make one VC-4 or 3 VC-3 cross-connections. The breakdown to building blocks for the STM-1 is the same as the breakdown for the OC-3.

Any building block that contains multiple layers has each layer of the building block Color conventions

Color conventions

Listed in the following table are the default color conventions used to represent cross connection and tributary properties. These colors may be changed through the Preferences window.

Table 15-1 Color Conventions for Cross Connection and Tributary Properties

Color	Representation
Green	Tributary is selected as a source for cross-connection
Magenta	Cross connection destination(s) (shows when selected)
Red	Cross connection line whose redline property is enabled
Dashed line	Standby cross connection
Orange	Cross connection on tributary is in the process of a pending operation (such as creation, deletion, modification).
Light yellow	Tributary which is not being used for any cross connection or reservation
Blue	Tributary which is being used for a cross connection
Dark blue	Tributary changes to this color when a cross-connection is created. Also indicates a reserved tributary.
Purple	Tributary which is a destination tributary for a cross-connection
Dark green	Tributary which is uni-directional
Grey	Tributary not available for cross-connection

A grey box is also displayed when:

- A multiple level graphic is displayed and there are cross connections at a lower rate than the highest rate in the graphic. For example, the graphic showing both STS-3 and STS-1 tributaries may have a grey STS-3 box if any of the STS-1 boxes are blue (already cross-connected in both directions).
- A multiple level graphic is displayed and for some reason the network element will not allow cross connection at a particular rate in the graphic. This will sometime occur when a specific setting in the network element is made to disable a certain rate.

For network element which allow cross-connections at multiple rates within a single tributary, for which no graphic exists (such as

STS-3/STS-1/VT1.5), the explorer will allow the user to drag and drop either the STS-3 tributary, or the STS-1 tributary to the View Area. In all other cases, only the bottom most level of tributaries shown in the explorer can be dragged to the View Area.

Entering cross-connections

See "Entering cross-connections" (15-25)

Cross-connection topologies

Cross-connection topologies supported by the system include the following:

- One-way point-to-point cross-connection
  NOTE: A one-way cross-connection can be created using the same tributary as source and destination (often referred to as a "loopback").
- Two-way point-to-point cross-connection
- One-way Dual Ring Interworking (path protected) for FT-2000 LCT R. 4.0 NEs
- Multicast cross-connection. Also encompasses bridge cross-connections. A bridge cross-connection allows the addition of a second leg to an existing one-way point-to-point cross-conection, resulting in a 1:2 one-way cross-connection from one input tributary to two output tributaries.
- Roll a cross-connection: this refers to the operation of moving the input of a one-way point-to-point cross-connection from the current input tributary to a new input tributary, while leaving the output unchanged. (For WaveStar® BWM R1.2/R1.3 and later and WaveStar® TDM 10G/STM-64 NEs.)
- Path-switching and dual ring interworking cross-connections
- Path-protected cross-connections to support Dual Ring Interworking (DRI) for FT-2000 LCT, 2.5G (R. 2.0 or later), 2.5G_10G NEs or Dual Node Interworking (DNI—SDH equivalent of DRI) for WaveStar® TDM 10G (STM-64) NEs; or Unidirectional Path-Switched Ring (UPSR)/Subnetwork Connection Protection (SNCP) toplogies for WaveStar® BWM (R3.0 or later) and WaveStar® TDM 10G (STM-64-R2.0 or later) NEs

- Redlining: this refers to the ability to mark a cross-connection and prevent it from being deleted (for WaveStar® TDM 2.5G NEs)
- Cross-connect loopback: a cross-connect loopback is created from an input tributary to the output of the same tributary for testing purposes. A loopback cross-connection can be set up on any logical tributary, whether or not there are cross-connections to that tributary. A loopback cross-connection is a temporary cross-connect; after it is removed, any pre-existing cross-connections that were affected are automatically re-established in the NE.

The system also provides the ability to provision cross-connections at VC-4/STS-3 ports between tributaries on SDH and SONET ports.

Cross-connections by NE type

The following highlights the cross-connection capabilities for NE releases. Cross-connections available for an earlier NE release are also available for a later release of the same NE type.

WaveStar® BWM

- SDH support (VC-3/VC-4 cross-connections)
- STS-3 cross-connections
- Cross-connections at VC-4/STS-3 between tributaries on SDH and SONET ports
- Reservations at the STS-1 level
- Roll (applicable from WaveStar® BWM R1.0)
- Loopback cross-connection (SONET and SDH rates)

WaveStar® TDM 2.5G R2.0-

- STS-3 cross-connections
- Path-protected cross-connections (DRI)
- Redline
- Loopback cross-connection (SONET rates)

WaveStar® TDM 10G R3.0/R4.0.1/R4.1.1/R5.0.2/R5.1.2

- STS-3 cross-connections
- Path-protected cross-connections (DRI)
- Redline
- Loopback cross-connection (SONET rates)

WaveStar® BWM R2.0/R3.0.11/R3.0.15/R4.0

- VC-4-4c cross-connections (fixed rate)
- STS-12 cross-connections (fixed rate)
- Tributaries on STM-64 port

WaveStar® TDM 10G (STM-64) R1.0/R2.0/R2.1/R3.0+

- 1-way and 2-way cross-connections
- Path-protected cross-connections (Dual Node Interworking)
- VC-3, VC-4-4c cross-connections (fixed)
- Roll
- Loopback cross-connection (SONET rates)

FT-2000 LCT R. 4.0

- STS-3 cross-connections
- STS-12 cross-connections
- 1-way, 2-way, and 1-way Dual Ring Interworking (DRI) (1-way path protected) cross-connections
- Pre–provisioning of cross-connections

Adjunct path-protected cross-connections

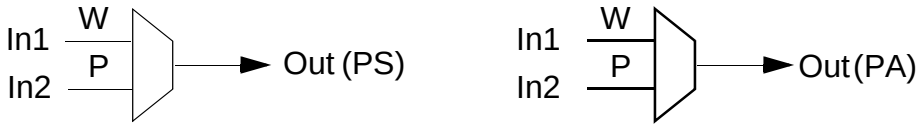
Navis™ Optical EMS supports the establishment of adjunct path-protected cross-connections. An adjunct path-protected cross-connection is established when you create a cross-connection from the same input tributary as an existing path-protected cross-connection, so that both cross-connections have adjunct working legs, but to different output tributaries. The adjunct cross-connection differs from the existing path-protected cross-connection in that it is not established with assignment to a path protection group and depends on the existence of the path-protected cross-connection.

This combination of a path-protected cross-connection with adjunct cross-connections off the same protected input tributary to different output tributaries can serve the following applications:

- A connection between two UPSR rings (SONET) or SNCP rings (SDH). This type of connection requires path selection to drop the circuit from the first ring and bridging to add the circuit into the second ring.
- Dropping traffic at many tributary interfaces in a UPSR/SNCP ring for applications such as video distribution. The path-selected signal is dropped to multiple ports.

The following simple diagram compares how the Navis™ Optical EMS identifies the input and output legs of a path-protected cross-connection with its adjunct cross-connection.

Atomic Cross-Connection Topologies



Path-Protected

consists of:

path protection group
working leg (In1-Out)
protection leg (In2-Out)

reported leg or leg-pair:

1wayPS,W
1wayPS,P

Adjunct Path-Protected

consists of:

adjunct working leg (In1-Out)
adjunct protection leg (In2-Out)

reported leg or leg-pair:

1wayPA,W
1wayPA,P

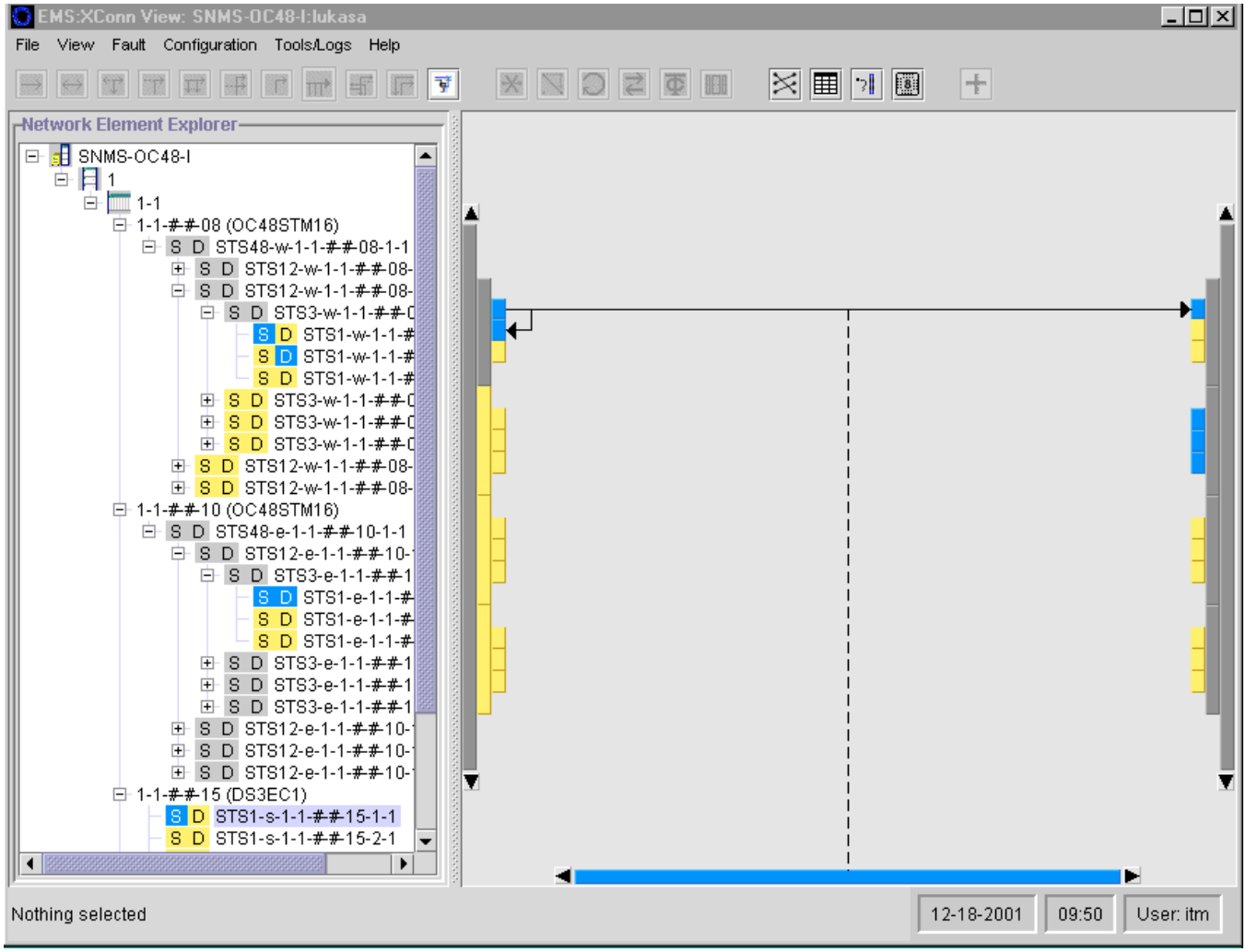
When you display a path-protected cross-connection textually, by clicking the List Cross Connections toolbar button on the Cross-Connection window, each output leg is displayed and identified as either working (PSW) or protection (PSP). When an adjunct cross-connection is displayed on the List Cross Connections window (by clicking the List Cross Connections toolbar button on the Cross Connections window), each output leg is displayed and identified as either working (PAW) or protection (PAP).

Compound cross-connections

Navis™ Optical EMS supports the establishment of compound cross-connections between input and output tributaries in a network element, which may be needed for a specific network application.

The following example of the Cross-Connection window shows multiple cross-connections that have been created graphically on the

main view of the Cross-Connection window (1-way path protected, 1-way adjunct path-protected) using the same set of tributaries.



There are two ways to create compound cross-connections:

- Create individual cross-connections graphically on the main view of the Cross-Connection window
- Create all cross-connections for a specific network topology/application via the Cross Connect Template window (refer to the section “Cross-connect template” (15-22)).

To make it easier to identify an individual cross-connection’s function in a compound arrangement, and to facilitate retrieval of information about cross-connections with associated legs and leg pairs, Navis™

Optical EMS allows you to assign a Cross-Connection Application and Cross-Connection Number to each cross-connection when it is being added.

Cross-connect template

To facilitate the creation of compound cross-connections for a specific network application as a one-step process, rather than having to create individual cross-connections on the main view of the Cross-Connection window, a special Cross Connect Template window can be invoked by clicking the Cross Connect Template button on the Cross-Connection window toolbar for this purpose.

The Cross Connect Template window, when it is invoked, replaces the main view of the Cross-Connection window. The Template window guides you through the process of creating a compound cross-connection through a series of drop-down list fields, textual fields, and other fields that allow you to select tributaries from the Network Element explorer for the cross-connections. You can also enter identifying information (Path Protected Group Name, Cross-Connect alias) for all related multiple cross-connections at once.

In the current Navis™ Optical EMS product release, the Cross Connect Template only supports creation of compound cross-connections for the UPSR/SNCP Add/Drop network topology, which provides protection for two-way traffic between separate NEs in a ring configuration.

For UPSR/SNCP ring Add/Drop cross-connections, the Cross Connect Template provides a one-step method for creating:

- The one-way path-protected cross-connection for Node 1 in the ring
- The two one-way point-to-point cross-connections for carrying traffic from Node 1 to Node 6 in the ring

Cross-connection application

The Cross-Connection Application is a parameter that can be assigned to a cross-connection to identify the cross-connection type. This parameter can be modified for the cross-connection. The following application (cross-connection types) can be optionally assigned when creating or modifying a cross-connection:

- 2-Way Point-to-Point
- 1-Way Point-to-Point

- 1-Way Path-Protected
- 1-Way Adjunct Path-Protected

Cross-connection number

The Cross-Connection Number is a parameter that can be assigned to a cross-connection to associate all atomic cross-connections being established in one step, so the associated legs and leg-pairs with the same Cross-Connection can be retrieved and displayed together on the List Cross-Connections window. When you add a cross-connection or compound cross-connections from the same output tributary, the Navis™ Optical EMS populates the Cross-Connection Number drop-down list for this field with a Cross-Connection Number for each of the atomic cross-connections with the same value. The number is a 9-digit number based on the AID of one of the logical output tributaries.

On the List Cross-Connection window (which is accessed by clicking the List Cross Connections toolbar button on the Cross-Connection window), if you select a leg of a cross-connection with the same Cross-Connection Number that has been assigned to associated legs in compound cross-connections, you can modify or delete all legs of compound cross-connections with the same Cross-Connection number.

Cross-connection alias

The Navis™ Optical EMS allows you to provision a label for each cross-connection. This label can be used for a customer's internal name for the cross-connection or any miscellaneous information that the customer desires to keep with the cross-connection (such as associating a circuit ID with the cross-connection). The cross-connection alias can be entered as part of creating a cross-connection and later modified. Cross-connection aliases are maintained in the Navis™ Optical EMS database and is displayed in the cross-connection list.

Related information

See the following tasks:

- "Display the Cross-Connection Window" (2-39),
- "Display Ports on the Cross-Connection Window" (2-41),
- "View NE Cross-Connections—Textual" (2-42)
- "Add a Single NE Cross-Connection" (7-9)
- "Roll a One-Way Cross-Connection" (7-17)

- "Roll a Two-Way Cross-Connection" (7-21)
- "Add a Path-Protected Cross-Connection" (7-25)
- "Add an Adjunct Path-Protected Cross-Connection" (7-31)
- "Add an NE Multi-Cast Cross-Connection" (7-36)

Deleting cross-connections

See "Deleting cross-connections" (15-27)

Modifying cross-connections

The system allows you to modify various cross-connection information, including the source TID, destination TID, cross-connection application, cross-connection number, and source NE.

For the WaveStar® TDM 2.5G and WaveStar® TDM 10G NEs, the system also allows you to modify the "redline" status of an existing cross-connection. If the "redline" status is set to "yes" on a given cross-connection leg, the cross-connection associated with that leg cannot be deleted. If a tributary associated with the cross-connection has an existing loopback for testing, the "redline" status cannot be modified.

The working and protection legs of a path-protected cross-connection can be modified by being switched.

For compound cross-connections from the same set of input and output tributaries, the Navis™ Optical EMS allows you to change the cross-connection application of the cross-connection.

Related information

See the related tasks in Chapter 7, "Traffic Provisioning" for instructions on modifying cross-connections.

□

Entering cross-connections

Procedure The general steps for entering cross-connections on the Cross-Connection window in the GUI are as follows:

1 Find the triburaries that are to be cross connected together and display them in the view area.

2 Choose the box that represents the source tributary for the cross connection by clicking on the box. The box will turn green. The cross connection type buttons on the toolbar will become enabled, but only those that can use the tributary chosen as a source.

3 Choose a cross connection type by clicking on the button in the toolbar for that cross connection type.

4 Choose the box that represents the destination tributary for the cross connection by clicking on it. An orange line connecting the source and destination tributaries appears (an operation is pending on these tributaries).

5 If it is necessary to provide further information before the cross connection can be completed, an additional information (Cross-Connect Attributes) window is opened. It contains parameter names and lists of values for each parameter. Choose the parameter values for this cross connection and choose OK.

6 Confirm entry of the cross connection when the confirmation window is displayed.

Result:

The cross-connection command is now sent to the network element. When the command has completed (either correctly or with errors), the orange color is removed from the cross-connecton line and changes to black. If the cross connection was created in the network element, the tributaries will turn blue. If the command failed, they will revert to their

original colors.

END OF STEPS

Related information

See the related tasks in Chapter 7, “Traffic Provisioning”.

□

Deleting cross-connections

Procedure The Navis™ Optical EMS denies the request to delete (remove) a cross-connection in the following scenarios, unless some modification is made to the cross-connection to be deleted:

1 A request to remove redlined cross-connections. The modification necessary to delete a redlined cross-connection is to change the redline status of the cross-connections.

2 A request to remove a cross-connection from a tributary also being used in a cross-connect loopback. The modification necessary to remove this type of cross-connection is to remove the cross-connect loopback.

3 A request to remove a cross-connection from a tributary used in a test access connection. The modification necessary to remove this type of cross-connection is to take the tributary out of test access mode using the proper TL1 command (see the vendor NE's documentation for the appropriate TL1 command/syntax to perform this action).

4 A request to remove a path-protected cross-connection that has an adjunct cross-connection associated with the same input tributary. In this case, the adjunct cross-connection associated with the same input tributary as the path-protected cross-connection must be deleted before the path-protected cross-connection can be deleted.

END OF STEPS

Related information

See the related tasks in Chapter 7, “Traffic Provisioning”.

□

16 Traffic Maintenance Concepts

Overview

Purpose

This chapter provides general information about maintaining network element traffic using the Navis™ Optical EMS, such as the setting up of network element protection groups and provisioning protection switches.

Objectives

This chapter explains how to do the following:

- Define, modify, and delete network element protection groups
- Provision protection switches for protected equipment and ports
- View the protection switch status for protected equipment and ports

Contents

Protection Groups	16-2
Protection Switch Management	16-11
Test Access	16-13

Protection Groups

Overview

Protection group management can include both equipment and port protection groups.There are several types of protection strategies, including:

- 1+1 protection (where a service entity and a protection entity serve as a pair, with only one of them active at any given time)
- 1xN equipment protection (where a single protection entity is shared by multiple service entities)
- 4-fiber BLSR protection (for SONET)
- 4-fiber MS-SPRing protection (for SDH)
- 2-fiber BLSR protection (for SONET)
- 2-fiber MS-SPRing protection (for SDH)
- Path/DRI for WaveStar® TDM 10G (STM-64) and WaveStar® TDM 2.5G NEs
- Unprotected entities (0x1 protection)

The Navis™ Optical EMS allows you to retrieve an NE's current protection configuration for its transmission interfaces and to configure, at NE level, the rate, member ports, and attributes of its protection groups. Protection group modifications are done per NE for its associated protection groups. The Navis™ Optical EMS also provides the capability to select a protection group and then to provision a protection switch between the working and protection entities in that group.

The types of electrical and optical interfaces and protection types supported by Navis™ Optical EMS are shown in the following table by the earliest NE release.

Interface	Type of Protection	BWM Rel.	TDM 2.5G Rel.	TDM 10G (STM-64) Rel.
DS3 Port Unit	1XN Equipment Protection	R2.1-/R1.0-	R2.1-/R2.0	
EC1 Port Unit	1XN Equipment Protection	R2.1-/R2.0-		
STM1E Port Unit	1XN Equipment Protection			R3.0-/R1.0-

Interface	Type of Protection	BWM Rel.	TDM 2.5G Rel.	TDM 10G (STM-64) Rel.
E4 Port Unit	1XN Equipment Protection			
OC-3 Port Unit	1+1 Line Protection	R2.1-/R1.2-	R2.1-/R2.0	
STM-1o Port Unit	1+1 Line Protection	R2.1-/R1.2-		R3.0-/R1.0-
OC-12 Port Unit	1+1 Line Protection	R2.1-/R1.2-	R2.1-/R2.0	
STM-4o Port Unit	1+1 Line Protection	R2.1-/R1.3-		
OC-48 Port Unit	1+1 Line Protection 2-Fiber BLSR Protection 4-Fiber BLSR Protection	R3.0-/R2.0- R3.0-/R2.0- R1.1-/R1.0-	N/A R2.1-/R2.0 N/A	
STM-16o Port Unit	1+1 Line Protection 2 Fibre MS-SPRing 4-Fiber MS-SPRing	R2.1-/R1.3- Future R2.1-/R1.2-		R3.0-/R1.0- R3.0-/R1.0- N/A
OC-192 Port Unit	1+1 Line Protection 2-Fiber BLSR Protection 4-Fiber BLSR Protection	N/A Future R3.0-/R2.0-		
STM-64o Port Unit	1+1 Line Protection 2 Fibre MS-SPRing 4-Fiber MS-SPRing	N/A R3.0-/R2.0- R3.0-/R2.0-		N/A R3.0-/R1.0- N/A
Tributary	PATHDRI		R2.1-/R2.0	R3.0-/R1.0-

Protection group discovery

Navis™ Optical EMS retrieves an NE's currrent protection group data for transmission interfaces and stores this information in its database when DNO is performed upon discovery of the NE or update of this information is requested while performing a manual DNO on the NE. For NEs with multiple bays/shelves, such as the WaveStar BWM, DNO can be performed to update protection group data for a selected single bay or shelf.

Provisioning protection groups

Protection groups can be added, modified, or deleted from an NE. You can also view the member ports and attributes for a protection group in an NE.

To add a new protection group for an NE, you select a protection group type from a list of available protection group types for the NE type, pick the rate of the protection group, assign a user-specified protection group ID which is associated with the selected bay and shelf, choose the members (ports) of the protection group, and provision the attributes for the group. In creating or modifying protection groups, Navis™ Optical EMS enforces that all members (ports) of the group are within the same shelf and bay and of the same transmission rate. When you select the first member port on the shelf,the first port becomes the reference port for the other members of the protection group and the remaining allowable choices are other ports on the same shelf.

The following table shows the available protection group types and the operations that can be performed on each one.

Protection Group Type	Operation	NE Release
4F BLSR/MS-SPRing	Establish, Modify, Delete	WaveStar®BWM R1.0, WaveStar® 10G
2F BLSR/MS-SPRing	Establish, Modify, Delete	WaveStar® TDM 2.5G R2.0-, WaveStar® BWM, R. 2.0-, WaveStar®10G (STM-64) R1.0-
1+1 Optical	Establish, Modify, Delete	WaveStar®BWM R1.2-, WaveStar® TDM 2.5G R2.0-, WaveStar® TDM 10G (STM-64) R. 1.0-
1xN Electrical	Modify	WaveStar®BWM R1.0-, WaveStar® TDM 2.5G R2.0-, WaveStar® TDM 10G (STM-64)
Path/DRI	Modify	WaveStar®TDM 2.5G R2.0-, WaveStar® 10G (STM-64) R1.0-

For the optical interfaces, protection switching provides protection against both equipment and facility (line) failures. For the WaveStar NEs, one universal constraint is that all the entities, service and protection, must be within the same shelf.

Modifying protection groups

Once a protection group has been added for member ports in an NE, you can modify the given attributes of a protection group or swap ports in certain protection group types as shown in the following table.

Protection Group Type	Swap
1+1 Optical	Working and Protection Ports
2-Fiber BLSR/MS-SPRing	East and West Ports
4-Fiber BLSR/MS-SPRing	East Working and Protection Ports West Working and Protection Ports

When modifying a protection group, the type, rate, and member ports of the group cannot be changed.

Deleting protection groups

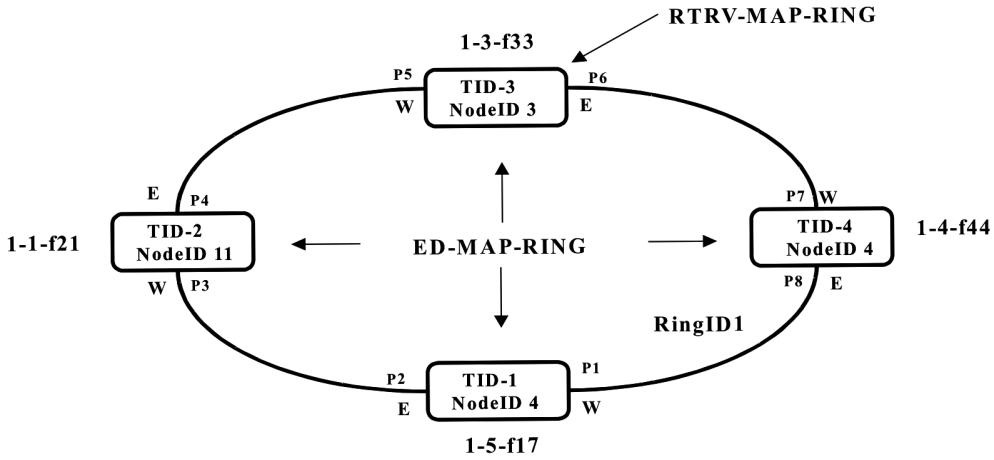
Deleting a protection group removes it from an NE.

Bidirectional line-switched ring (BLSR) ring maps

The Navis™ Optical EMS allows you to create a new ring map or modify an existing ring map of interconnected WaveStar® BWM R4.0- network elements that provide 2–fiber or 4–fiber BLSR protection. You can view a discovered ring of DCC-connected network elements or a manually created ring map. Manual ring provisioning allows multi-vendor network elements to provide BLSR protection.

Ring map diagram

The following figure graphically illustrates a ring map of network elements with its identifiers.



Discovery of ring maps

To retrieve an existing ring map, Navis™ Optical EMS issues a `RTRV-MAP-RING` command to the local network element to discover a network ring. If a TL1 command request to retrieve a BLSR ring that contains only WaveStar network elements is issued, the Navis™ Optical EMS automatically discovers the neighbor network elements in the ring map. If a non-WaveStar® network element is introduced into the BLSR ring, the ring map is downloaded into each WaveStar® network element in the ring. If a WaveStar network element is introduced into a ring of non-WaveStar® network elements, then a ring map is loaded into the WaveStar® network element.

Provisioning a ring map

The Navis™ Optical EMS allows you to create a new ring map or modify an existing one.

To create a new ring map or update an existing map, the Navis™ Optical EMS issues an `ED-MAP-RING` command to the corresponding local network element. This command activates an inactive ring map for updates.

To create or modify a ring map, you specify the following:

- the local network element TID (the ring map is stored in this network element's memory)
- the protection group AID on the local network element
- the list of network elements (identified by TID and correspond node ID)

The Navis™ Optical EMS builds the ring map, starting from the local network element identified and going in an eastern direction from this network element, and sends the ring map information to the local network element.

The maximum number of network elements that can be provisoned in a ring map is 16. The minimum number of network elements allowed in a ring is 2. Valid node IDs are 0 to 15. All TIDs and node IDs are unique and cannot be repeated in a ring map. Navis™ Optical EMS shifts the node IDs in ring map list until the network element with the lowest node ID is in the first position.

Viewing a ring map

The Navis™ Optical EMS allows you to view a ring map autodiscovered via the DCC interconnectivity of network elements in the ring or manually provisioned. The ring map displayed depends on the selection of the local network element and protection group AID and its interconnected network elements. When requested through the GUI, the resulting display shows, in tabular format, the local network element TID and node ID, and the list of network elements in the ring, identified by their TID and node ID. The TIDs and node IDs must be unique in the list. The network elements are presented as pairs in the ring, showing the TID of the From network element and the To network element and the direction of the connnection. The ring map is requested by Navis™ Optical EMS issuing a `RTRV-MAP-RING` command to the local network element. The ring map display may show varying degrees of detail, depending on whether the ring map

was manually provisioned or previously autodiscovered. For example, the display may only show the TID of the From network element in the node pairings or may not contain any connectivity information.

Non Preemptible Protection Access (NPPA)/Non Preemptible Unprotected Traffic (NUT) Provisioning

Another layer of traffic protection is provided by network elements by managing bandwidth and dividing the available timeslots into working and protection capacity. For example, on an OC-192 port, timeslots/tributaries 1–96 serve as the working timeslots/tributaries for in-line traffic and timeslots/tributaries 97–192 serve as the protection timeslots/tributaries for automatic switching of traffic from the working timeslots/tributaries in the event of communications failure.

Non Preemptible Protection Access (NPPA)

To increase the available in-line traffic capacity on a 2–Fiber BLSR or 4–Fiber BLSR ring, some network elements/interfaces support Non Preemptible Protection Access (NPPA). NPPA allows in-line traffic to be carried on both the working and protection timeslots/tributaries of the bandwidth. In-line traffic carried on the protection timeslots/tributaries cannot be pre-empted by traffic from the working side of the bandwidth due to communication failure, so traffic on the working timeslots/tributaries is unprotected.

Non Preemptible Unprotected traffic (NUT) provisioning

For certain network elements and interfaces that support NPPA protection, the Navis™ Optical EMS provides the flexibility of overriding the automatic preempting of traffic on the protection side of the bandwidth, on specified working/protection timeslots. You can provision the handling of traffic between the service/protection side of a specified timeslot pair. For example, you can designate traffic on a timeslot of the service side to be protected and traffic on its corresponding timeslot of the protection side preemptible.

The Navis™ Optical EMS allows you to display and modify the NUT status of a selected timeslot. The number or range of timeslots for display and modification is based on the transmission rate selected.

The following table shows the values that can be selected for the NUT status of working/protection timeslot pairs, based on a bandwidth of 192 timeslots for an OC-192 or VC-3 interface. Timeslots 1–96 are for the working (service) capacity and timeslots 97–192 are for the protection capacity.

NUT Value of Timeslots 1–96 (working)	NUT Value of Timeslots 97–192 (protection)
protected	preemptible
unprotected	not preemptible
temporary unprotected	temporary not preemptible

NPPA/NUT provisioning by NE type

The following table shows which types of NPPA/NUT protection provisioning are supported by NE type/release.

Network element type/release	Transmission interface	Types of protection
WaveStar® Bandwidth Manager R. 2.0–	OC-48 Port Unit	2–Fiber STS-n NPPA,4–Fiber STS-n NPPA
WaveStar® Bandwidth Manager R. 2.0–	STM-64o Port Unit	2–Fiber VC-n NPPA/NUT,4–Fiber VC-n NPPA/NUT
WaveStar® TDM 2.5G R. 3.0–	OC-48 Port Unit	2–Fiber STS-n NPPA/NUT
WaveStar® TDM 10G R. 6.0–	OC-192 Port Unit	2–Fiber STS-n NPPA/NUT
WaveStar® TDM 10G (STM-64) R. 4.0–	STM-16o Port Unit	2–Fiber VC-n NPPA/NUT
WaveStar® TDM 10G (STM-64) R. 4.0–	STM-64o Port Unit	2–Fiber VC-n NPPA/NUT

Provisioning a protection switch

A protection switch in a protection group occurs automatically when a signal failure, signal degradation, equipment failure, or similar cause prompts a switch from the working entity in a protection group to the protection entity. The Navis™ Optical EMS also allows you to provision a protection switch on demand through a GUI-based function on the Manage Protection Groups window. To provision a protection switch, you specify the protection group type, protection group AID, protection switch type (command), and the destination of the entity that should be active after the protection switch is activated. In some types of protection groups (for example, 2-Fiber BLSR), the protection switch is made between the working and protection ports, while in equipment protection groups (for example, 1xN Electrical), the protection switch is made between working and protection circuit packs.

Related information

See the related tasks in Chapter 8, “Traffic Maintenance”.

□

Protection Switch Management

Overview

The Navis™ Optical EMS has the capability to monitor and control protection switches that can occur as a result of a fiber cut, signal degradation, equipment failure, or loss of signal, thereby provoking a switch from the working to the protection facility. Protection switches can occur automatically or be manually provisioned by the user.

Protection switch status information is generated by NEs for:

- ports involved in 1+1 optical line protection
- circuit packs involved in 1xN equipment protection
- ports involved in 2-fiber BLSR/2-fiber MSSPRing protection
- ports involved in 4-fiber BLSR/4-fiber MSSPRing protection
- signal rates that are path protected
- optical ports involved in optical channel path protection

Protection switch management functions

The protection switch management functions provided by Navis™ Optical EMS are:

- monitoring the messages generated by the NE in response to protection switch requests that occur automatically due to incoming signal failure, incoming signal degrade, circuit pack failure, or similar cause
- maintaining the status of protection switches in the Navis™ Optical EMS database based on the protection switch messages received by the system
- provisioning protection switches for a given protection group type, while viewing autonomous messages received about protection switch activity for that protection group type, from the Protection Status Management window (see
- logging all autonomous and user-generated (CIT/Navis™ Optical EMS) protection switch requests and NE messages generated in response to switch requests. Protection switch requests and resulting messages can be viewed through the Network Notification Log (see Display and Use the Network Notifications Log in *Navis™ Optical EMS Maintenance Guide*.)
- notifying the user of a protection switch status change
- displaying the current protection switch status for a protection type for one or more NEs on demand

- displaying the history of protection switch status changes for a protection type for one or more NEs on demand
- operating a protection switch

Related information See the related tasks in Chapter 8, “Traffic Maintenance”

□

Test Access

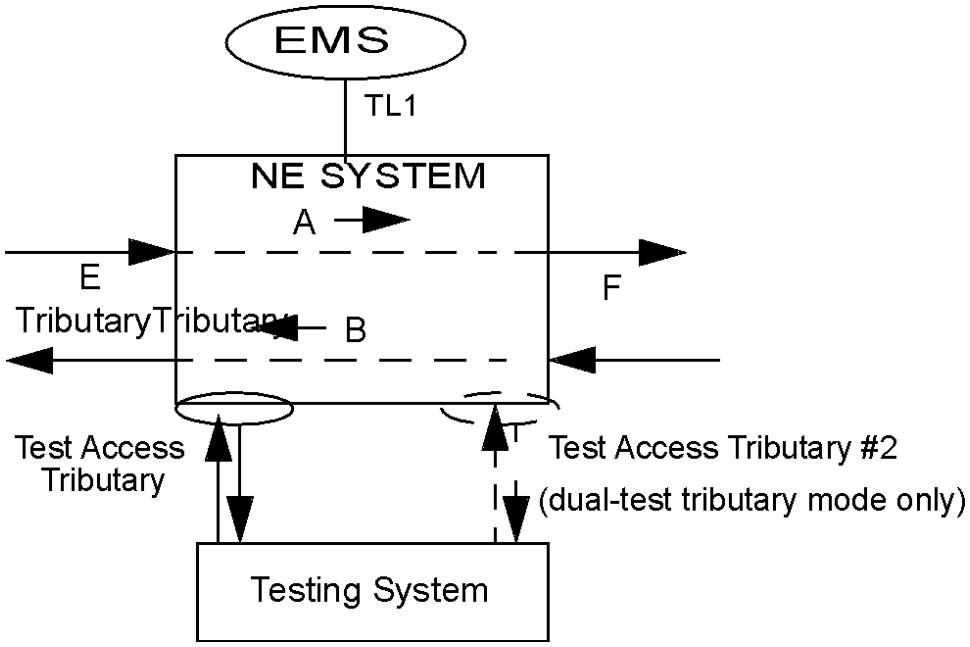
Overview

Test access is a set of cross-connection topologies used in conjunction with a testing system to monitor and split signal paths for the purpose of fault isolation. It consists of a set of non-intrusive operations (or "monitoring" modes) and intrusive operations (or "split" modes) that aid users in turning up facilities and in fault isolation of existing service circuits.

The applications for test access are associated with testing the quality of circuits over part or all of an end-to-end connection that traverses multiple networks. At its simplest, it may involve monitoring a signal at a particular NE. More generally, it involves splitting a path at an NE so that a test signal can be injected by the testing system and the received signal can be monitored by the testing system. This is often associated with a loopback at a distant NE. These tests can be done on one direction of a circuit or in both directions at once.

Test access architecture

The following figure illustrates the various components of setting up test access between the NE, the Navis™ Optical EMS, and an external test system.



E-end and F-end tributaries

The E-end and F-end are tributaries that are arbitrarily designated as near-end (E) and far-end (F) of a one-way or two-way cross-connection, with the dashed lines indicating the signal traveling through the system. The signal path from the E-end to the F-end is referred to as the “A” direction; the opposite direction as the “B” direction. If there is only a one-way cross-connection, the signal travels in the A direction. If an idle (un-cross-connected) tributary is the focus of test access, it is always the E-end. Note that the arrows indicate individual tributaries.

Test access modes

The Navis™ Optical EMS issues commands to the NE system through the GUI functions to make various “monitor” (bridge) connections or “split” connections between the tributaries under test and the test access tributaries. These are the test access “modes”. There are single-test tributary modes that access only the E-end or F-end (when supported) or the A direction or B-direction (when supported) and there are dual-test tributary modes that access both the A and B directions. The connection to the second test access tributary in a dual-test tributary mode is always from/to the B direction.

□

17 Software Upgrade Concepts

Overview

Purpose

This chapter provides general information about managing and upgrading network element software for NEs managed by the Navis™ Optical EMS, both on an on-demand and scheduled basis.

Objectives

This chapter explains how to do the following:

- Transfer the NE software from media to the Navis™ Optical EMS host
- Download NE software from the Navis™ Optical EMS host to the NE
- Copy NE software from one NE to another NE
- View NE software descriptive information
- Activate NE software on an NE
- Delete a specific NE software release from Navis™ Optical EMS
- Back up NE provisioning data
- Restore NE provisioning data from backup
- Scheduling tasks (such as software management functions) through the Navis™ Optical EMS

Contents

Software Management	17-3

Scheduling Tasks	17-15

Software Management

Overview

The Navis™ Optical EMS Software Management feature provides a set of functions that automates the process of transferring NE software from CD-ROM to the Navis™ Optical EMS host machine, and downloading, activating, and copying software to NEs. The Software Management functions assist you in doing a generic software upgrade of a given NE type in the network by providing the ability to download NE software to NEs. The Software Management features also provides backup and restore functions to protect against NE data loss. Software management functions can be peformed on demand or scheduled to be performed at a later time.

Software management functions

The following functions are provided:

Executables

- NE Software Transfer (Import Software to the EMS)
- NE Software Download
- NE Software Copy
- NE Software Activate
- NE Software Delete

Data

- NE Software Backup
- NE Software Restore

Software Release Information

- View software release descriptive information

Ways to perform software management functions

Some of the Software Management functions can be performed either on-demand or scheduled. Scheduled tasks are set up to be performed once or periodically at a certain time. As with other scheduled tasks, you can specify the number of times to retry a failed or incomplete Software Management activity, as well as the time interval between attempts.

The following table indicates how the various Software Management functions can be performed.

Table 17-1 Methods of Performing Software Management Function

Software Management Function	On-Demand	Scheduled
NE Software Transfer	3	
NE Software Download	3	3
NE Software Copy	3	3
NE Software Activate	3	3
NE Software Delete	3	
NE Software Backup	3	3
NE Software Restore	3	

Related information

For details about how to schedule Software Management functions, see the related tasks in Chapter 9, “Software Upgrade”.

Software transfer via removable media

For file transfer from CD-ROM, the user must both physically load the CD-ROM and use UNIX utilities to mount the file system for the CD-ROM. Once the CD-ROM has been inserted and mounted, a user can use the EMS GUI application to transfer the files from the CD-ROM to the EMS file system.

Important! It is also possible to use other commonly available tools and applications to get software files into the EMS file system (for example, use file transfer software, such as File Transfer Protocol (FTP), to transfer software to Navis™ Optical EMS over a network).

Viewing descriptive information for an NE software release

Prior to transferring a new software release or after the software transfer, the Navis™ Optical EMS provides a function for viewing

descriptive information for all software releases that are currently maintained on the Navis™ Optical EMS host machine for a given NE type.

Maximum number of software releases on Navis™ Optical EMS host

The maximum number of software releases for a given NE type than can reside on the Navis™ Optical EMS host machine varies with the host type.

If the host limit is exceeded, and you attempt to transfer a new software release, Navis™ Optical EMS informs you of this and instructs you to delete at least one of the existing software releases. You can use the NE Software Delete function to do this. See "Delete NE Software" (9-14) in Chapter 9, "Software Upgrade" for instructions on how to delete NE software from Navis™ Optical EMS.

Related Information

"Import Software to the Navis™ Optical EMS" (9-3) in Chapter 9, "Software Upgrade" describes how to import NE software from DAT or CD-ROM to the Navis™ Optical EMS host for eventual downloading to for an NE type.

NE software download

The Software Download function allows you to download a specific software release from the Navis™ Optical EMShost to a specified NE. Software downloads are done by specifying the NE type and the software release to download. Software downloads are performed by the Navis™ Optical EMS via an NE LAN interface using File Transfer Access Method (FTAM) protocol.

Verifying software downloads

When a software download is performed Navis™ Optical EMS checks if the release identified for the download is older than or the same version currently running on the NE, or if it is a release that is not supported by Navis™ Optical EMS. If any of these conditions occur, Navis™ Optical EMS informs you of this, and asks if you want to proceed with the software download anyway. You have the option of continuing with the software download or cancelling it. Navis™ Optical EMS informs you of the status of the download. If the software download fails for some reason, Navis™ Optical EMS issues an error message.

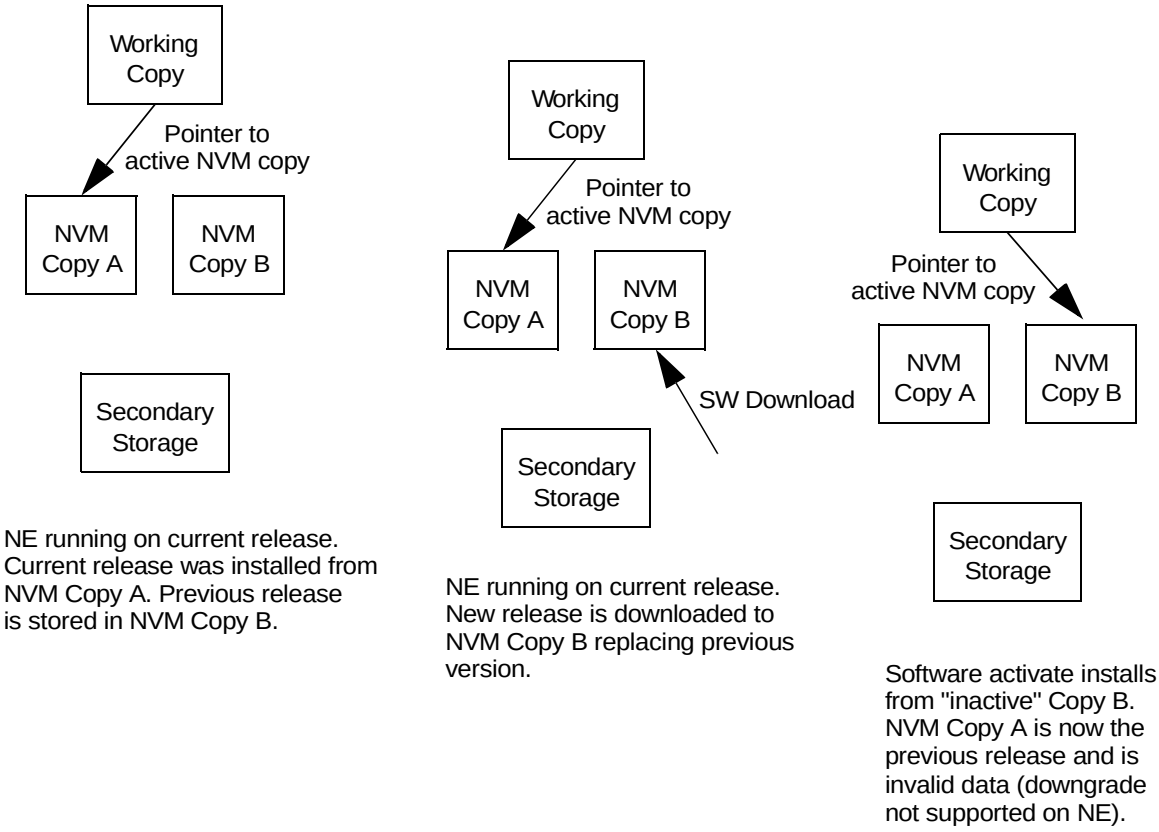
Maximum number of software downloads

Only one software download should be performed at a time. A software download may take up to two hours due to data communications and the size of the software being downloaded.

The WaveStar NE Software Download Process

The following figure illustrates the software download/activation process for NEs.

Figure 17-1 WaveStar NE Software Download/Activation Process



When software is downloaded from the Navis™ Optical EMS to an NE, it replaces the non-working copy in the NE's Non-Volatile Memory (NVM). When you perform a software download and click the Apply button on the Software Download to NE window, the currently non-working release is activated and becomes the active version. The software release that it replaces in working memory remains in the NVM and becomes the previous software version.

Related information

"Download NE Software" (9-7) in Chapter 9, "Software Upgrade" describes how to use the Software Download function.

NE software copy

The Software Copy function allows you to copy software from a Lucent Technologies NE to one or more Lucent Technologies NEs of the same type.

Verifying software copies

When a software copy is performed, Navis™ Optical EMS checks if the release identified for the copy is older than or the same version currently running on the destination NE(s). If either of these conditions occur, the Navis™ Optical EMS informs you of this, and asks if you want to proceed with the software copy anyway. You have the option of continuing with the software copy or cancelling it. Navis™ Optical EMS informs you of the status of the copy. If the software copy fails for some reason, Navis™ Optical EMS issues an error message.

Maximum number of software copies

The maximum number of simultaneous software copies from a given source NE allowed is 4.

The maximum number, in total, of simultaneous remote copies within an open or closed ring of NEs allowed is 8.

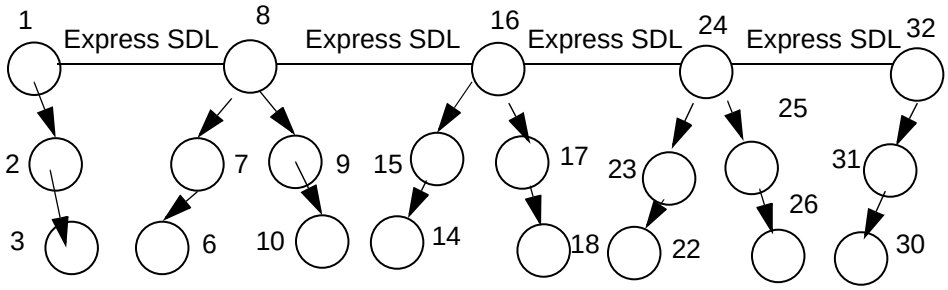
Navis™ Optical EMS software upgrade process

The process of upgrading NEs with the latest software through the Navis™ Optical EMS is a combination of the Software Download, Software Copy, and Software Activate functions requested by the user that are executed by the system in a certain order or sequence.

The software upgrade process is performed on one open or closed ring of NEs at a time.

Refer to the following figure that shows a sample 32 node open ring configuration when following the sequence of events for a software upgrade by the Navis™ Optical EMS.

Figure 17-2 Software Upgrade Process: 32 Node Open Ring Configuration



1. The Navis™ Optical EMS downloads the software to all NEs within the open or closed ring that have the Express Software Download (SDL) terminated.
2. One all software downloads in step 1 are completed, the Navis™ Optical EMS remote copies the software from the NEs downloaded in step 1 to those NEs' neighbors.
3. Once all remote copies in step 2 are completed, the Navis™ Optical EMS remotely copies the software from the NEs that have just received the remote copies from the source NEs in step 2 to those NEs' neighbors.
   The express software downloads are terminated are nodes 1, 8, 16, 24, and 32.
   The process continues until all NEs contain the desired software load.
4. NEs should then have the active/inactive partition swapped and reset, starting from the NE furthest away and working towards the NE connected to the Navis™ Optical EMS.

Related information

"Copy Software from NE to NE" (9-9) in Chapter 9, "Software Upgrade" describes how to use the Software Copy function.

NE software activate

The Software Activate function allows you to activate a specific software release on an NE. When new software is downloaded to an NE, it is placed in ″standby″ until it is activated; it then replaces the old software.

Software activation for NEs

Some NEs maintain two copies of software in Non-Volatile Memory (NVM), one of which corresponds to the installed and working software and the other is typically the previous version that was replaced by the current working version. When a new version is downloaded using the Software Download function, it replaces the old version in the NE's NVM. When a software activation is performed, the new software release is installed from the NVM and current running version becomes the standby version in NVM.

Verifying software activations

When a software activation is performed, the Navis™ Optical EMS checks if the software being activated is the same as the current version, older than the current version, or is currently not supported by the Navis™ Optical EMS. If either of these conditions exist, Navis™ Optical EMS informs you of this, and asks if you want to continue with the software activation anyway. You have the option of continuing with the software activation or cancelling it.

Software activation failures

When Navis™ Optical EMS is unable to complete an on-demand request to activate NE software on one or more NEs because some of the NEs rejected the software activation request, the Navis™ Optical EMS displays an error message for each failed NE request.

Loss of communications

When the Navis™ Optical EMS loses its connection to the NE as a result of a software activation request, and determines that the activation request was unsuccessful upon re-establishment of the connection with the NE, a failure message is logged in the Activity Log and the Navis™ Optical EMS issues a failure message in the status bar for failed on-demand requests.

Related information

"Activate NE Software" (9-12) in Chapter 9, "Software Upgrade" describes how to use the Software Activate function.

NE software delete

The Software Delete function allows you to delete a specific software release from the Navis™ Optical EMS for an NE type.

When software is deleted from Navis™ Optical EMS, it is not recoverable. The only way to get the software back into Navis™ Optical EMS is to reload it from a CD-ROM. Navis™ Optical EMS informs you of this prior to actually deleting the software. You have the option of continuing with the software deletion anyway or cancelling the deletion.

Related task

"Delete NE Software" (9-14) in Chapter 9, "Software Upgrade" describes how to use the NE Software Delete function.

NE data backup

The NE Software Backup feature lets you perform an on-demand backup of an NE's provisioning data. The provisioning data includes port parameters and cross-connections.

To avoid unnecessary redundant backups of NE data that has not changed since the last backup, the Navis™ Optical EMS checks the selected NE to make sure a backup is necessary. If there is no change in the NE's configuration status since the last backup, a backup is not necessary and you are informed of this and given a choice of performing the backup anyway or cancelling it. If you choose to do a backup anyway, all data is backed up.

Storage of backup data

NE backup data is stored in flat ASCII files with header information, including the NE type, software release, NE's TID, equipment/slot information, the ID of the user performing the backup, date/time of the backup, and the system release that created the backup.

Simultaneous backups

The number of simultaneous NE backups (either on-demand or scheduled) that can be performed depends on the Navis™ Optical EMS host type.

The following table shows, by server type, the maximum number of simultaneous NE backups allowed.

Host	Number of Simultaneous NE memory backups
K580 (6 CPU)	6

Host	Number of Simultaneous NE memory backups
K580 (4 CPU)	6
K460 (4 CPU)	6
K580 (2 CPU)	6
K460 (2 CPU)	6
K380	4
K360	4
L2000 (1, 2, 4 CPU)	6
N4000 (8CPU)	6

If you attempt to perform more than the maximum number of simultaneous backups than can be performed for the Navis™ Optical EMS host type, the new backup is not accepted and Navis™ Optical EMS informs you that no more backups can be performed at the current time.

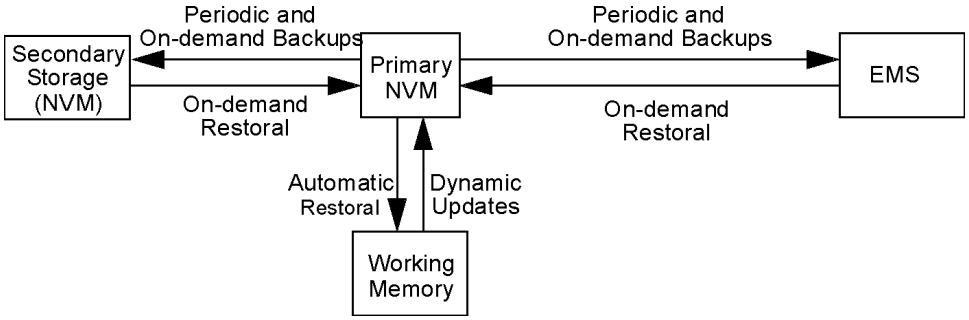
Backups/Restorals for the WaveStar NEs

Some of the WaveStar® NEs and WaveStar® NCCs have both a primary NVM that mirrors the current working memory configuration and a local secondary storage device that provides a local memory backup and restore capability. Navis™ Optical EMS supplements the local memory backup and restore, by both managing the local backup and restore capability and providing additional capabilities to back up and restore NE configuration data to/from Navis™ Optical EMS as is done for other NE types.

The WaveStar®NEs Memory Backup and Restore Process

The following figure illustrates the basic memory backup and restoral scheme for the WaveStar® NEs.

Figure 17-3 The WaveStar® NEs Memory Backup and Restore Process



Data transfers between the NE's primary NVM and secondary storage use local file system copy functions. The Navis™ Optical EMS allows you to choose whether to back up the NE data to the Navis™ Optical EMS memory or the NE's local secondary storage.

Alarms present during backups

If an on-demand NE backup is performed on an NE with alarms present, you are informed of this and given a choice of proceeding with the backup anyway or cancelling it.

Related task

"Back Up NE Data" (9-16) in Chapter 9, "Software Upgrade" describes how to use the NE Software Backup function.

NE data restore

The NE Restore function allows you to restore NE data that was backed up using the NE Backup function.

When a backup or restore is in progress, the Navis™ Optical EMS prevents the execution of any command that may change the settings of NE parameters until the backup or restore is completed.

When a restore is requested, the Navis™ Optical EMS compares the NE type, software release, and equipment of the NE with the data in the selected backup file. If the NE type or software release does not match, a message is issued and you are given the option of continuing with the restore anyway.

Regular restore

The Navis™ Optical EMS performs a regular restore. This means that the system restores all backup data from the selected NE file, including parameters set to the default settings.

Restoring NE backup data

The files that are created by the NE Backup function are accessible through the NE Restore function. The Navis™ Optical EMS stores up to seven files for each NE. When seven backup files exist and another backup file is created, the oldest backup file is removed.

Verifying NE restorals

The Navis™ Optical EMS keeps you informed about the status of the NE restoral in progress. If the restoral fails for some reason, the Navis™ Optical EMS informs you of the problem via a pop-up message window.

Related Information

"Restore NE Data" (9-18) in Chapter 9, "Software Upgrade" describes how to use the NE Restore function.

Load management and software management functions

The Navis™ Optical EMS has a Load Manager process that determines how the system behaves during high load conditions. The Load Manager coordinates the processing of transactions initiated by the Navis™ Optical EMS users that involve multiple data transfers and acts as a ″gatekeeper″ that interprets command notifications to the appropriate backend process that actually performs the data transfer.

The Load Manager checks whether the average CPU utilization (at that instant) exceeds a set value or whether there is an overload condition in effect. If either of these condition is true, new commands are delayed until the CPU utilization is below the set value or the system is no longer in overload.

The Load Manager checks the following activities:

- NE backups
- NE software downloads
- DNOs
- Data transfers to other OSs
- Periodic maintenance activities (such as database and file purges)

If the average CPU utilization exceeds a Delay Threshold of 70% of the total CPU capacity (the pre-set default), any/all of the above activities are suspended until this is no longer true and the system is not in overload.

The system resumes processing of transactions, on a first-in, first-out basis, in the following order:

1. All transactions requested by users in ″ad hoc″ (on demand) mode
2. All scheduled NE data backups
3. All other scheduled tasks.

□

Scheduling Tasks

Overview

Many of the administrative functions that are performed on demand can also be scheduled to be done periodically, and/or a specific time through the GUI.

Tasks that can be scheduled

The following tasks can be scheduled:

- DNO
- NE Date/Time Synchronization
- NE Software Download
- NE Software Activate
- NE Software Copy
- NE Backup

Scheduling methods

Tasks can be scheduled to be performed periodically (daily, weekly, monthly, once every *x* months) or as a one time event.

NE software downloads, NE software copies, and NE software activations are scheduled as one time events. DNOs, NE date/time synchronizations, and NE backups are scheduled to be performed periodically.

Retrying scheduled tasks

The Scheduler software allows you to specify the number of times to automatically retry a scheduled task that did not complete or failed due to loss of communications with the NE or some other reason.

You can also specify the timer interval between retries. The retry interval timer starts on receipt of the failure response by the scheduled task server for the task type. The system attempts to complete the failed scheduled task the number of specified times.

Each failed scheduled task is logged in a task-specific error log in the *$ROAMLOG/SCHED.out* directory.

Scheduling simultaneous tasks

The number of tasks that can be scheduled simultaneously depends on the task type and the Navis™ Optical EMS host server size.

If the number of tasks that you schedule to be performed in the same timeframe exceeds the maximum number allowed, Navis™ Optical EMS informs you of the next available timeslot for scheduling the task. The system calculates the next available timeslot based on the

number of tasks already scheduled and the process duration of each task type. The process duration can vary with the NE type for which the task is being performed. For example, a DNO for most NE types takes approximately 30 minutes. Depending on the size and equipage of an NE, however, a DNO can take up to 180 minutes.

Modifying and deleting scheduled tasks

You can also modify and delete scheduled tasks. However, if a scheduled task is already in progress, you cannot modify it.

For scheduled software downloads and DNOs, if you attempt to delete a task that is already in progress, a warning message is issued, asking if you want to continue with the deletion. If you indicate that you want to delete the in-progress job, the job is terminated and is removed from the scheduled list.

CAUTION: Deleting scheduled DNO requests can result in database discrepancies between the Navis™ Optical EMS database and the network configuration.

Load management and scheduled tasks

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The Load Manager checks whether the average CPU utilization (at that instant) exceeds a set value or whether there is an overload condition in effect. If either of these condition is true, new commands are delayed until the CPU utilization is below the set value or the system is no longer in overload.

The Load Manager checks the following activities:

- NE backups
- NE software downloads
- DNOs
- Data transfers to other OSs
- Periodic maintenance activities (such as database and file purges)

If the average CPU utilization exceeds a Delay Threshold of 70% of the total CPU capacity (the pre-set default), any/all of the above

activities are suspended until this is no longer true and the system is not in overload.

The system resumes processing of transactions, on a first-in, first-out basis, in the following order:

1. All transactions requested by users in ″ad hoc″ (on demand) mode
2. All scheduled NE data backups
3. All other scheduled tasks.

Related information

For specific information on scheduling tasks, refer to related tasks in Chapter 9, “Software Upgrade”.

□

Index

A

Activate

network element software;Network element, 9-12

Add

adjunct cross-connection;Adjunct cross-connection, 7-31

compound cross-connections, 7-39

cross-connection;Cross-connection, 7-9

network element, 11-47

network element protection;Network element protection, 8-3

one-way bridge cross-connection, 7-54, 7-61

one-way merge cross-connection, 7-47

path-protected cross-connection;Cross-connection, 7-25

X.25-connected network element;Network element, 3-4

Add an Aggregate button, 10-15

Adjunct path-protected cross-connection;Cross-connection

adjunct path-protected, 15-19

Administration, 10-14

Aggregate, 13-2

add;Add, 5-6

change alias;Modify, 5-9

change shape;Change, 2-18

delete;Delete, 5-11

display on Map window, 10-19

expand;Expand, 2-13

Map window symbol;Map window, 13-2

Alarm

Map window display;Map window, 10-20

Alarm color

change;Change, 2-18

Alarm Notification window, 10-8

Alarm Severity button, 10-15

Alarm severity level

change display of;Change, 2-18

Alarms, 1-4

Alarm states, 1-4

Autonomous alarm messages, 1-4

Correlation, 1-4

Provisioning, 1-4

Status indication, 1-4

Summary report, 1-4

Alias

cross connection, 15-23

Architecture

Hardware, 1-8

Software, 1-14

Audible Alarm feature, 10-22

Audible Alarms button

enable/disable, 10-15

Automatic date/time synchronization;Date/time synchronization

automatic, 6-22

B

Back up

network element provisioning data;Provisioning data, 9-16

Broadcast

TL1 command;TL1 command, 2-29, 10-51

C

Clear

status message;Status message, 2-17

Clear the Status Line button, 10-15

CMISE, 1-2, 1-6

Common Management Information Protocol (CMIP), 11-22

Common Management Information Service Element (CMISE), 11-5, 11-22

Communication state

network element;Network element, 3-76

Compound cross-connections, 7-39, 15-20

Configuration, 10-14

Configuration management, 1-5

Copy

network element software;Network element, 9-9

user preferences;User preferences, 2-23

Cross Connect Template, 7-39

Cross Connect Template window, 15-22

Cross connection

alias, 15-23

Cross-connection, 15-5

add, 15-25

delete multiple, 7-73

delete;Delete, 7-70

modify;Modify, 7-76, 7-79, 15-24

one-way bridge, 7-54, 7-61

one-way merge, 7-47

view list, 2-42

Cross-connection application, 15-22

Cross-connection number, 15-23

Cross-Connection Number, 15-23

Cross-Connection window, 2-39, 15-6

color conventions used on, 15-15

display ports on, 2-41, 15-10

Cut-through, 1-7, 10-50

Cut-through capability, 1-3, 1-7

Cut-Through window, 10-50

D

Data Communications Network (DCN), 11-41, 11-43

Database synchronization, 11-51

Date format

change format for items;Change, 2-19

Date/time synchronization, 6-14, 14-6

Delete

cross-connection;Cross-connection, 7-67

network element software;Network element software, 9-14

network element;Network element, 3-30

scheduled item;Scheduled item, 3-58

scheduled task, 17-16

scheduled task;Scheduled task, 6-29, 9-42

Dense Wavelength Division Multiplexing (DWDM), 1-2

DIB prefix

add;Add, 3-61

delete;Delete, 3-65

Directory Information Base (DIB), 11-24

add network element to;Network element, 3-66

Directory Services Agent (DSA), 1-19, 11-11, 11-24, 11-43

alarms, 11-27

EMS-based, 11-27

NCC-based;Network Communications Controller (NCC), 11-34

Directory Services Agent (DSA);Directory Service Agent (DSA) icon

Map window;Map window, 10-20

Directory User Agent (DUA), 1-19, 11-24

Download

network element software release;Network element, 9-7

Drift threshold

date/time synchronization;Date/time synchronization, 6-20

DSA. See Directory Services Agent (DSA);, 3-72

Dynamic Network Operation (DNO)

schedule;Schedule, 3-53

Dynamic Network Operation (DNO);, 3-49

Dynamic Network Operations (DNO), 1-2, 1-5, 1-19, 11-48, 11-51

ways to initiate, 11-53

E

Element Management System (EMS), 1-2, 1-2

EMS alarm icon

Map window;Map window, 10-19

Equipment

details;Network element, 2-37

Equipment display, 10-52

Equipment provisioning;Network element

equipment provisioning, 12-2

Establish

equipment;Equipment, 4-14

Expand

equipment view;Equipment view, 10-36

item on Map window;Map window, 10-17

Expand item

subnetwork explorer;Subnetwork explorer, 2-10

F

Fall Back/Spring Forward, 14-7

enable;Enable, 6-17

Fault, 10-14

Fault management, 1-4

Fields

manipulating in GUI;Graphical User Interface (GUI), 10-5

File, 10-14

Filter

list items;Sort, 10-43

Find a network element

Map window;Map window, 2-16

G

Gateway (GW) process, 1-18

Gateway network element, 11-5

add;Add, 3-22

associate with remote network element;Remote network element, 3-38

association, 3-45

backup;Gateway network element, 3-41

multiple, 11-7

switch active and standby, 3-43

Global Acknowledge button, 10-15

Global Unacknowledge button, 10-16

GNE. See Gateway network element;, 3-41

Graphical User Interface (GUI), 1-3, 10-3

multiple instances, 10-10

session time-out;Session time-out, 10-10

GUI client, 1-8

H

Help, 10-14

Help button, 10-16

Help feature;Tooltips help, 10-30

HP server, 1-8

I

Import

network element software release;Network element, 9-3

Informix Enterprise Replication, 1-13

L

LambdaRouter, 12-3

Large Capacity Terminal (LCT), 1-2

List

equipment;Equipment, 2-34

Lists

using, 10-41

Load Manager process, 11-53, 17-13, 17-16

log into Navis Optical EMS, 2-3

Log management, 1-6

Log out

Navis Optical EMS, 10-11

Log out of Navis Optical EMS, 2-7

Log-Based Synchronization method (LBS), 11-52

Loopback

add;Add, 7-82

delete;Delete, 7-90

view;View, 7-88

M

Management Functional Area (MFA), 1-18

Management Information Tree (MIT), 1-19

Map pane, 10-18

Map window, 10-12

change item label;Item label, 2-18

menu, 10-13

toolbar, 10-14

Minimize GUI window, 10-17

Modify

DIB prefix;DIB prefix, 3-63

scheduled task;Scheduled task, 6-27

user preferences;User preferences, 2-18

Mouse

using, 10-4

Move

network element;Network element, 10-33

Move an item

Map pane;Map pane, 2-12

Multi-cast cross-connection

add;Add, 7-36

N

Navis ™ Optical EMS application

System interfaces, 1-16

Navis Optical EMS supported NEs

2.5G/10G, 1-15

Navis™ Optical EMS supported NEs

WaveStar®OLS 1.6T, 1-15

*Navis*Optical EMS application

Features, 1-4

System overview, 1-2

*Navis*Optical EMS supported NEs, 1-15

NavisOptical EMS supported NEs

FT-2000 LCT, 1-15

*Navis*Optical EMS supported NEs

LambdaRouterAOS, 1-15

Metropolis™ DMX, 1-15

*Metropolis*EON, 1-15

WaveStar BWM®, 1-15

*WaveStar*NCC, 1-15

*WaveStar*TDM 10G (OC-192 2F), 1-15

*WaveStar*TDM 10G (STM-64), 1-15

NCC. See Network Communication Controller (NCC);, 3-59

NE Event Handler (NEH), 1-6

NE size

change;Change, 2-18

NE. See Network element;, 3-47

Network Communication Controller (NCC), 11-26

Network element

add OSI-connected;OSI, 3-8

add TCP/IP-connected;Add, 3-16

add to aggregate;Aggregate, 5-8

definition, 11-3

delete from DSA DIB, 3-72

delete;Delete, 11-49

display on Map window, 10-18

equipment, 2-31

equipment discovery, 12-2

find on Map window;Find, 10-25

modify in DIB;Directory Information Base (DIB), 3-70

modify;Modify, 3-28, 11-48

move out of aggregate, 5-12, 10-23

password aging, 3-8, 11-31

protection group, 8-9, 8-11, 8-14

software activate;Activate, 17-9

software backup;Software backup, 17-10

time zone;Date/time synchronization, 14-6

types, 11-4

view software release resident on EMS;View, 9-6

Network Element Explorer, 10-35

Network Service Access Point (NSAP), 11-12

Network Time Protocol (NTP), 14-6

Non-managed device, 11-7, 11-41

display on Map window, 10-19

Northbound communications, 11-5

NSAP address fields, 3-14

O

On-line documentation, 10-31

One-way bridge cross-connection, 7-54, 7-61

One-way merge cross-connection, 7-47

Open System Inteconnect (OSI), 11-5

Open System Interconnection (OSI), 11-32

Optical Amplifier (OA), 15-2

Optical association, 15-2

add;Add, 7-3

delete;Delete, 7-7

Optical connection, 15-3

Optical Demultiplexing Unit (ODU), 15-2

Optical EMS supported NEs

LambdaUniteMultiService Switch (MSS), 1-15

Optical Multiplexing Unit (OMU), 15-2

Optical Translator Unit (OTU), 15-2

OSI communications, 11-8

Overload Indicator button, 10-24

P

Packet Switched Network (PSN), 11-5

Password, 10-7

Performance, 10-14

PF-2000 network element;Network element

PF-2000 class, 11-46

Port

configuration;Configure, 12-4

provision;Provision, 4-4

Product information, 10-31

Protection group, 16-2

delete, 16-5

discovery, 16-3

modify;Modify, 16-5

provision, 16-3

ring map, 16-5

Protection switch

management of, 16-11

provision;Provision, 8-16, 8-24

Protection switching status, 8-22

Provision

network element equipment parameters;Network element, 4-13

tributary signal rate;Tributary signal rate, 4-8

Q

Q-Adaptor process, 11-23

Q3 adaptor process, 1-18

Q3 manager, 1-18

R

Redundant systems, 1-8

Registration Agent (RA), 11-24

Registration Manager (RM), 11-24

Remove

equipment;Equipment, 4-17

Reset the Zoom on the Map Window button, 10-15

Reset, network element (OLS 1.6T);Network element

reset, 3-73

Restore

network element provisioning data;Network element, 9-18

user preferences;User preferences, 2-22

Ring map, 16-5

Roll

one-way cross-connection;Cross-connection, 7-17

two-way cross-connection;Cross-connection, 7-21

S

Save

network element positions;Network element, 10-28

Save Preferences button, 10-14

Schedule

date/time synchronization;Date/time synchronization, 6-24

network element data backup;Network element, 9-29

network element software activation;Network element, 9-37

network element software copy;Network element, 9-35

network element software download;Software download, 9-32

software download;Schedule, 17-15

software management tasks, 17-4

Scheduled task

modify;Modify, 9-40

Security management, 1-5

Select

network element;Network element, 6-18, 10-23, 10-32

Select an item

Map pane;Map pane, 2-11

Software copy;Network element

software copy, 17-7

Software download;Network element

software download, 17-5

Software Management feature, 17-3

Software Transfer, 17-3

SONET Directory Services (SDS), 3-61, 11-11

Sort

table;Table, 10-47

Southbound communications, 11-5, 11-32

Southbound interface

CMISE, 1-18

Connection Manager (CM) process, 1-17

SONET Directory Services (SDS), 1-19

TL1, 1-19

Start up Navis Optical EMS GUI;Graphical User Interface (GUI)
start up, 10-6
Status Dialog button, 10-16
Status window, 10-28
Subnetwork, 11-3
Subnetwork alias
change;Change, 3-34
Subnetwork discovery, 11-37, 11-38, 11-51
SONET Directory Services (SDS) and;SONET Directory Services (SDS), 11-29
Subnetwork Explorer, 10-16
Subnetwork explorer
select an item;Select an item, 2-9
Subnetwork name
add;Add, 3-32
delete;Delete, 3-36
Synchronous Optical Networks (SONET), 1-2, 1-2
System parameters
provision network element;Network element, 4-2
System redundancy, 1-8
Geographic redundancy, 1-12
Host redundancy, 1-9
Local redundancy, 1-10

T

Target Group, 14-6
Target Identifier (TID), 10-17
TCP/IP communications, 11-10
TCP/IP communicatons, 11-14
Test Management, 10-14
TL1, 1-2
TL1 command file, 2-27
TL1 macro builder, 10-51
Tools/Logs, 10-14
Tooltips help
turn on;Tooltips help, 2-19
Trail, 13-4
add;Add, 5-2
delete;Delete, 5-4
Map window display;Map window, 10-20
Transient Condition Event Browser, 10-16
Transmission Control Protocol/Internet Protocol (TCP/IP), 1-2, 11-32
Transport bridge, 11-11, 11-12, 11-44
assign network element to, 3-47
Tributary
provision, 4-4
Tributary Incoming Signal Rate, 4-8
Tributary Outgoing Signal Rate, 4-8
Turn On/Off Map Pan button, 10-15
Type ahead field, 10-46

U

Update
network element system (OLS 1.6T);Network element, 3-75
User ID, 1-6, 10-7
User password, 1-6
User preferences, 10-26

V

View, 10-14
View software release;Network element
view software release resident on the EMS, 17-4
virtual circuit;permanent virtual circuit (PVC);switched virtual circuit (SVC), 11-6

W

Wide Area Network (WAN), 1-8
Window
minimize, 10-17
Window buttons, 10-37
Window help, 10-31

X

X.25 communications, 11-5
X.25-based protocol layer, 1-2

Y

Year 2000 compliance, 1-3

Z Zoom in

Map window;Map window, 2-15

Zoom In on the Map Window button, 10-15

Zoom Out on the Map Window button, 10-15