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USER MANUAL

FOXMAN-UN under Linux

Planning and Operation

Hitachi Energy

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Contents

1 Preface

The FOXMAN-UN System Manual provides general information about the FOXMAN-UN system and covers both FOXMAN-UN and Linux administration tasks that are associated with maintaining a running FOXMAN-UN system. The document is directed at System and Application administrators who will be responsible for administering and maintaining the FOXMAN-UN application and its HW and SW platforms.

The System Manual consists of several initial chapters to provide general information about the FOXMAN-UN application that should be helpful in understanding and carrying out the tasks presented in the following chapters.

1.1 About this Manual

This manual is divided into the following sections:

1 "Preface"	Introduces the System Manual and provides information about its layout and contents, as well as a brief description of the tasks required to install, operate, and maintain a FOXMAN-UN system.
2 "FOXMAN-UN Components"	Introduces the major components of the FOXMAN-UN and discusses the performance considerations for deciding which of the FOXMAN-UN components to install.
3 "Core Component"	Describes the core component and the database system in greater detail. There are no user configurable parameters and the information here is available for troubleshooting purposes only.
4 "Agent Component"	Describes the agent component in greater detail and the parameters that must be configured for proper operation with the workstation that it is installed on.
5 "Graphical User Interfaces"	Describes the GUIs in greater detail and the parameters that the customer can configure to customize them for their specific needs. Things such as changing the default map backgrounds, symbols, colors, alarm scripts, printer configuration, etc. are detailed.
6 "Deployment Scenarios"	Describes the possibilities of single machine and redundant installation.
7 "Installation of FOXMAN-UN"	Describes how to install the FOXMAN-UN application.
8 "Start and Stop of FOXMAN-UN"	Describes how to start and stop the FOXMAN-UN or one of its components.
9 "Directory Structure and Files"	Describes the structure of the FOXMAN-UN directories, subdirectories, and files. The alarms and events log files containing all cleared and acknowledged alarms and all system events are described.
10 "Remote Admin Tool (RAT)"	Describes the NEM Remote Admin Tool which is a user friendly GUI for tasks such as viewing license options, starting and stopping FOXMAN-UN services, configuring database backup and recovery procedures, and managing main/standby server setups.
11 "FOXMAN-UN Administration"	Describes the FOXMAN-UN administrative tasks such FOXMAN-UN configuration, backup and restore of the database, monitoring the system. Also contains a list of FOXMAN-UN commands.
12 "FOXMAN-UN Upgrade"	Describes how to upgrade an existing FOXMAN-UN installation with a newer FOXMAN-UN version so that the database need not be re-populated from scratch.
13 "System Administration"	Deals with issues concerning administrative tasks such as OS installation, workstation backups, and disaster recovery procedures for items such as hanging workstation, hard disk failure, corrupted files etc.
14 "Error Codes"	Provides tables with FOXMAN-UN error codes that may occur during operation.

1.2 Basic steps for FOXMAN-UN Installation

1 Determine on which workstation(s) to install which FOXMAN-UN components (refer to 2 "FOXMAN-UN Components").
2 Install the FOXMAN-UN system (refer to section 7 "Installation of FOXMAN-UN" and, for more details, to [1KHW002426] FOXMAN-UN Installation - User Manual).
3 Optionally modify parameters of the FOXMAN-UN configuration files to change any of the default settings (refer to 11.4 "FOXMAN-UN Configuration Files").

1.3 FOXMAN-UN Commissioning Overview

Once the FOXMAN-UN software is successfully installed, it can be started and commissioned as follows:

1 **Connect the workstation** port(s) to the Gateway NE(s) of the network(s) to be managed. Make sure that a possible firewall is suitably configured so as to allow agent-NE communication.
2 Start the **NEM Login**.
3 From the NEM Login dialog, click on the gear icon, add a server machine and click on “Manage”. Use the Remote Admin Tool (RAT) to check the server state, i.e., that the base and core services are active (running).
4 Log in to start the FOXMAN-UN client.
5 If the NEM Login is successful, the **NEM Desktop** will be presented.
6 Start the NEM Configurator and create the **agents** that are necessary to provide the communication interfaces to the NEs.
7 Create (or discover) the **NEs** for each agent, which will cause an automatic upload of the configuration and the inventory of NEs present in the network.
8 Start the NEM Network Browser and set up the **maps** and the **group maps**.
9 Set up FOXMAN-UN **security** using the NEM Configurator.

1.4 FOXMAN-UN Administration

Once the FOXMAN-UN is operating successfully, various administrative tasks such as backing up and restoring the FOXMAN-UN database, adding and modifying agents, monitoring the log files and upgrading an existing FOXMAN-UN installation are possible.

2 FOXMAN-UN Components

2.1 Introduction

This chapter describes the FOXMAN-UN system components. If you plan to install the FOXMAN-UN software on multiple workstations, then it is vitally important that you understand the contents of this chapter.

A FOXMAN-UN system consists of several basic and add-on software components.

- Basic Components:
  - Core component including database,
  - Agents,
  - Graphical user interfaces (NEM Desktop, NEM Configurator and NEM Network Browser with Help viewer, Homepage),
  - HLM Components: SNMP, CLI,
  - Networking Package (NP) Components,
  - Ethernet Networking Package (ENP) Components,
  - Service Supervision Components,
- Add-on vomponents
  - Hitachi Energy SOX Server,
  - UCST (Windows® only),
  - DIRAC,
  - ALS,
  - Language Package (optional),
  - Additional online documentation.

2.2 Core Component

The FOXMAN-UN system is built around a central FOXMAN-UN database. This database must be present for the FOXMAN-UN software to run, and records information about the network elements (FOX61x, FOX515, Foreign Objects, and SNMP devices), alarms, maps, etc.

A FOXMAN-UN system has a single database that is used as a repository of information for the other processes. The core component contains all the software necessary to manage and communicate with the database.

2.3 Agents

An agent handles the communications to a single management network, connected via a serial or an Ethernet link. It can upload and download configurations from and to the network elements (NEs). It can poll the NEs for alarms and listens to alarm notification messages. It communicates with the NEs to get or set status or diagnostic information.

It is important to distinguish between the **agent component** and the **agent process**. Linux is a multi-user, multi-tasking operating system, which means that a single workstation may run several agent **processes** simultaneously.

2.4 Graphical User Interfaces

FOXMAN-UN offers the following main GUIs:

- Homepage

  This window is the new central dialog for starting each of the FOXMAN-UN applications, including browser-based and legacy applications. It is currently started from the NEM Desk-

top. In addition to legacy applications it provides new applications, such as an MPLS map, Circuit Emulation map, TDM map, DCN map, Network Monitoring, and Inventory Request.

- NEM Desktop

  This window is the central dialog for starting FOXMAN-UN legacy applications like the NEM Configurator, the NEM Network Browser, and other legacy dialog windows.
- NEM Configurator

  The Configurator allows setting up all the details of the management network and defining the security aspects including role-based access control. In addition it provides access to the NE configuration management and limited access to the fault management.
- NEM Network Browser

  The Network Browser provides the operator with a graphical view of the network(s) in the form of maps to supervise the network and carry out the day-to-day management of the NEs.
- Remote Admin Tool (RAT)

  The Remote Admin Tool provides quick access to basic management functions of the FOXMAN-UN server(s).
- Metrics Database

  The Metrics Database provides access to performance data collected from the FOXMAN-UN server and from the network. More information is provided in a separate application note [1KHW029196] FOXMAN-UN Metrics Database.
- ALS Configurator GUI

  The ALS Configurator is an add-on that can be installed if required. Its documentation is currently published separately.

The FOXMAN-UN Help Viewer can be started on its own and as that serves as a user manual. It can also be used as a context sensitive help system for all major FOXMAN-UN dialogs with the exception of those in the NE specific configuration management tools (FOXCST or UCST).

The Help Viewer provides a table of contents (TOC) where the topics (dialog pages) are grouped logically, as well as a search function. Using the context sensitive entry, the page that was called will be highlighted in the TOC tree. Links to related topics are provided within the pages.

2.5 HLM Components

2.5.1 SNMP Component

The SNMP component comprises the software to handle the communication between the FOXMAN-UN system and a Higher Level Manager (HLM) having an SNMP interface. The SNMP functionality of FOXMAN-UN is restricted to the Fault management functional area.

When alarms are gathered by the FOXMAN-UN system they are processed and sent to the SNMP Proxy Agent that then sends SNMP traps to the HLM. The SNMP Proxy Agent also listens for “get” requests if there is a need to synchronize the alarm situation in the HLM after a loss of communication or a restart.

Further information on HLM components can be found in [1KHW002427] FOXMAN-UN Northbound Interface - User Manual.

2.6 Networking Package (NP) Components

2.6.1 NP Component

The Networking Package (NP) Provisioning component is an optional component that works with the FOXMAN-UN Basic Package (BP) and is enabled through the license key mechanism. It comprises the software that provides the functionality to:

- automatically and semi-automatically provision trails and circuits;
- scan an existing network and determine the existing end to end connectivity (support of complex constructs such as broadcast, data multi-point and voice conference);
- manage any connections that are discovered;
- generate reports of the network.

NP does not require separate installation as it is installed when the BP itself is installed.

The Administrator can grant access rights to the Networking Package for other operators from the NEM Configurator / Role Based Access Control (RBAC) application.

Further information and implementation guidelines can be found in [1KHW002416] FOXMAN-UN Networking Package - User Manual.

2.6.2 NP Reporting Tool Component

The NP Reporting Tool is an integrated component distributed together with the FOXMAN-UN system. It generates a set of report files containing information on NEs, units, ports, applications, customers, sections, and transport entities. These files can be analyzed offline by any suitable third party tool (e.g. MS Excel).

Further information can be found in document [1KHW002416] FOXMAN-UN Networking Package - User Manual.

2.7 Ethernet Networking Package (ENP)

The Ethernet Networking Package is an optional component for managing MPLS-TP networks based on FOX61x nodes. It comprises functionality for:

- Static network provisioning;
- Automatic or manual routing of Tunnels and Label Switched Paths (LSPs);
- Service provisioning for Virtual Private Wire Services (VPWS) and Virtual Private LAN Services (VPLS);
- Provisioning of 1:1 protected LSPs and PWs.

The ENP is enabled through the license key mechanism.

Further information and implementation guidelines can be found in [1KHW002412] FOXMAN-UN Help - User Manual, section “Ethernet Networking Package”.

2.8 Service Supervision and Reporting

The Service Supervision and Reporting are optional components that work with the FOXMAN-UN Basic Package (BP). These are enabled through the license key mechanism. The software provide the functionality to:

- Monitor end-to-end services,
- Generate end-to-end services availability reports.

Further information and implementation guidelines can be found in [1KHW002412] FOXMAN-UN Help - User Manual.

2.9 Online Documentation (Optional)

The complete documentation can be installed on the workstation and then be viewed using a browser (for the HTML contents) and a PDF viewer (for the PDF documents included). Refer to 7.4 "Installation of Online Documentation" for further details.

- Main documents, e.g.:
  - FOXMAN-UN System Description,
  - FOXMAN-UN NEM Help User Manual,

  - FOXMAN-UN Networking Package User Manual,
  - FOXMAN-UN under Linux User Manual,
  - FOXMAN-UN Northbound Interface User Manual.
- Application Notes.

3 Core Component

3.1 Introduction

The core component consists of the software for handling the FOXMAN-UN database and for the inter-process communication. The database is based on the PostgreSQL ODBC system. The inter-process communication is based on the omniORB object request broker (ORB) software. The core therefore consists of a PostgreSQL database server, along with additional software to handle the communication between the various components and their processes.

In addition to the above, there is also a watchdog process that is responsible for checking the status of the core processes and re-spawning them in case of abnormal termination. The core component can only exist once in every FOXMAN-UN system.

For most FOXMAN-UN installations, the core does not need any configuration, nor does it need any maintenance. The only action that must be performed is to periodically backup the FOXMAN-UN database (refer to 11.5 "Backup of the FOXMAN-UN Database").

3.2 The Database System

3.2.1 Introduction

FOXMAN-UN uses the PostgreSQL database system. It is a very flexible system which offers amongst other features:

- Installation as a “Core+UI”, “UI only”, or “Core only” system. This means that the UIs can access the FOXMAN-UN database from any workstation, provided that a TCP/IP connection exists between NEM core server and client;
- Runs on major operating systems:
  - Linux (Core, UI) and
  - Microsoft Windows® (client UI only).
- Has native programming interfaces for REST, C++, Java, ODBC, and others.

3.2.2 Database Names

Every database in a PostgreSQL system has a unique name.

Please note:
The database names NEM_DATABASE, PM_DATABASE, NEMSEC_DATABASE, and DIRAC_DATABASE are fixed and cannot be changed.

3.2.3 Creation of the FOXMAN-UN Database

Please note:
The FOXMAN-UN database is created automatically during the FOXMAN-UN installation process. This database will not contain any network nodes yet. If you have been running an installation already before, you will need to restore the database backup of the previous installation. For details see 12.2 "Database Migration".

If for any reason the existing FOXMAN-UN database needs to be replaced by an empty one, the command “edbcreate” can be used. Use the option -f only for this purpose.

The edbcreate command has the following options:

```
[nemsec@nemsrv ~]$ edbcreate --help
```

```
Usage: edbcreate [OPTION]...

Options: -d, --database=DB_NAME          Name of the database (Optional).
         -e, --create-empty-db           Create an empty database (No bitmaps, backgrounds) (Optional).
         -f, --force-recreation-db       Force the destruction and the recreation of the database
                                         (Optional).
         -w, --without-progress-cursor   Without progress cursor. This parameter is optional. The
                                         default behavior is with progress cursor.
```

3.3 Interprocess Communication

FOXMAN-UN runs a RabbitMQ server. RabbitMQ is a message broker and is used to

- receive internal messages from core services
- send messages to the MIB
- expose data to the UI
- distribute notifications to clients over an encrypted notification channel.

Examples for such notifications include, among others:

- object creation events,
- object deletion events,
- attribute value change events,
- alarm events.

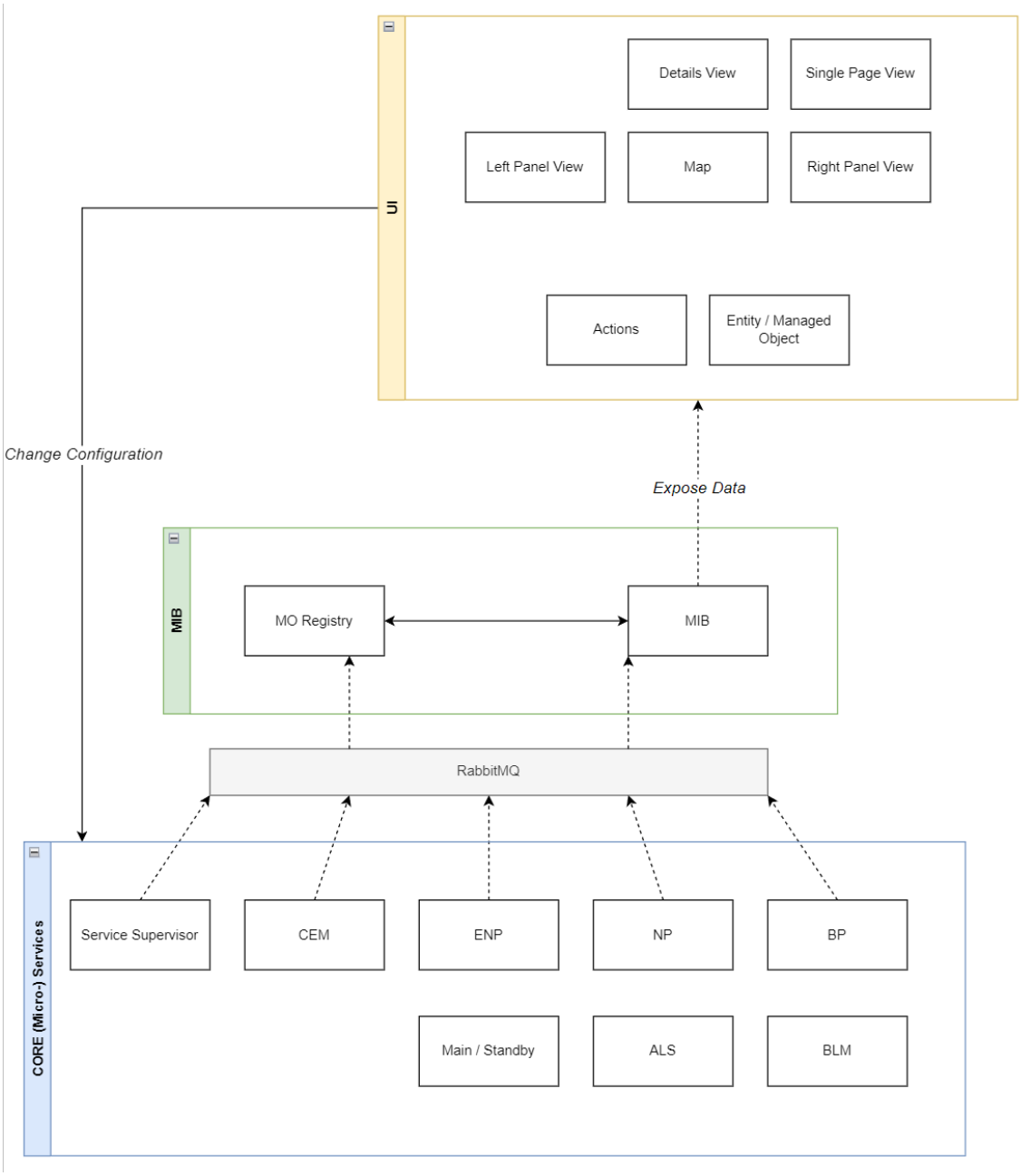


Figure 1: Interprocess communication with RabbitMQ

For some legacy tasks, FOXMAN-UN uses omniORB CORBA for interprocess communication.

OmniORB is a software environment that allows building and integrating distributed applications. OmniORB is a fully compatible open source implementation of the Object Management Group's (OMG) Common Object Request Broker Architecture (CORBA) specification.

An omniORB application consists of one or more client programs that communicate with distributed objects located in server programs. Clients can communicate with distributed objects from any host in a network through clearly defined interfaces specified in the CORBA Interface Definition Language (IDL).

OmniORB mediates the communication between clients and distributed objects. This mediation allows clients to communicate with objects without concern for details such as:

- the hosts on which the objects exist;
- the operating system that these hosts run;
- the programming language used to implement the objects.

The OmniORB architecture includes several configurable components that support the mediation of communications between clients and objects.

As an example, a diagram for an IDL Operation Call on a Distributed Object is shown.

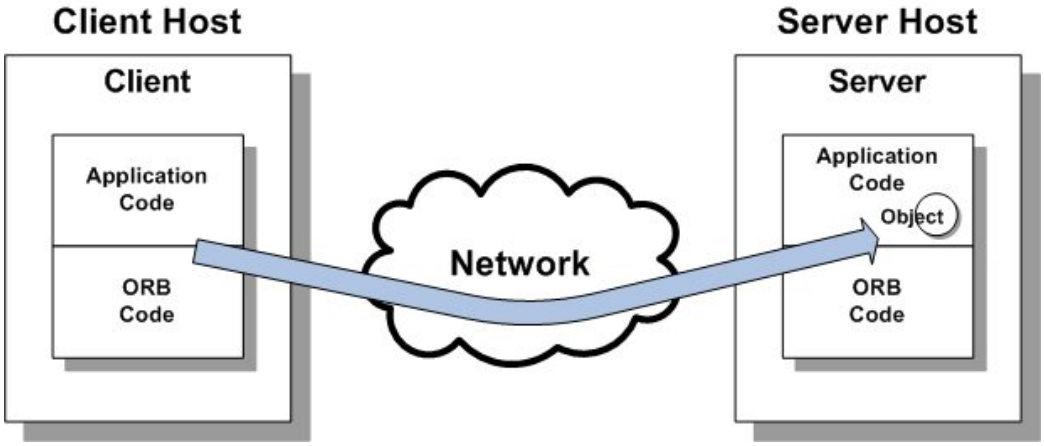


Figure 2: IDL Operation Call

3.4 REST Public API

The FOXMAN-UN provides a number of REpresentational State Transfer (REST) resources of the ENP on a public API. This public API is based on the Swagger UI. It is used to manage some of the Ethernet Networking Package (ENP) related information.

To make use of this interface you need a web browser and the IP address of the FOXMAN-UN server. To access the information provided, start the web browser and enter the following URL in the address field:

`https://<IP_address>:<public-rest-port>/public-ui/index.html`

where:

- <IP_address> is the IP address of the FOXMAN-UN server,
- <public-rest-port> is 9443 (default value).

Example:

`https://10.6.114.32:9443/public-ui/index.html`

Some browsers consider the connection to this URL not secure due to the self-signed certificate used. Depending on the browser type and version, this may require you to add a security exception for being able to use the REST Public API.

The basic operations supported are “Get”, “Post”, and “Delete”. The following resources are available:

Resource (URL)	Description	Result
GET:		
`/network/nes`	List of all Network Elements.	network.nes.json
`/network/nes?name=NE_12.0.120.17` **`?ipAddress=12.0.120.17`**	List of Network Elements with the specified name. Wildcards are not supported.	
`/network/nes/{NEid}`	Return a particular Network Element with the specified NEid.	
`/enp/nes`	List of all Network Elements in the ENP domain	enp.nes.json
`/enp/nes?name=NE_12.0.120.17`	List of Network Elements with the specified name present in the ENP domain.	

Resource (URL)	Description	Result
?ipAddress=12.0.120.17	List of Network Elements with the specified IP Address.	
?nodeId=82	List of Network Elements with the specified ENP Node ID.	
?globalId=2000	List of Network Elements with the specified ENP Global ID.	
	Wildcards are not supported. Several parameters are treated as AND.	
/enp/nes/{NEid}	Return a particular Network Element in the ENP domain with the specified NEid.	
/enp/tunnels	List of all ENP tunnels.	enp.tunnels.json
/enp/tunnels?name=DMEO_VPLS_222	List of ENP tunnels with the specified name. Wildcards are not supported.	
/enp/tunnels?tunnelIdString=8::2000::80::2000::82	List of ENP tunnels with the specified Id that is shown in the FOXMAN-UN Client. Wildcards are not supported.	
/enp/tunnels?neId=3	List of ENP tunnels with the specified NE as an Initiator or a Terminator.	
/enp/tunnels?neId=1&neId=3	List of ENP tunnels between the specified NEs. Any NE can be an Initiator or a Terminator.	
/enp/tunnels/{id}	Return a particular ENP tunnel object with the specified tunnel database id.	
/enp/tunnels/{id}/workingLSP	Get LSP information for the working path (id=1).	enp.lsp.json
/enp/tunnels/{id}/protectingLSP	Get LSP information for the protecting path (id=2).	
/enp/tunnels/{id}/workingLSP/oam/delaymeasurements	Return the list of all running or finished delay measurement tasks	
/enp/tunnels/{id}/workingLSP/oam/delaymeasurements/{taskId}	Return results of the {taskId} delay measurement task.	No statistic (min, max, avr.) is returned.
	In contrast to the core, the results of the task will not be discarded on the first retrieval and will be kept in cash until the service is restarted or cache is cleared (see below).	Only the results per each measurement (as the core does) + a timestamp when the task was originally started.
POST:		

/enp/tunnels/{id}/workingLSP/oam/delaymeasurements	Starts new delay measurement task for the specified tunnel {id} on the working-LSP.	JSON request body
		{
		startingOn={"Initiator";"Terminator"},
		timeout=5,interval=1,packetCount=5,EXPValue=0
		}
		If any or all attributes are missing, the default values from the NEM Client (Initiator;5;1;5;0) are used.
		PacketCount is ignored in case of “continuous” measurement.

Resource (URL)	Description	Result
/enp/tunnels/{id}/protectingLSP/oam/delaymeasurements	Starts new delay measurement task for the specified tunnel {id} on the protectingLSP.	Delay measurement taskId is returned as URL in the “location” Header, as well as in the response Body: {“taskId”: 1, Location: “/enp/tunnels/…/1”}
/enp/tunnels/{id}/workingLSP/oam/delaymeasurements/continuous	Start continues delay measurement process on aEnd & workingLSP.	
DELETE:		
/enp/tunnels/{id}/workingLSP/oam/delaymeasurements/{taskId}	Cancel a particular {taskId} delay measurement task.	
/enp/tunnels/{id}/workingLSP/oam/delaymeasurements	Cancel all delay measurement tasks running for the particular tunnel+LSP.	

3.5 Start and Stop of the FOXMAN-UN Core

3.5.1 General

Only a FOXMAN-UN administrator can start and stop the FOXMAN-UN core component, either by using the Remote Admin Tool (RAT) or from the command line. After installation, the core must be started manually.

After a reboot in a setup without standby server, the FOXMAN-UN system including the base and core services is started automatically. Stopping of the core occurs together with the system shutdown.

In a setup with warm/cold standby server, the core is not starting automatically.

For the purpose of activating changes in the FOXMAN-UN configuration file, just the core can be stopped and then started again.

3.5.2 The Command “lsnem”

This command, when executed by a FOXMAN-UN administrator, shows the status of the NEM components. It displays a list of the daemons, services, and database instances with their status. The following is a sample output from the “lsnem” command. Some of the components and services depend on license options and may not be available in your setup.

```
NEM COMPONENTS:
===============

Host: Running system services            Status
---------------------------------------------
NEM InfluxDB Service                     active
Telegraf Service                         active
Postgresql Server                        active
RabbitMQ Service                         active

Database: Instances                      Status
---------------------------------------------
'NEM_DATABASE'                           present
'PM_DATABASE'                            present
'NEMSEC_DATABASE'                        present
'DIRAC_DATABASE'                         present

NEM Base: Running services               Status
---------------------------------------------
OMNI Event                               active
OMNI Names                               active
```

```
Procwatch                                 active
BP Credentials                            active
BP Event Channel                          active
BP RabbitMQ VirtualHost                   active
BP Security Manager                       active
Event Log Manager - Security              active
Voyager API Gateway                       active
Voyager MainStandby                       active
Voyager NEMCORE                           active

NEM Core: Running services                Status
----------------------------------------------
BP Alarm Manager                          active
BP Business Logic Manager                 active
BP Network Manager                        active
BP Network Query Manager                  active
BP PM Async Manager                       active
BP PM Collector                           active
BP Service Manager                        active
BP Task Manager                           active
ENP Network Manager                       active
ENP Security Manager                      active
Event Log Manager - System                active
Supervision Timer                         active

NEM NP: Running services                  Status
----------------------------------------------
NP Network Manager                        active

NEM CLI: Running services                 Status
----------------------------------------------
BP ECLI Proxy                             active
BP Line Test Manager                      active
BP Report Manager                         active

NEM HLM: Running services                 Status
----------------------------------------------
HLM SNMP NBI Agent                        active

NEM Voyager: Running services             Status
----------------------------------------------
Voyager CEM                               active
Voyager Credential Distribution           active
Voyager DCN Manager                       active
Voyager ESW                               active
Voyager Healthcheck                       active
Voyager MIB                               active
Voyager PM                                active
Voyager PTP Map                           active
Voyager Public Gateway                    active
Voyager QOSTE                             active
Voyager Tag Manager                       active
Voyager Task Scheduler                    active

DIRAC Key Manager: Running services       Status
----------------------------------------------
DKM REST Server                           active

ELEMENT AGENT COMPONENTS:
=========================

Element Agent Name      Host Name       Port  PID   Admin          Status
-------------------------------------------------------------------------
Agent-1                 localhost       LAN   16113 Running        Running
```

```
Agent-2                 localhost       LAN   16117 Suspended       Suspended
SNMPAgent-1             localhost       LAN   16963 Running         Running
```

Please note:
The database server, voyager nemcore services, message broker, security manager, rabbitmq services and procwatch are not affected by the nemstart or nemstop sequences and should always be running.

4 Agent Component

4.1 General

The agent component organizes the communication between the FOXMAN-UN core and the NEs in the field. Each agent transfers information via one communication port leading into the management network.

There are different types of agents, one for each of the main NE family types:

- FOX61x,
- FOX515,
- SNMP,
- FOX660,
- ALS,
- NEs of type “Foreign Object”.

A mixture of NE families on one agent is not possible.

4.2 Agent Name

Each agent has to be given a unique name for identification. FOXMAN-UN does not allow more than one agent carrying the same name.

Maximum length of the agent name is 60 characters, the name is case sensitive, it cannot contain blanks, “?” and “*”.

The name is assigned via a dialog in the NEM Configurator and is tested for suitability and uniqueness on submission. It is displayed in various indications and should therefore adequately describe the area of the agent in the management network.

4.3 LAN Ports

For agents using a LAN port, the IP addressing is used to determine through which LAN port communication should take place. What may be required is the setup of external routes to the various management communication networks that will be accessed using Ethernet, MPLS-TP (PVC, PWAC), Qx, ECC or DCC interfaces. This is best done in the FOXMAN-UN dialog that is used to create the agents themselves as this ensures that the routes will be re-established upon re-boot. It will also ensure that the routes are removed if the agent is stopped.

5 Graphical User Interfaces

5.1 Homepage

The Web browser based UI is the new home to all applications. Since its introduction with R16B it is continuously increasing its coverage. It provides an overview on your system and tiles with links to each of the UI applications provided with the FOXMAN-UN installation.

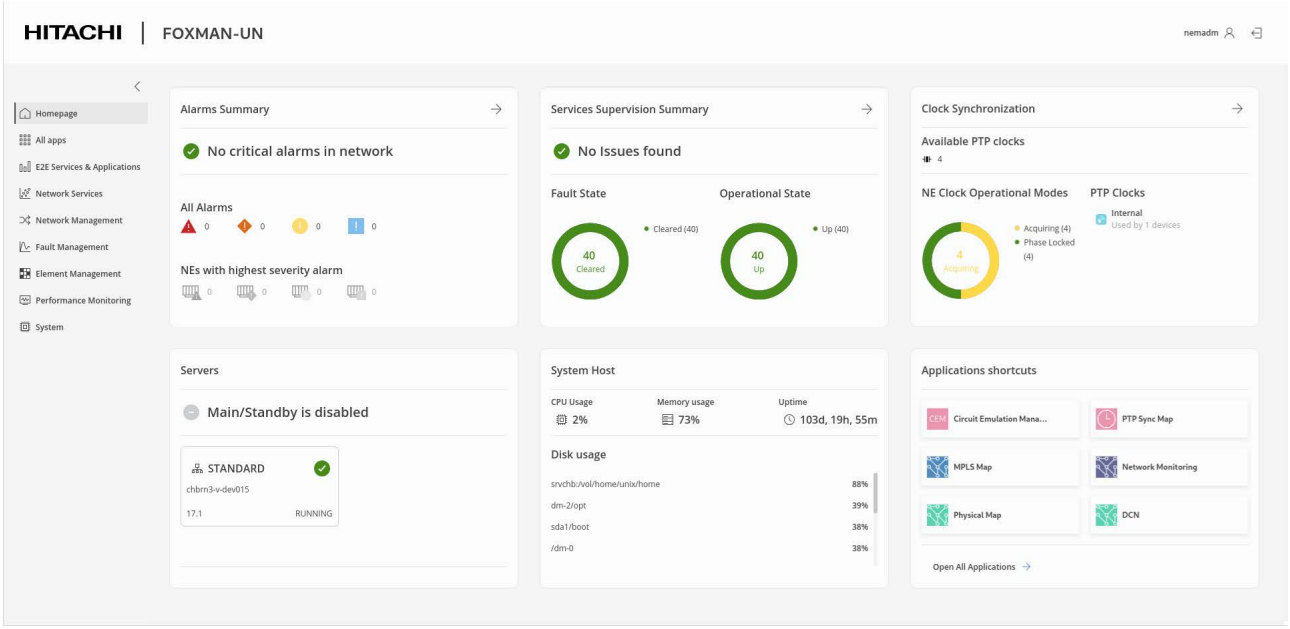


Figure 3: Homepage

The Homepage is called from the NEM Desktop “Application” menu.

A detailed description of the browser-based graphics elements is provided in [1MRC000084] FOXMAN-UN Web UI, whereas the UI functionality is described in [1KHW002412] FOXMAN-UN Help - User Manual.

5.2 NEM Desktop

The NEM Desktop provides the menus for launching all FOXMAN-UN applications, functions, and help. It also provides the dialog to connect to / disconnect from the NEM core and to manage NEM core connections.

Figure 4: NEM Desktop

The NEM Desktop provides the following functions from its main menu:

- File:
  - Exit.
- Application:
  - NEM Network Browser,
  - NEM Configurator,
  - Section Management,

  - Networking Package,
  - Ethernet Networking Package,
  - Ethernet Security Manager,
  - Service Supervision,
  - Circuit Emulation Manager,
  - Homepage.
- Fault Management:
  - Alarm Summary,
  - Alarm List,
  - Alarm History,
  - Alarm Customization.
- Network:
  - Performance Management,
  - Inventory Request,
  - Synchronization Map,
  - PTP Sync Map,
  - Spanning Tree,
  - Protection Ring,
  - Task View,
  - NE Password Tasks,
  - Profile & CPS Tasks,
  - Credential Distribution,
  - ESW Management.
- System:
  - Event List,
  - Remote Admin Tool,
  - Remote Executor,
  - Metrics Database.
- Options:
  - Preferences.
- Help:
  - Help,
  - About.

Please note:
For more information on the NEM Desktop functions and dialogs, please refer to the NEM Help Viewer (NEM Help user manual or built-in help in FOXMAN-UN) or to the system description.

5.2.1 NEM Login

The NEM Desktop is started by connecting it to an active NEM core via the login procedure.

The first dialog to start the FOXMAN-UN GUI is the NEM Login. It is required to log you in as a specific user on a specific host.

The dialog requires the entry of a host name. The FOXMAN-UN core must be running on that host. The host name and its IP address are entered in the Host Manager dialog so that the NEM knows the server to connect. Once this is done, you can select the host from a list when performing the NEM login.

The credentials (username, password) are needed to identify an operator and apply their permissions when working with FOXMAN-UN.

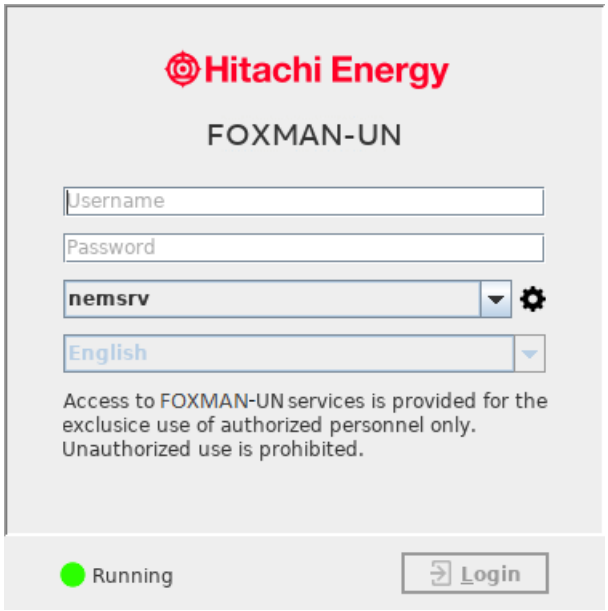


Figure 5: NEM Login

If a user logs in to the specified host for the first time, they will be prompted an “SSL Certificate Verification” dialog upon pressing the <Login> button which looks as the following sample dialog:

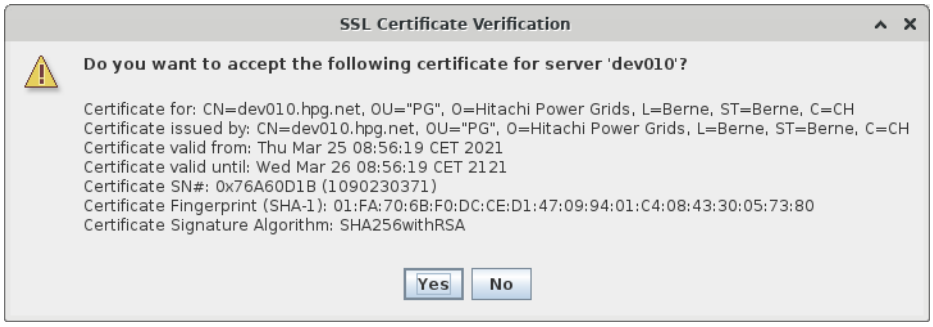


Figure 6: SSL Certificate Verification

If the user presses the <No> button, they will not be able to connect to the FOXMAN-UN server. The next time they try to login to the same host from the same client, they will be prompted again the “SSL Certificate Verification” dialog.

If the user presses the <Yes> button, they will be connected to the FOXMAN-UN server. The next time they try to login to the same host from the same client, they will directly be connected to the server (they will no longer be prompted the “SSL Certificate Verification” dialog).

Please note:
Make sure that you are connecting to the correct server especially from a remote client. This is particularly important when you are working in a non-safe network environment like for instance accessing a FOXMAN-UN server over the public Internet.

Validation can be done by the user by contacting the server administrator and comparing the fingerprint of the FOXMAN-UN server certificate stored on the server to the one presented in the “SSL Certificate Verification” dialog on the FOXMAN-UN client.

Once the username and password are accepted on the specified host, and once the login is successful, the NEM Desktop is started.

A given user, except the NEM Security Administrator (nemsec), can only log in once on FOXMAN-UN. This implies that the FOXMAN-UN Core keeps a list of active sessions. If a user attempts to log in again in parallel, the login is refused and a message informs of the presence of another session on a client host.

5.2.2 NEM Configurator

This browser style interface allows setting up all the details of the management network (NE Browser tab) and defining the security aspects (Role Based Access Control tab). In addition, it provides access to the NE configuration management and limited access to the fault management.

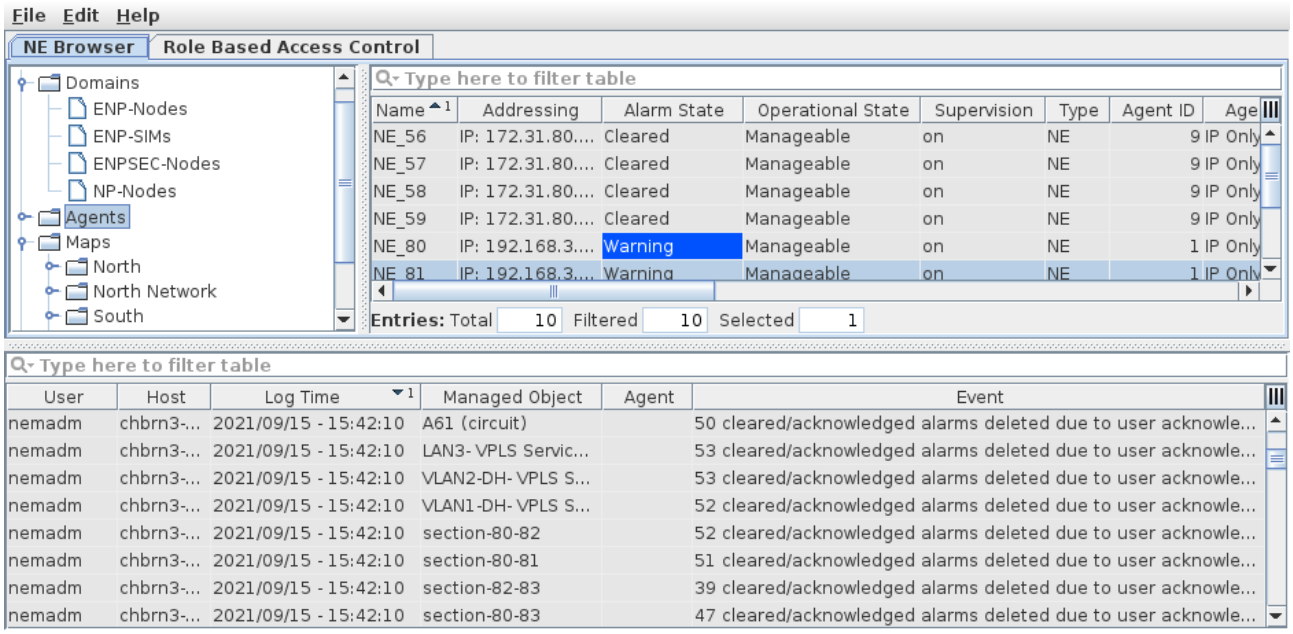


Figure 7: NEM Configurator

5.2.3 NEM Network Browser

The Network Browser provides the operator with a graphical view of the network in the form of maps for the supervision and the carrying out of the day-to-day management of the NEs.

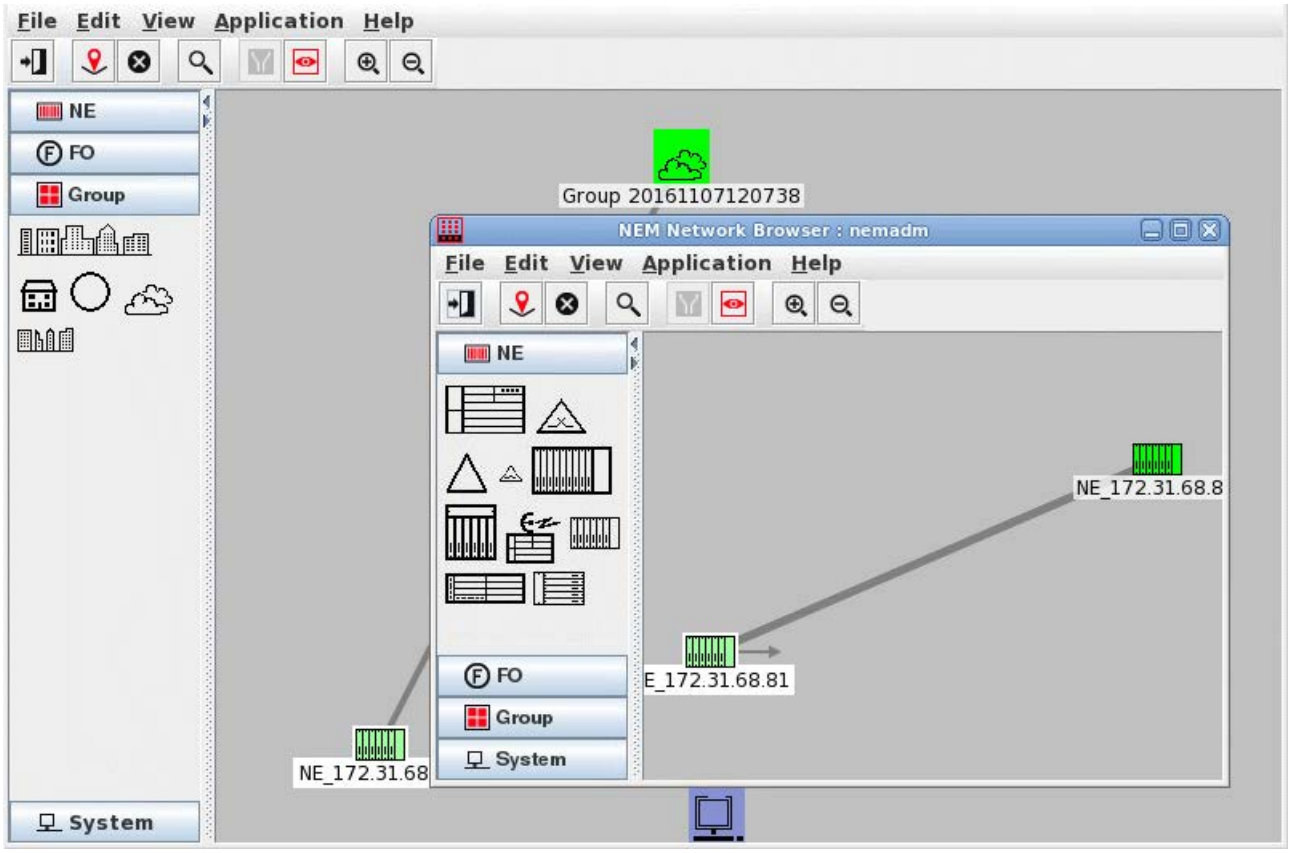


Figure 8: NEM Network Browser

5.2.3.1 Map Backgrounds

One of the features of the NEM Network Browser is the ability to display background images for the network maps. The backgrounds might be a map of a country, region or city, or possibly of a building, etc.

There are a number of ways to generate your own backgrounds:

- use a scanner to scan some images.
- search the Internet for suitable maps.
- create your own backgrounds using a graphics tool.

Do not forget that most books and maps are protected by copyright.

Color images generally look better and can display more information, but note the following:

- Do not choose an image with too many bright colors, as you will not be able to see the NEs easily.
- Multi-color images use more file space and memory and so they are slower when they are being loaded. For each pixel there are 4 - 64 bits to describe the colors as opposed to 1 bit to describe the colors for a (black and white) bitmap.
- You may experience problems with images which have large numbers of different colors. Many workstations can only display a limited number of colors simultaneously, with a result that the backgrounds might not be displayed properly. In practice this often depends on which other applications are running on the workstation.

Please note:
The files must be in JPEG format. The only limit for image size is 120M pixels (120,000,000). This means “width-in-pixel” multiplied by “height-in-pixel” must not exceed this number. The file size and the DPI don’t matter.

5.2.3.2 Imported Backgrounds

The function for deletion and importing of user specific backgrounds is part of the NEM Network Browser and is called “Files - Manage Graphics”. It also serves for adding and deleting the different map symbols.

Please note:
You must be logged in as an administrator in order to modify the contents of the symbol subdirectories.

5.2.3.3 Map Icon Text Background

The background for map icon text is configurable via the nem.conf parameter “mapgui_transparent_symbol_label”. The default value is “false” (non transparent). To switch to transparent set the value to “true”.

Please note:
You have to stop/restart the NEM Network Browser in order for the change to take effect.

5.2.3.4 Symbols

By default, FOXMAN-UN offers the choice of 37 (29) different symbols, consisting of 10 (10) FOX61x, FOX515 or MicroSCADA NE symbols, 10 (12) foreign object symbols, 10 (5) group symbols, and 7 (2) system NE symbols. These symbols may be replaced or extended with a set of user defined symbols (in brackets are the number of legacy symbols).

The customizing of the symbols is handled by the “Files - Manage Graphics” function called from the NEM Network Browser.

Please note:
You must be logged in as an administrator in order to modify the contents of the symbol subdirectories.

The graphics format supported by FOXMAN-UN for symbols is .png, and for map backgrounds it is .jpg.

If any deleted default symbols have to be re-imported, they can be found under the directory:

`/opt/nem/share/bitmaps`

5.3 Alarm Colors

These colors are used to represent the individual perceived alarm severities for alarms on the NEs. Note that there may be GUI preferences set by the user that can have an impact on the color scheme.

By default, the following colors are used:

Red	This color is used to indicate alarms with perceived severity: Critical.
Orange	This color is used to indicate alarms with perceived severity: Major.
Yellow	This color is used to indicate alarms with perceived severity: Minor.
Blue	This color is used to indicate alarms with perceived severity: Warning.
Light blue	This color is used to indicate alarms with perceived severity: Indeterminate.
Magenta	This color is used to indicate alarms with perceived severity: Off In legacy GUI style alarms with severity “Off” are colored green.
Green	This color is used to indicate normal status, i.e. no alarms, or cleared alarms only. Optionally cleared alarms can be shown uncolored.
Dark gray	This color is used to indicate nodes with admin state “inactive” or nodes that are unmanageable.

In legacy GUI style NE symbols show colored flags at the top left, top middle and top right of the symbol indicating the following conditions:

- Light blue in the top left corner:
  The NE is unmanageable.
- Any alarm color in the top center:
  Indicates the highest severity of all currently unacknowledged alarms within the NE.
- Black at the top right corner:
  The supervision of the NE has been stopped.

For group symbols the flags show the conditions for all NEs contained in the lower layers.

5.4 Blink Timer

It is possible to change the on blink time of the NE and group symbols as well as the toggle buttons and numbers of the Alarm Status dialog. The blinking is used to indicate to the operator that there are unacknowledged (new) alarms for one of the symbols that are on the currently displayed map. By default the blink time is set for approximately 3 seconds on and 0.5 second off.

This time may be changed by editing the parameter “blink_timer” in the file

`/opt/nem/etc/alarming.conf`

Please note:
You must be logged in as an administrator to do this.

6 Deployment Scenarios

6.1 Single Platform Installation

The following diagram shows a simple FOXMAN-UN system running on a single workstation. This is the typical installation for small to medium networks, dependent on performance requirements.

The figure shows different agents communicating with three distinct NE networks. The user interacts with the GUIs, while the GUIs and the agents communicate with each other via the core component.

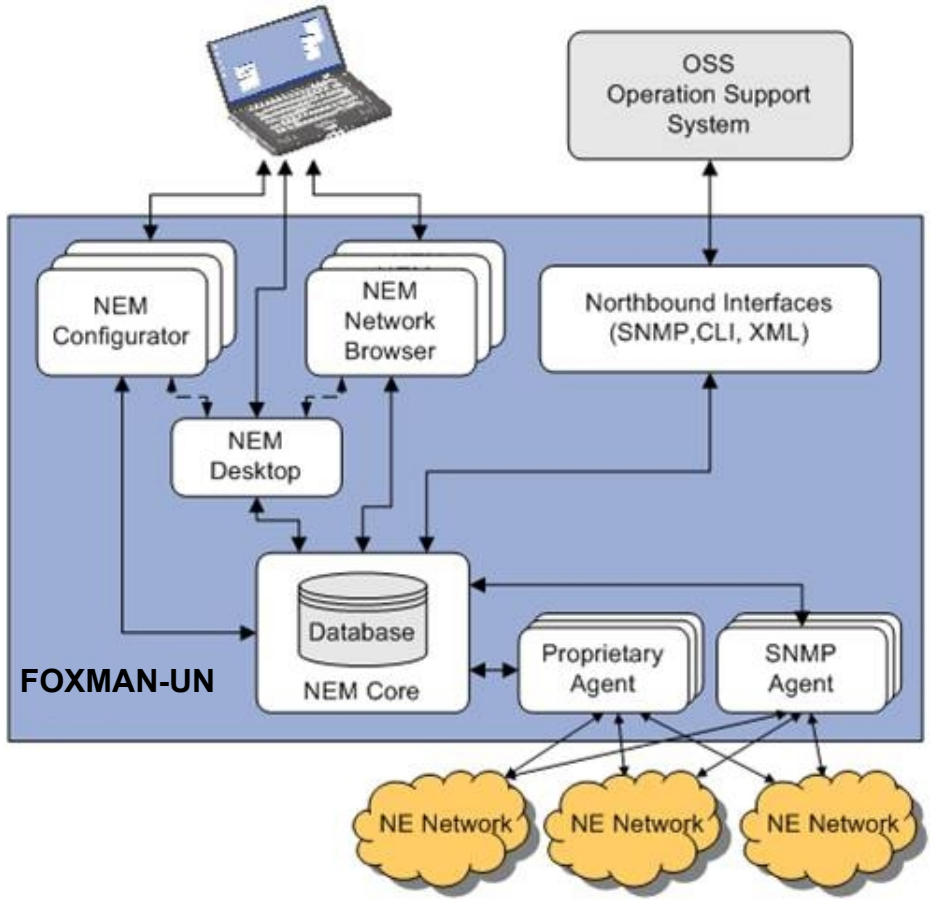


Figure 9: Single platform installation (basic features)

6.2 Redundant Installation

With the appropriate license option, FOXMAN-UN can be installed with core server redundancy supporting a main server and a warm standby or cold standby server. The two machines can be implemented anywhere in the network and must be connected via an IP network. Both servers need access to the managed equipment and have the same setup.

A typical network setup may look as shown in Figure 10: "Redundant Installation" (on page 30).

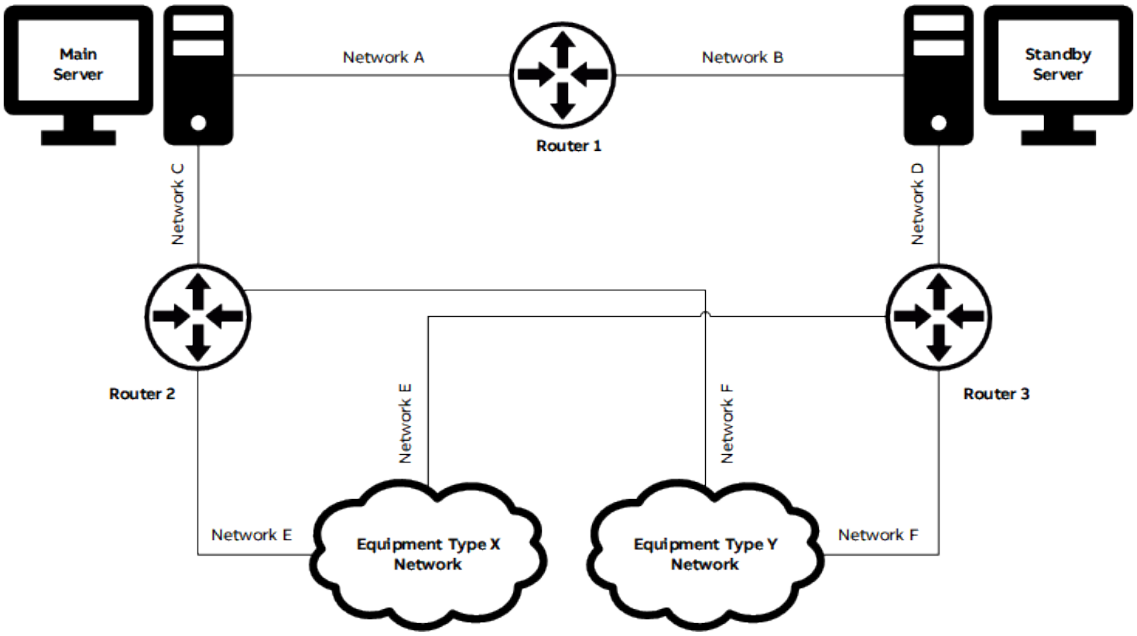


Figure 10: Redundant Installation

More information on the installation and operation of the Main/Standby option is given in the user manual “FOXMAN-UN Main/Standby Solution” [1KHW029097].

7 Installation of FOXMAN-UN

Please note:
For the installation of FOXMAN-UN refer to [1KHW002426] FOXMAN-UN Installation - User Manual.

Please note:
The NEM Security Administrator must be an existing Linux user.
→ When using the installation option -a make sure to choose an existing Linux user.

7.1 Installation command

The installation script will run in the interactive mode if no options are given. To execute the installation script, change to the directory where the install.sh is originally stored and use the following command to start installation if you have sudo permissions:

```
sudo ./install.sh
```

or use the following command to start the installation if you are already logged in as root:

```
./install.sh
```

The installation script has the following options:

```
Options:
[-f]  (optional) Use installation configuration file
[-o]  (optional) Do an OS update before installing the software
[-t]  (optional) Make CORBA Naming Service remotely available via TCP (default: via SSL)
[-u]  (optional) Proceed with update NEM automatically (agree license and to update)
[-s]  (optional) Change support for Network Elements with specific ESW release
                 Possible options:
                 DEFAULT  ->   refers to Network Elements R17A and newer
                               Security: uses default system security settings
                 LEGACY   ->   refers to Network Elements older than R17A
                               Security: enables ssh-dss
[-c]  (optional) Install Core only without interactive mode
[-g]  (optional) Install UI only without interactive mode
[-a]  <USER> (optional)  Set NEM Security Administrator to <USER> and
                         proceed without interactive mode (default: <current-user>)
[-h]  Display this help text
```

After the installation starts, the default setup options are as follows (sample):

```
############################
FOXMAN-UN Installation Utility
18.0.0
############################

Host: myhostname (<ip-addr>)

Components for FOXMAN-UN Software:
  [x] 1. Core + UI
  [ ] 2. Core only
  [ ] 3. UI only

  Environment:
    Installation directory:           [/opt/nem]
    Database:                         [NEM_DATABASE]
    Supported ESW:                    [DEFAULT]
    NEM Security Administrator:       [<current-user>]


Enter the number 1-3 to select the component to install
```

```
Enter 's' to modify supported ESW
Enter 'a' to configure NEM Security Administrator

Enter 'r' to reset selection
Enter 'i' to proceed with the installation
Enter 'q' to quit

Enter : s
```

If you enter `3` to install the UI only, the setup options are different (sample):

```
############################
FOXMAN-UN Installation Utility
18.0.0
############################

Host: myhostname (<ip-addr>)

Components for FOXMAN-UN Software:
  [ ] 1. Core + UI
  [ ] 2. Core only
  [x] 3. UI only

  Environment:
    Installation directory:            [/opt/nem]
    Remote Host:                       [localhost (127.0.0.1)]

Enter the number 1-3 to select the component to install
Enter 'h' to modify remote host

Enter 'r' to reset selection
Enter 'i' to proceed with the installation
Enter 'q' to quit

Enter:
```

7.2 Post Installation Tasks

If you have successfully installed the FOXMAN-UN software, you should proceed to the following sections:

- 7.3 "Installation of NE/Unit SW and Custom Parameter Sets",
- 7.4 "Installation of Online Documentation",
- 7.5 "Creation of FOXMAN-UN User Accounts",
- 7.6 "Printers".

Please note:
After going through all of the above sections, in order that the NEM Configurator and the NEM Network Browser can be opened and connected to the database, the FOXMAN-UN core processes must be started.

This can be done only by a FOXMAN-UN administrator either via the "Start/Stop Services" function of the Remote Admin Tool (RAT) or by entering the command: "`nemstart`".

If the machine is rebooted, the FOXMAN-UN processes will be started automatically during the OS initialization phase.

7.3 Installation of NE/Unit SW and Custom Parameter Sets

Network Elements of type FOX61x and FOX515 and their pluggable units require Embedded Software (ESW) to operate.

Please note:
ESW delivery to FOX515 NEs is no longer supported by FOXMAN-UN. To deliver ESW to FOX515 NEs, use the UCST installed on a Windows® PC.

7.3.1 General

The Unit SW (ESW) files as well as the FOX61x CPS files are either delivered together with the FOXMAN-UN system SW and are available via download from Hitachi Energy Publisher (https://publisher.hitachienergy.com) in a separate zip file.

These files must be imported to the NEM database prior to use.

For FOX61x NEs, the ESW files are imported using the “Network - ESW Management - Distribution Wizard” dialog window from the NEM Desktop. This dialog is also used for network-wide distribution of the ESW.

Please note:
Prior to Importing the FOX61x ESW, you need to download the FOX61x ESW ZIP archive for the specific system release required for your network and save it in a folder that is reachable from the FOXMAN-UN server.

The FOX61x CPS and profiles are imported using the “Profile & CPS” dialog window.

7.3.2 Importing the Files to FOXMAN-UN database

7.3.2.1 Importing the FOX61x ESW

- From the NEM Desktop, start the “Network - ESW Management - Distribution Wizard” dialog.
- Proceed to step 3 “ESW Selection”.
- In step 3, click on the “Import ESW…” button.
- Navigate to the folder that contains the ESW ZIP archive for the specific system release required for your network. Select the ZIP archive and click “Import”. The import will take some time due to the file size (several 100 MB). It is confirmed with a message “Import successfully completed”.
- Once the import is completed, the System Release will appear for selection in the “Desired System Release” drop-down field.
- You can now close the ESW Distribution Wizard dialog, unless you want to continue with ESW distribution to the network. ESW distribution to the network is described in [1KHW002412] FOXMAN-UN Help - User Manual.

7.3.2.2 Importing the FOX61x CPS and Profiles

Start the “FOX61x Embedded SW” DVD

- Make the CPS files (*.cps) and/or Profile files (*.pf) available in a folder that is reachable from the FOXMAN-UN server.

Import the CPS Files

- From the NEM Desktop, start the “Profile & CPS Tasks” dialog (Network – Profile & CPS Tasks…)
- In the “Profile & CPS: Tasks” dialog, select “File – Administration…”
- In the “Profile & CPS: Administration (NE)” dialog, click on the button “Import…”
- In the “Profile & CPS: Import” dialog select the file type = “All Files” (“Files of Type:” = “cps”), then navigate to the folder with the CPS files
- Select each CPS file that is to be copied from the folder (to select multiple files use the CTRL key), then select “Open”.

Import profile files (optional)

- From the NEM Desktop, start the “Profile & CPS Tasks” dialog (Network – Profile & CPS Tasks…).
- In the “Profile & CPS: Tasks” dialog, select “File – Administration…”.
- In the “Profile & CPS: Administration (NE)” dialog, click on the button “Import…”.
- In the “Profile & CPS: Import” dialog select the file type = “pf” (“Files of Type:” = “pf”), then navigate to the folder with the profile files.

Select each profile file that is to be copied (to select multiple files use the CTRL key), then select “Open”.

7.3.2.3 Importing ESW, CPS and Profile from FOX61x NE

Importing ESW currently stored in the FOX61x NE

- As an administrator, add the parameter “cst_create_esw_control on” in the file /opt/nem/etc/nem.conf.
- As an administrator, execute a “nemstop” and “nemstart” to activate the new setting. Users will need to log in to the NEM Desktop again.
- From the NEM Desktop, start the “Application - NEM Configurator” dialog.
- From the NEM Configurator dialog, launch the FOXCST GUI.

  This will import the NE’s control unit ESW to the FOXMAN-UN database if not currently stored in the database.
- From FOXCST shelf view, click on the service unit(s).

  This will import the service unit’s ESW, if not available in the FOXMAN-UN database.
- Verify that the ESW are imported in the NEM database:

  From the NEM Desktop, start the “ESW Tasks” dialog Window.

  Then click on “File - Administration”. The “ESW Administration” window lists all the ESW stored in the NEM database.

Importing the CPS and Profiles currently stored in the FOX61x NE

- From the NEM Desktop, start the “Profile & CPS Tasks” dialog (Network – Profile & CPS Tasks…).
- In the “Profile & CPS: Tasks” dialog, select “File – Administration…”
- In the “Profile & CPS: Administration” dialog, “Select NE”
- Select the appropriate CPS or Profiles to be imported from the “Profile & CPS on NE” dialog.
- Click the “<” or “<<” to import the selected files to the NEM database

7.4 Installation of Online Documentation

The online documentation is either delivered together with the FOXMAN-UN package or as a separate module. It is release specific.

To install the documentation, log in as “root”, extract the files from the FOXMAN-UN doc tar.gz archive, and run the installation script

```
./install.sh
```

The documentation files are installed in the standard FOXMAN-UN directory

```
/opt/nem/share/doc
```

Please note:
If starting the installation from the GNOME window by double clicking the install.sh icon, use only the “Run in Terminal” button in the resulting “Run or Display?” dialog.

Do not use the “Run” button, as no feedback of information is provided.

To view the documentation a browser is required. To view the included PDF documents the Adobe Reader or any other PDF viewer is required optionally. If not yet installed, you may need to download and install the Adobe Reader from the Adobe web site. For a download link please refer to the readme text file provided with the document collection.

The online documentation is started via the FOXMAN-UN command

```
docviewer
```

or from the Linux “Applications” menu, Network Management, NEM Doc Viewer.

The installation of FOXMAN-UN adds the item “Network Management” to the main menu of the GNOME desktop. This menu contains the “NEM Documentation” icon.

7.5 Creation of FOXMAN-UN User Accounts

7.5.1 Introduction

The first step is to create a Linux account for each user account to be used. The installation will automatically create the “nemadm” Linux account with its home directory /opt/nem/nemadm. The “nemadm” user can, however, not be used to log in to FOXMAN-UN. It is only used as owner of the installation file system and owner of FOXMAN-UN system processes.

It is recommended that you create a separate user account for each FOXMAN-UN user, including the NEM Security Administrator. The main advantage of this is that you can make full use of the security mechanisms provided by the FOXMAN-UN software using role-based access control (RBAC). For example, different users may be given access to a different set of features and function areas.

In addition, some users may be given administrator privileges so that they can also perform FOXMAN-UN administration tasks when, e.g., the NEM Security Administrator is not available.

Please note:
Only the “nemadm” account is created automatically at installation time. All other accounts have to be created as described below.

Before you start however, you should give some thought to the management of user passwords. When you create a new user account, you will have to configure a password for that user. If the user account is to be used by another person, then how should you set the password? One possibility is to leave the password empty, and tell the user to set their password at the earliest opportunity. Unfortunately this opens a potential security hole, as anyone can now login as that user without having to enter a password. Another possibility is to enter a default password, such as the name of your company, and tell the user to change their password as soon as they log in. Although this offers slightly increased security, do not forget that it may be some time before the user logs in, or they may forget to change their password.

For sites requiring increased security, note that Linux offers the following additional features (amongst others):

- It is possible to force the user to change his password when logging in.
- It is possible to force users to change their passwords periodically.

7.5.2 Creation via Command Line

A shell script, ‘nemuser’, is provided to simplify host user creation in Linux. The script executes the “useradd” system call with the appropriate options to create the user with home directory in “/home”. The script is installed in

/opt/nem/bin

Please note:
You have to be “root” to perform some of the following actions, or, alternatively, use “sudo” if you have the permissions to do so.

```
Usage: nemuser -a <-u user | -b backup_device [-f]> [-p parent_dir_for_home]
       nemuser -r -u user
Options:
       -a, --add                 Add the user
       -r, --remove              Remove the user (and the home directory)
       -u, --user=USERNAME       Name of the user
       -e, --enable-admin        Enable existing user as nem linux
                                 administrator
       -d, --disable-admin       Remove existing user from nem linux
                                 administrators
       -n, --no-prompt           Do not prompt to force logout user when -e or
                                 -d option is present
       -b, --backup=FILENAME     Backup device or file name, where to extract
                                 user list from, by default only users having
                                 passwd file format entries will be taken,
                                 override this with the -f option.
       -i, --inspect             Inspect backup file. Print nem users and nem
                                 admin users.
       -f, --force-non-passwd-   When used with –b option, forces to also add
       format-user               users without passwd file format entries. By
                                 default, the parent directory for these users
                                 will be /home. Override this with the –d
                                 option.
       -p, --parent-             Parent directory for the user's home.
       directory=DIR             Optional, default: '/home'.
                                 When using –b and –f options this specifies
                                 the parent directory for those users not
                                 having a passwd file format entry in the user
                                 list.
       -h, --help                Print this message.
Note:       Before using nemuser with the -b option show the user list using
            the following command:
            su nemadm -c 'edbrestore -u -b nem.bkp'
Examples:   nemuser –a –u operator
            Adds the user 'operator', creating home dir: /home/operator
            nemuser –r –u operator
            Removes the user 'operator'
            nemuser –a –u operator –p /opt/nem
            Adds the user 'operator', creating home dir: /opt/nem/operator
            nemuser –a –b nem.bkp
            Adds the users found in the specified NEM backup file, creating
            home dir: as defined in the backup
```

To complete the addition of the user, the password has to be entered with the command (example shown using sudo):

```
[admin@server ~]$ sudo passwd operator
Changing password for user nmsuser.
New password:
[enter password]
Retype new password:
[re-enter password]
passwd: all authentication tokens updated successfully.
```

A second script, ‘rbacuser’, is provided to manage role-based access control (RBAC) administrators. The script is installed in

/opt/nem/bin

Usage:	rbacuser -a user	
	rbacuser -r	
	rbacuser -g	
Options:	-a user, --add=user	Add linux user to rbac administrators
	-r, --reset	Reset initial rbac administrators
	-g, --get	Get configured administrator
	-h, --help	Print this help

You must be member of the nem group to execute the command.

7.5.3 Creation via GNOME Desktop

Please note:
Although this is possible, do not create FOXMAN-UN users via the main menu item “System Settings - Administration - Users and Groups” of the GNOME desktop. The “Users and Groups” dialog does not allow setting the user properties in the setup required for FOXMAN-UN.

→ For correct user creation refer to the previous parts of 7.5 "Creation of FOXMAN-UN User Accounts" and to the RHEL 9.x user guide.

→ The new user setting must have: group:nem shell: /bin/bash

7.5.4 Creation without User Home

To add a user without user home directory for FOXMAN-UN only and assign required permissions within FOXMAN-UN, execute the following in a shell (example shown using sudo):

```
[admin@server ~]$ sudo useradd -s /bin/bash -G nem -M nmsuser
[admin@server ~]$ sudo passwd nmsuser
Changing password for user nmsuser.
New password:
[enter password]
Retype new password:
[re-enter password]
passwd: all authentication tokens updated successfully.
```

The new user will appear in the RBAC selection for new users after a NEM logout / login. Only a FOXMAN-UN administrator can assign access rights to the new user via the RBAC function in the NEM Configurator.

7.5.5 FOXMAN-UN User Security

A FOXMAN-UN user created as described above initially has no access rights within the FOXMAN-UN system. The GUI NEM Desktop can be started, but all functions are locked, including connecting to the database.

The FOXMAN-UN administrator has to set up the security environment for the new user account before it can be used. This is done using the Role Based Access Control section of the NEM Configurator. Refer to the FOXMAN-UN help system for details on FOXMAN-UN security.

7.5.5.1 Single Login per User Account

Limitation for the number of sessions per account: The same operator shall not be able to log in over the NEM Desktop with the same credentials (username + password) to the same FOXMAN-UN core more than once simultaneously.

To enhance the ClientMonitor process with a check of the number of user client sessions, add the variable below with the required simultaneous sessions to nem.conf:

```
cMAX_SIMULTAN_USER_CLIENT_SESSION 0
```

Possible values:

0: disabled

≥1: enabled

Please note:
The limitation is not applicable for the NEM administrator. By default, the limitation is disabled.

7.5.5.2 Logout by an Administrator

An administrator has the possibility to see the list of active sessions, and mark sessions that must be closed.

```
[nemsec@nemsrv ~]$ lsem -x
Connected EM Processes  Host                  User            PID
-----------------------------------------------------------------------
NEM Desktop             nemsrv.company.net    nemadmin        30645
NEM Desktop             nemsrv.company.net    nemadmin        29387
```

After the administrator decides to close a session, that session disconnects from core within a minute, independently of its activity or state.

```
[nemsec@nemsrv ~]$ killem -u <User Name> -p <Process ID> -l <Hostname>
[nemsec@nemsrv ~]$ killem -u nemadm -p 29387 -l nemsrv
[nemsec@nemsrv ~]$ lsem -x
Connected EM Processes  Host                  User            PID
-----------------------------------------------------------------------
NEM Desktop             nemsrv.company.net    nemadmin        30645
```

The use case is when inactive users use licenses, and no license is left for other users.

7.5.6 Adding FOXMAN-UN Icons to the Desktop

The installation of FOXMAN-UN adds the item “Network Management” to the main menu of the GNOME desktop. This item contains the icons

- FOXCST
- NEM Doc Viewer
- NEM Login

If required, these menu items can be copied onto the desktop of the user by copying the application shortcuts

- nem-cst.desktop
- nem_doc_viewer.desktop
- nem_login.desktop

from the folder

/usr/share/applications

to the user’s Gnome desktop. After the shortcut has been copied to the desktop, right-click on it and select “Allow Launching”.

The icons (launchers) can also be copied to the panel by opening the context menu on the menu entry as shown in the figure below, and selecting “Add to the favorites”.

7.6 Printers

The GUIs offer the functionality to print alarm lists, NE unit lists, NE configurations, network trail and circuit, customer information, etc. To do this, the workstation must have a printer configured.

The printer configuration for the workstation is the responsibility of the System Administrator, and is outside the scope of this document.

Once at least one printer has been set up, it is recommended to use one of these printers (a local printer or a network printer) for any printing task with FOXMAN-UN.

7.7 Additional Tasks

In practice you will probably wish to customize your FOXMAN-UN installation according to your requirements, in particular:

- Define suitable background images to improve the readability of your network maps.
- Modify options of the FOXMAN-UN configuration by editing the FOXMAN-UN configuration file, although most FOXMAN-UN installations will leave these unchanged.

You have now installed the FOXMAN-UN software and configured the user accounts for using FOXMAN-UN. Before using your FOXMAN-UN system, you are strongly advised to inform yourself about the backup possibilities for the NEM database.

7.8 Reconfiguring FOXMAN-UN

After installation, some of the installation options can be reconfigured if required by using the command

/opt/nem/bin/private/reconfigure_nem

The reconfigure_nem command has the following options:

```
[nemadmin@nemsrv private]$ ./reconfigure_nem --h
This script allows end user to reconfigure NEM that is already installed
```



```
Usage: reconfigure_nem [OPTION]…

Options:
-s, --support-esw=        Support ESW by enabling specific (less secure) crypto
                          algorithms.
                          WARNING!     Reconfiguration will remove current .ssh/config
                                       and replace it with new one. Prepare backup if
                                       needed.
                          Possible options:
                          DEFAULT  ->  refers to Network Elements R17A and newer
                                       Security: uses default system security settings
                          LEGACY   ->  refers to Network Elements older than R17A
                                       Security: enables ssh-dss
-c, --corba-interface=    Change used CORBA Interface. Possible options: TCP, SSL
                          WARNING! This change restarts NEM.
-p, --print-nem-setup     Print current NEM setup.
-v, --verbose             Prints more info during actions (enables debug logs)
-q, --quiet               Turn off reconfigure_nem output.
-h, --help                Print this message.
```

NOTICE **Non-observance could result in equipment damage.**
Some of the command options require creation of a backup before executing the command or will restart the FOXMAN-UN application.

→ Read the options in the command help carefully before executing the command.

7.9 Installation Problems

Should you encounter any problems during installation, please read the Release Notes first to see if there is any related information there.

If the problem cannot be solved that way, contact the Hitachi Energy customer support.

7.10 Removing the FOXMAN-UN Software

If you need to uninstall FOXMAN-UN, remove the FOXMAN-UN software by using the rmnem script, which has been specially written for this purpose.

The main advantage of the script is that it will remove all parts of the FOXMAN-UN installation, i.e. not just the contents of the installation directory, but also the nemadm account, the symbolic links used for defining the agent port numbers, etc.

If you try to remove the FOXMAN-UN software manually and subsequently run the FOXMAN-UN installation script, you may run into some unexpected problems due to the fact that the FOXMAN-UN system was only partially removed.

Please note:
Do not forget that the rmnem script will delete the contents of the FOXMAN-UN installation directory (it will also delete the installation directory itself provided that it is not a logical volume).

→ The working directory from which you call the “rmnem” script must not be located in the FOXMAN-UN software tree. This applies not only to the window in which “rmnem” is started, but to ALL windows. If you forget this, then you may notice error messages such as “not found” or “No such file or directory”. This is because the user shell is located within a directory that no longer exists.

To remove (uninstall) the FOXMAN-UN software,

Proceed as follows:

Step 1	Login as root.
Step 2	Make sure all NEM users are logged out.
Step 3	Enter the command: `cd /`

Step 4	Enter the command:
	`/opt/nem/share/uninstall/rmnem`
	
	`Example:`
	`as nem administrator, execute: nembasestop`
	`the, as root, execute: /opt/nem/share/uninstall/rmnem`
	
	Wait for the confirmation that the uninstall process is concluded.

End of instruction

To uninstall add-ons such as DIRAC, ALS, SOX SNMP add-on, where available, execute the respective uninstall commands as root and wait for the confirmation that the uninstall process is concluded:

- DIRAC uninstall command:
  `/opt/dirac/bin/private/rmdirac -f`
  DIRAC can be uninstalled before or after uninstallation of FOXMAN-UN.
- ALS uninstall command:
  `rpm -e als-server`
  ALS can be uninstalled before or after uninstallation of FOXMAN-UN. After uninstallation, a message about creation of an ALS settings backup is issued which confirms uninstallation.
- SOX add-on (required for getting SNMP agents for FOX660 NE types) uninstall command:
  `rpm -e nem-ea-snmp-sox`
  The SOX add-on can be uninstalled before or after uninstallation of FOXMAN-UN; however, deletion of SOX related NEs and agents and a nembasestop are required before uninstallation in case FOXMAN-UN is still installed. After SOX uninstallation, a nemstart is required.

8 Start and Stop of FOXMAN-UN

8.1 Introduction

This chapter describes how to start and stop a FOXMAN-UN system.

Please note:
Only a FOXMAN-UN administrator can start and stop the FOXMAN-UN system or its processes, respectively.

The FOXMAN-UN core services are not started automatically after the installation. This has to be done manually.

For setups without standby server configured, when the workstation is rebooted the base / core services are also started during the boot sequence. Hence the FOXMAN-UN administrator has to start and/or stop the FOXMAN-UN system only if there is a particular reason for it, e.g. for maintenance purposes or when encountering problems that might be solved with a restart.

For main/standby setups, the base / core services need to be started manually as described in the “Main/Standby” user manual.

A watchdog process has been implemented to check that the key processes continue to run. If it detects that one of these processes has terminated abnormally, it will try to restart it. The watchdog process itself is checked by the Linux init daemon, which will re-spawn the watchdog daemon when it terminates.

The agents are supervised by the agent daemon. It will try to restart them if they should terminate abnormally. These events are recorded in the “Activity List”.

Unlike some other database systems, the FOXMAN-UN database does not have to be explicitly stopped before shutting down or rebooting the workstation. This means that no special precautions are necessary, i.e. FOXMAN-UN does not have to be explicitly stopped, and you may shut down or reboot your workstation in the standard manner.

8.2 Start-up Configuration

The following processes can be configured for start-up via a configuration file:

1 SNMP agent daemon
2 BP Performance management daemon
3 PM collector daemon
4 Northbound CLI Proxy daemon
5 NP Network Manager daemon
6 BP Service Manager daemon
7 ENP Manager daemon
8 ENP Security Manager daemon
9 ALS Server

Path and name of the configuration file is

`$/opt/nem/etc/process_ctl.cfg`

Format of entries:

```
# Defines whether a daemon will be started on "nemstart"
# Only the currently listed processes are supported
# Use the keywords enabled/disabled
#
snmpagentd:enabled
# Disabling bppmasynchmgrd disables also pmcollectord
```

```
bppmasynchmgrd:enabled
pmcollectord:enabled
# Northbound CLI daemon
ecliproxyd:enabled
# NP: Disabling npnetworkmgrd
npnetworkmgrd:enabled
# BP Service Management
bpservicemgrd:enabled
# E-NP
enpmgrd:enabled
# E-NP Security
enpsecuritymgrd:enabled
# ALS Server
alsserver:enabled
```

The following applies:

- By default all the above processes are enabled in the configuration file.
- If the file is missing, all processes are started and no alarm is raised.
- A process missing in the configuration file is enabled and an alarm is raised.
- If “disabled” / “enabled” cannot be recognized (wrong spelling or missing), the corresponding process is disabled and an alarm is raised.
- The commands “lsnem” report a process disabled via the configuration file with “disabled” rather than “0”. An enabled process reports with “0” or “1”.

8.3 Using the Remote Admin Tool

The Remote Admin Tool (RAT) provides a dialog to start and stop the FOXMAN-UN system in its “Start/Stop Services…” function.

You can call the Remote Admin Tool from the NEM Login dialog by clicking on the gear icon, selecting the host, then clicking on “Manage”. If logged in already, open the menu item “System - Remote Admin Tool…” from the NEM Desktop.

For details refer to 10.3.3 "Start/Stop Services" of the Remote Admin Tool.

8.3.1 Starting

After installation, system services are running already. The FOXMAN-UN services must be started manually. In the Remote Admin Tool (RAT) call the “Services Management” dialog via the “Start/Stop Services…” button, then use the “Start NEM Core Services” button.

Start NEM Core Services:

- Starts the NEM core services, including remaining BP services, ALS service, ENP services, NP services, CLI services, HLM/NBI services, Voyager services, and the agents that have admin state “running”.

The status of the different services is shown in the “Services Management” dialog window.

Rebooting the server (e.g. after a power failure) automatically starts up the FOXMAN-UN system. There is no manual intervention necessary.

8.3.2 Stopping

The system has to be stopped using “Stop NEM Core Services” when a restore of the database from a backup has to be performed.

To make modifications to the FOXMAN-UN configuration file “nem.conf” become effective, the base has to be stopped using menu item “Stop NEM Base” (command: nembasestop) followed by a restart with “Start NEM Core” (command: nemstart, which will start both the NEM Base and Core).

Please note:
Stopping the FOXMAN-UN core while GUIs are running causes the GUI dialogs to be closed since they will lose connectivity to the core. The NEM Desktop will indicate “Connection Lost”. After restart of the core the NEM Desktop will reconnect to the core, and the GUI dialogs can be opened again from the NEM Desktop.

Please note:
Stopping the FOXMAN-UN base will cause the base services to stop. In case of an active Main/Standby installation with warm standby, the Standby server will take over if the base services are stopped on the Main server. You will have to manually switch back to the Main server, as described on the related user manual.

8.4 Using FOXMAN-UN Commands

As an alternative to using the Remote Admin Tool (RAT) function described above, FOXMAN-UN provides the following commands for starting and stopping the various components of the FOXMAN-UN system:

- nemstart

  Starts the NEM Core services after installation or after a nemstop. If the NEM Base services are not running, this will start both the NEM Base services and the NEM Core services.
- nemstop

  Stops the NEM Core services, e.g. for restoring the database from a backup. The NEM Base services will keep on running.
- nembasestart

  Starts the NEM Base after a nembasestop to activate changes to some of the system configuration files. This will not start the NEM core services.
- nembasestop

  Stops the NEM Base. This will also stop all NEM core services if these are running.
- enpcorestart

  Starts the ENP core after a enpcorestop to activate changes to Class-Type settings.
- enpcorestop

  Stops the ENP core. Used when changes to Class-Type settings have been done.
- enpsecstart

  Starts the ENP Security Manager only, provided the FOXMAN-UN system is running.
- enpsecstop

  Stops the ENP Security Manager.
- snmpstart

  Starts the SNMP daemon only, provided the FOXMAN-UN system is running.
- snmpstop

  Stops the SNMP daemon.

Please note:
The NEM Network Browser can only be launched if the core is running.

The results of the start and stop commands can be checked using the command “lsnem” for the FOXMAN-UN system.

9 Directory Structure and Files

9.1 Introduction

This chapter describes the files and directories comprising the FOXMAN-UN software.

The first part describes the files and directories located within the FOXMAN-UN installation directory, usually /opt/nem.

The second part describes the miscellaneous files located outside this directory.

This chapter assumes that all software components have been installed on the machine, i.e. core, agents and GUIs.

9.2 FOXMAN-UN Directories

The FOXMAN-UN root directory structure for a full FOXMAN-UN installation is organized as follows; some of the directories may be created only upon use of the related features:

/opt/nem/	bin
	client
	contrib
	cst
	ecst
	etc
	influxdb
	lib
	nemadm
	pmcollector
	servicereport
	share
	var
	voyager

The following gives a short description of the FOXMAN-UN root directories and some of their subdirectories.

/opt/nem/bin	Contains FOXMAN-UN commands such as nemstart, edbbackup, lsnem, etc. Most of these commands are to be used by the FOXMAN-UN administrator or the system administrator.
/opt/nem/bin/private	Contains commands and scripts used by some FOXMAN-UN scripts. As the name suggests these files should not be used unless explicitly directed to do so by the Hitachi Energy customer support. One exception to this rule may be the use of the “logcycle” script to archive the current log files. This is usually run once per day by a cronjob that is automatically configured for this action at the time of installation.
/opt/nem/contrib	Contains various 3rd party SW (omniORB, ILOG graphic libraries, Java runtime environment). These applications are used when printing the alarm list, etc., and for formatting reports and lists.
/opt/nem/cst	Contains the ucst.ini file and all directories and files required by the configuration management. The following cst directories may be of interest:
/opt/nem/cst/cfg	UCST default directory for saving the FOX515 configuration files.
/opt/nem/cst/cps	Contains the custom parameter sets. Valid cps files that are in this directory are automatically loaded into the GUI. New cps files have to be copied to this directory.

/opt/nem/cst/fw	Contains the default “application download software” files (apdsw) for the NEs of the type FOX515, FOX512. Note that ESW files have to be imported to the NEM database as described in 7.3 "Installation of NE/Unit SW and Custom Parameter Sets".
/opt/nem/etc	Contains the user configurable files such as “nem.conf”, “alarming.conf”, “smtool.cfg”, the “connections.xml” file and “NMS.properties” file, which contains all the java properties. It also contains several configuration files for the CORBA daemon, which are configured at the time of installation and should not be modified by the operator unless instructed to do so by Hitachi Energy customer support. Note that some FOXMAN-UN client related settings may be defined per client when set in the file `/opt/nem/client/etc/NMS.properties`
/opt/nem/influxdb	Contains user configurable files of the influxdb plugin used for system performance monitoring.
/opt/nem/lib	Contains application dependent libraries.
/opt/nem/share	Contains several subdirectories with information on different components of the FOXMAN-UN, such as backgrounds, icons, desktops. Also contains various scripts used during installation and removal of FOXMAN-UN. Online documentation is also stored below this directory.
/opt/nem/nemadm	This is the default home directory created for the nemadm user by the FOXMAN-UN installation.
/opt/nem/var	This is the central area for logs, reports and traces from the different components of the FOXMAN-UN. The following directory may be of interest:
/opt/nem/var/backuped_dir	This directory is used to store files that the administrator or operator wants to have archived when a backup of the FOXMAN-UN database is made.
/opt/nem/var/backups	Contains directories for manually or automatically created database backups as configured with the Remote Admin Tool (RAT). Accordingly, the sub directories “manual”, “remote” and scheduled” are used.
/opt/nem/var/neconfigs	This is the default directory to store NE configuration backup files. The location and the enabling of the backup to file system is configurable via database.conf. Note: The NE configuration backup files in the file system are not part of the FOXMAN-UN backup and restore. If a configuration backup is not found in the file system, it will not appear in the client interface.

9.3 The Alarm Log and History Files

9.3.1 Introduction

The alarm log files record the NE alarms that have been cleared and acknowledged, as well as other alarm types described below. One file is created per day.

The current alarm log file has the name “alarms.txt” and is located in the directory “/opt/nem/var/log”.

The size of the alarm log file depends on the number of alarms that are recorded (approximately 150 bytes per alarm if there is no Operator Message). For a network of approximately 300 nodes, the alarm log file may grow by a few Mbyte per day or a few Mbyte per hour in the case of an unstable network. The rate at which the file grows is highly dependent on the type of network being managed and how well it is managed.

To prevent the alarm log file from growing until it causes a “disk full” condition, its contents are automatically flushed to a new history file every 24 hours at 23:55. Then, in default configuration, history files older than 30 days are automatically deleted.

Please note:
The history range can be set from 2 up to 730 days by modifying the log-file_keep.time parameter of “/opt/nem/etc/alarming.conf” file.

Identification of the automatically created alarm history files occurs through time stamping. Timestamp syntax is:

```
alarms_YYYYMMDD.txt
```

where YYYYMMDD is the year, month, and day on which the alarms have been collected (starting 5 minutes before midnight).

9.3.2 Manual Flushing of Alarm Log File

If the automatic maintenance of the alarm log file has to be disabled for any reason, or if the growth of the file over a period of 24 hours is still not acceptable, the flushing of the alarm log file can be triggered manually. The command must be executed by an administrator.

`/opt/nem/bin/private/logcycle`

This either creates the history file for the current day with a time stamp if it does not exist, or it appends the contents of the alarms.txt file to the existing history file.

Please note:
At the same time as the alarm log file, the activity log file is also flushed and an activity history file created (if required) according to the same naming rules.

9.3.3 Alarm Record Syntax

The alarm log and the history files are ASCII (i.e. text) files, where each line contains one alarm record.

The generic alarm record syntax is:

```
Time stamp, Syslog location, Alarm key|
NE type|
Localisation|
Alarm text|
Alarm severity|
Alarm on date and time|
Alarm off date and time|
Ack on date and time|
Ack on user id|
Ack off date and time|
Ack off user id|
Comment|
```

The above information is on a single one line.

The above entry is written when a cleared alarm is acknowledged and flushed from the database.

In general, an alarm record consists of a number of fields separated by the “|” character. The various fields are described below.

- Time Stamp and Syslog location, Alarm Key

- Syslog location

  The hostname of the workstation where the core is installed, and the name of the daemon that reported the alarm.

- Alarm key

  For NE alarms, the alarm key is a string of the form X:Y, where X is the NE name and Y is an index number for the alarms of that particular NE. For system alarms X is the name of the workstation containing the core. The number Y is incremented for each new alarm that is detected by the FOX515.

  For example, Paris:12 refers to the 12th alarm recorded on the FOX515 with the name Paris.

  In general, every NE alarm key is unique. The exception to this is if the NE is deleted and re-created. In this case the alarm index (Y) starts counting from 1 again.

- NE type

  This field identifies the source of the alarm, which can be an Hitachi Energy NE, a foreign object (Foreign) or the system (System).

- Localization

  For NE alarms and internal alarms, the 3rd field of an alarm record is the “localization” of the form “unit_name <slot layer or distribution frame text”.

  Examples:

  - LOMIF <17> 2 Mbit/s-3 FOX515_A<->B / E12
  - SYNAC <6> Link-1 (<2 STM1-1-Paris K111) 2Mbit/s
  - SIFOX <8>Traffic-2

  For system restarts and foreign object alarms, this field is empty.

- Alarm text

  For NE alarms the 4th field of an alarm record is the alarm text.

  Examples

  - SYNAC_Remote loss of CAS MF
  - SIFOX_No DTE signal T

  For internal alarms and system restarts, this field is empty.

- Alarm Severity

  For NE alarms the 5th field of an alarm record is the alarm severity.

  Examples

  - “Critical”
  - “Warning”

Please note:
This is the alarm severity that was active when the alarm was registered in the FOXMAN-UN. This could be different than the alarm severity that is in the current alarm criteria if this was modified before or after the alarm was registered.

- Alarm on date and time

  For NE alarms the 6th field of an alarm record is the date and time at which the alarm on event was recorded by the NE.

  For internal alarms this field records the date and time at which the alarm was recorded by the NE.

  For system restarts this field records the date and time at which the NE restarted.

  The date and time is of the form “mm/dd/yyyy hh:mm:ss”

  - e.g. 17/05/2012 03:08:40

  The remaining fields are present for NE alarms only. For internal alarms and system restarts, these fields are missing.

- Alarm off date and time

  The 7th field of an alarm record is the date and time at which the alarm off event was recorded by the NE.
  The date and time is of the form “mm/dd/yyyy hh:mm:ss”.
- Alarm on acknowledge date and time

  The 8th field of an alarm record is the date and time at which the alarm on event was acknowledged using the FOXMAN-UN.

  The date and time is of the form “mm/dd/yyyy hh:mm:ss”.
- Alarm on acknowledge user name

  The 9th field of an alarm record is the username of the person who acknowledged the alarm on event.
- Alarm off acknowledge date and time

  The 10th field of an alarm record is the date and time at which the alarm off event was acknowledged using the FOXMAN-UN.

  The date and time is of the form “mm/dd/yyyy hh:mm:ss”.
- Alarm off acknowledge user name

  The 11th field of an alarm record is the username of the person who acknowledged the alarm off event.
- Comment

  If you have added a comment to the alarm via the “Alarm Details” dialog, this is written into the 12th field of the alarm record. If there is no comment, this field is empty.

  To maintain compatibility with Excel, the comment is truncated to 255 characters, with carriage returns converted to spaces.

  The following lines show some examples of typical alarm records. Note that the NE alarm record has been split into separate lines so that it fits onto the page. In practice the NE alarm record is written on a single line of approximately 150 characters.

  Example of BP alarm.txt records:

```
May  9 13:33:48 nemsrv bpalarmmgrd: NE_172.31.38.208:71|FOX615|/unit-19/port-8
(E12)|Loss Of Signal|Major|2017/05/07  11:47:40|2017/05/08  10:44:42|2017/05/09
13:33:48|nemadmin|2017/05/09  13:33:48|nemadmin||
May  9 13:33:48 nemsrv bpalarmmgrd: NE_172.31.38.209:12|FOX615|/unit-18/port-1
(STM4)|Loss Of Signal|Major|2017/05/07  11:48:48|2017/05/07  18:03:24|2017/05/
09  13:33:48|nemadmin|2017/05/09  13:33:48|nemadmin||
```

  Example of NP specific alarm.txt records:

```
Mar  5 14:06:12 picard syslog: NP Alarms:8|FOX-U|NP|Desynchronization on NE NE1
via LAN |Critical|05/03/2012 13:55:54|05/03/2012 14:06:12|05/03/2012
14:05:22|FOXMAN-UN|05/03/2012 14:06:12|FOXMAN-UN|
Mar  5 14:06:12 picard syslog: NP Alarms:9|FOX-U|NP|Process notification
failed, received the internal error : Database object not found|Critical|05/03/
2012 13:57:57|05/03/2012 14:06:12|05/03/2012 14:05:22|FOXMAN-UN|05/03/2012
14:06:12|FOXMAN-UN|
```

The default delimiter for the individual fields in the alarms.txt file is the bar “|” symbol.

9.4 The Event Log and History Files

9.4.1 Introduction

The system event log records various system activities and events such as uploads and downloads etc.

Events are logged in the database as long as the number of events does not exceed the value “`nem.eventlogmanager.logRotation.threshold`” specified in the file

/opt/nem/voyager/etc/eventlogmanager-system.properties

The default value for “max_nof_events” is 100’000.

The events stored in the database can be viewed via the NEM Desktop menu “System – Event List”.

The current system event log file has the name

- nem-system-event.log,

and is located in the same directory as the alarm log file, i.e. `/opt/nem/var/log`.

Further event logs are available with the files

- nem-security-event.log
- nem-bp-eventchannel.log
- nem-bp-eventlogmanager-security.log
- nem-bp-eventlogmanager-system.log

Event log settings for security events and for the NEMSEC database are in the properties files

/opt/nem/voyager/etc/eventlogmanager-security.properties

and

/opt/nem/voyager/etc/eventlogmanager-ensure-sec-db.properties

respectively.

Log, trace and *.txt files are rotated to prevent filling up disk space. For more information refer to the product description “FOXMAN-UN Logging Feature” [1KHW029166], section “Log, Trace and *.txt File Rotation Definitions”.

Please note:
When restoring a database, the events stored in the backup database are restored as well. This will hence reset the event counter. If the number of events stored in the database is smaller than the maximum allowed, this will lead to creation of empty daily event history files until the maximum number of events stored in the database is reached again.

For more details on logging and on forwarding events to a syslog server refer to the product description “FOXMAN-UN Logging Feature” [1KHW029166].

9.4.2 Event Record Syntax

As the alarm log and history files, the event history files are ASCII (i.e. text) log files where each line contains one event record. A record consists of seven fields, separated by the “|” character. The last field may have two parts separated by a colon.

The following lines show some examples of typical event records:

```
Feb 26 11:49:32 chbdev015 NEM_SECURITY_EVENT: 14|nmssystem|chbdev015|8944572|
||New FOXMAN private key activated. Keypair id 2
Feb 26 12:08:44 chbdev015 NEM_SECURITY_EVENT: 15|nemadmin|chbdev015|8945724|
8||DownloadKeyTask was successful, #taskId374
Mar  1 17:55:00 chbdev015 NEM_SECURITY_EVENT: 1041|nmssystem|chbdev015|9312100|
||Database backup start
Mar  1 17:56:50 chbdev015 NEM_SECURITY_EVENT: 1042|nmssystem|chbdev015|9312210|
||Database backup completed
```

The fields are:

- Event Time

  This is the date and time at which the event was detected. It is of the form “yyyy/mm/dd hh:mm:ss”.

  - Example: Feb 26 11:49:32

- Host

  This is the name of the workstation on which the event occurred.
- Event type

  Event type indicating the daemon sending the event.
  - Example: NEM_SECURITY_EVENT:
- Id

  This is the identifier of the event list entry.
- User

  This is the name of the user who was logged in and started the process or service that generated this event.
- Managed Object

  The majority of activities are associated with NEs. In these cases, the activity identifier is of the form “NE Name”:

  For system activities, the managed object shows the workstation name.

  For Foreign Objects, the FO name is shown.

  For miscellaneous events that are not related to a particular object, the managed object field is empty.
- Agent

  For activities concerning NEs, the associated agent is shown.
- Activity

  This field describes the activity or event. For section activities this includes the section name.
  - Examples: “Upload terminated successfully.”, “DownloadKeyTask was successful, #taskId374” or “No response from NE”.

9.5 Viewing Alarm and Event History

9.5.1 Using the History Viewer

The alarm history viewer is called from the NEM Desktop via the menu “Fault Management – Alarm History”.

For the alarm history, a date / time window can be specified which may span the whole history period. The viewer then automatically collects the appropriate data from all existing and relevant history files. Data can be additionally filtered and sorted if required, and then sent to a printer, or be exported to a file.

The files produced are in .csv or .xml format. They can be imported into a spreadsheet application for further analysis.

The event log is called from the NEM Desktop via the menu “System – Event List”. This Event List only shows events that haven’t yet been pushed to the event history files. If events do not appear any more in the Event List, you need to check the event history files “`/opt/nem/var/log/events_yyyymmdd.txt`”. The default prefix “events” of the log files can be modified via the system events configuration file “`/opt/nem/voyager/etc/eventlogmanager-system.properties`”.

The event list can be filtered e.g. for the event time being before a certain date and time. Data in the Event List can be further sorted and sent to a printer, or be exported to a file.

The files produced for export are in .csv or .xml format. They can be imported into a spreadsheet application for further analysis.

9.5.2 Import to a spreadsheet application

History files are text files, the fields separated by the bar symbol “|” and each record terminated by carriage return. The files can be directly imported into a spreadsheet application for filtering, sorting and any further analysis.

10 Remote Admin Tool (RAT)

10.1 Introduction

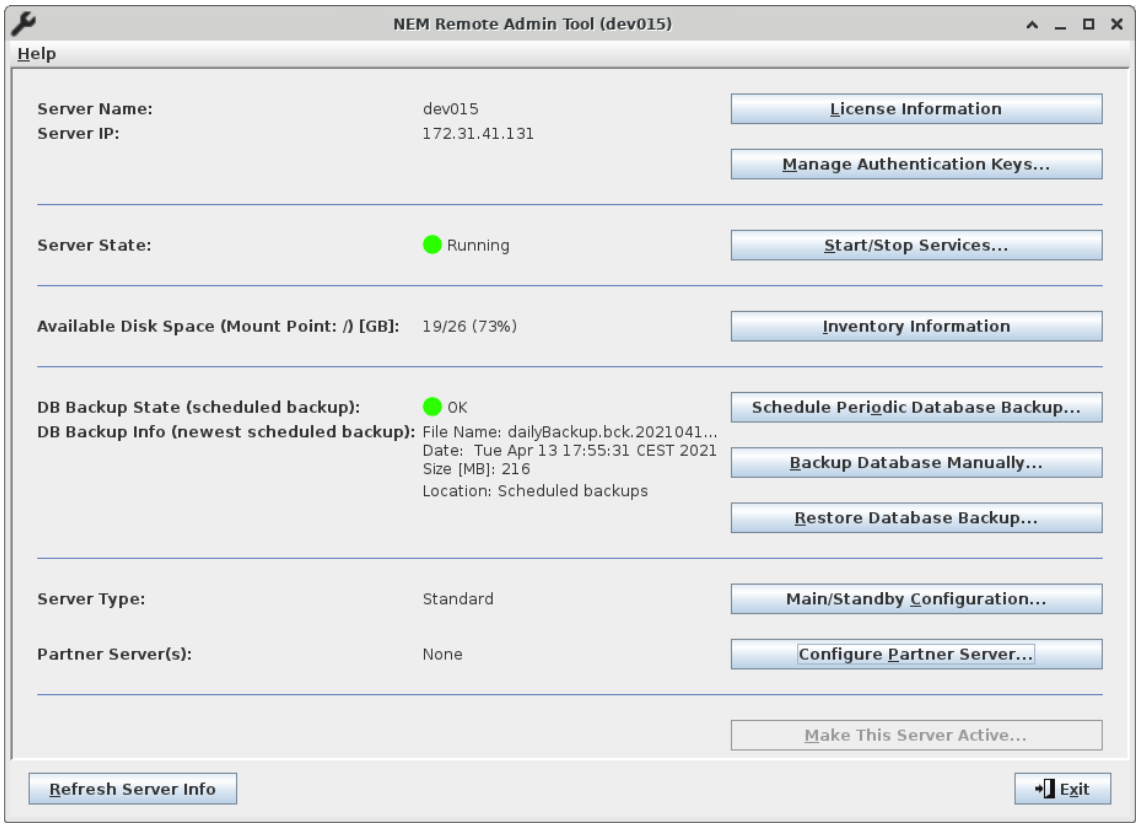


Figure 11: NEM Remote Admin Tool (RAT)

Please note:
The Remote Admin Tool (RAT) can only be used with appopriate permissions associated with the SECADM system role.

The Remote Admin Tool has been designed to simplify the task of managing the FOXMAN-UN system. It provides a user-friendly graphical interface for managing the following activities:

- Viewing and loading the license key,
- Managing authentication keys,
- Starting/restarting and stopping FOXMAN-UN services,
- Re-synchronizing NP objects with BP NE data,
- Viewing the Element Agents status,
- Viewing server inventory information,
- Scheduling periodic database backups,
- Performing a manual database backup,
- Restoring a database backup manually,
- Providing redundancy via main/standby configuration.

Please note:
The Remote Admin Tool replaces the NEM Administration Tool (nemtool) which was available in earlier versions of FOXMAN-UN.

10.2 Starting the Remote Admin Tool

The Remote Admin Tool can be started from the NEM Desktop “System – Remote Admin Tool…”.

Some of the Remote Admin Tool functions can be executed via a command line. This applies to the following commands:

`ratcheckcstlicense`	Checks the validity of the UCST license.
`ratcheckunemlicense`	Checks the validity of the FOXMAN-UN license.
`ratcpuinfo`	Returns CPU information in raw format.
`ratcstlicense`	Checks whether the UCST license is available. Returns an error message if not available.
`ratedbbackup`	Executes a manual backup of the database. Options can be displayed with “ratedbbackup -h”.
`ratedbinfo`	Displays information on the database.
`ratedbrestore`	Executes a manual restore of the database. Options can be displayed with “ratedbbackup -h”.
`rathddinfo`	Returns server hard disk information, similar to the “df -h” Linux command.
`ratiscorerunning`	Returns “1” if the NEM core is running, “0” if it is not running.
`ratlicenseif`	Returns the name of the LAN interface covered in the license.
`ratlslicense`	Displays license information, provided a valid license file is available in /opt/nem/etc.
`ratlsnem`	Displays information on NEM services.
`ratmemoryinfo`	Displays information on memory usage of the server machine.
`ratnembaserestart`	Stops and restarts the NEM base services. If the NEM core services were running, also the core services are restarted.
`ratnembasestart`	Starts the NEM base services.
`ratnemrestart`	Stops and restarts the NEM core services.
`ratnemstart`	Starts the NEM core services.
`ratnemstop`	Stops the NEM core services.
`ratrestartlinux`	Reboots the server.
`ratsystemid`	Returns the NEM license system ID for the server machine.

10.3 Remote Admin Tool Functions

The main window of the Remote Admin Tool shows the available functions.

To start a function, click the respective button.

10.3.1 License Information

The License Info dialog shows the details of the currently active license keys. Depending on the licensed options, one or more tabs are provided in the dialog. As a default, the NEM license tab includes the workstation identification number and the LAN interface ID, followed by the various licensed options.

Via the command button “Upload NEM License File…” menu it is possible to select a new license key file.

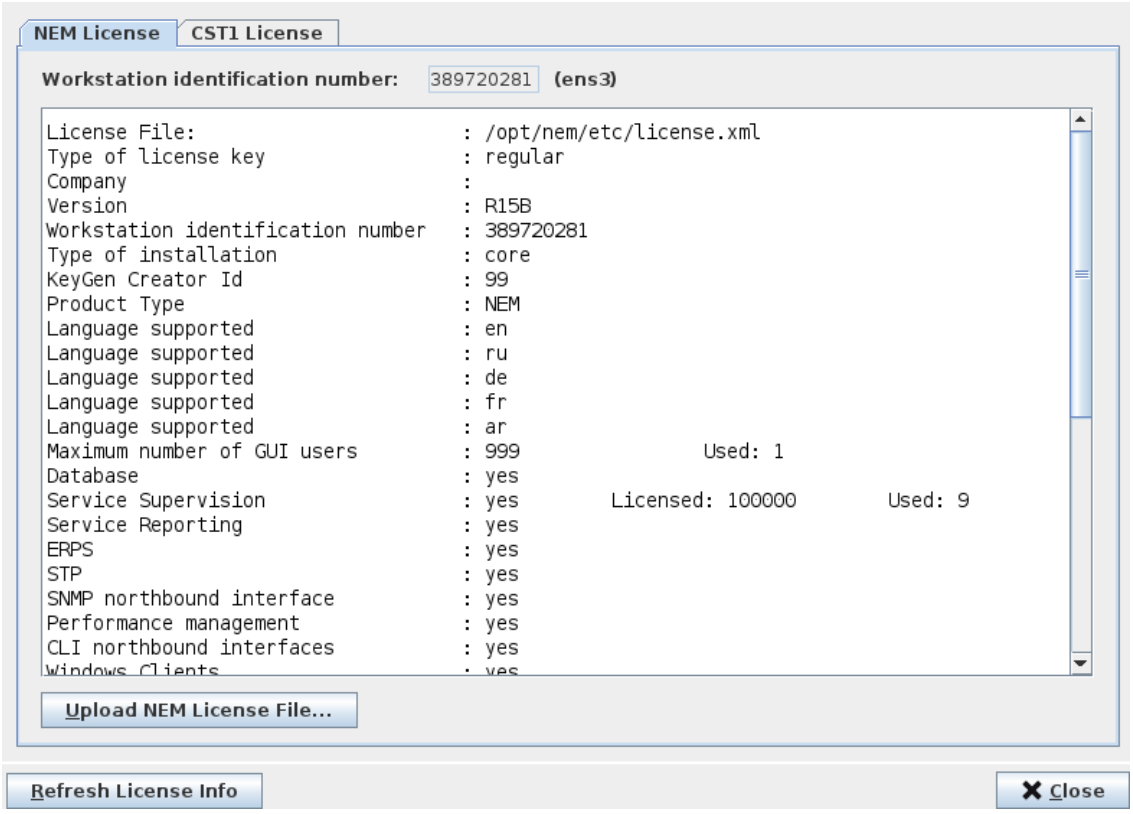


Figure 12: NEM License sample

10.3.2 Managing Authentication Keys

The tool to manage authentication keys is provided in the “Manage Authentication Keys” dialog. It allows you to create, activate, and delete authentication keys. Such keys are used e.g. for secure access to FOX61x nodes.

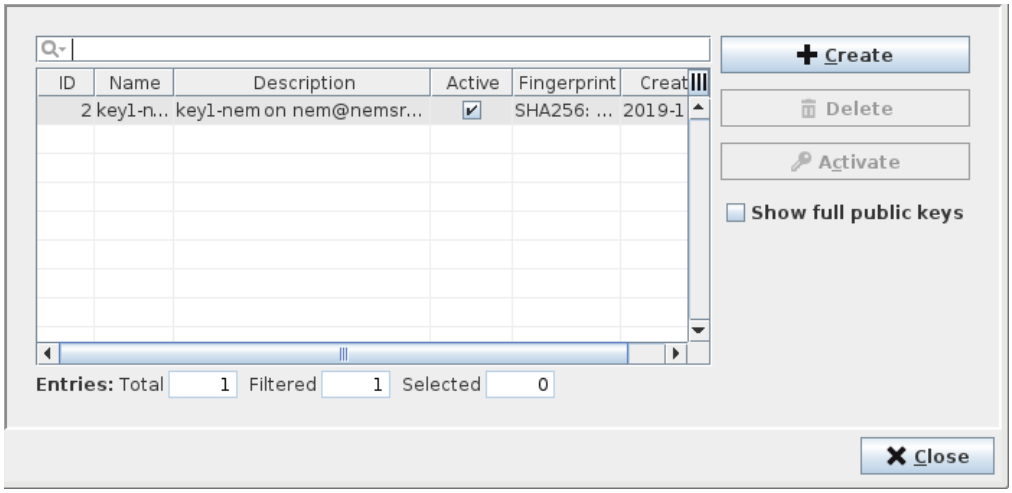


Figure 13: Manage Authentication Keys sample dialog

10.3.3 Start/Stop Services

This function reports the status of the FOXMAN-UN services and provides commands to start and/or stop services. It allows you to:

- Show all FOXMAN-UN services (i.e. base services, core services, and additional services like e.g. DIRAC services, depending on license options) with their name, description, selection for restart, restart indication, state, start date, and run time;
- Restart selected services;
- Start NEM core services;
- Stop NEM core services;
- Execute NP Resynchronization with BP NE data: this will re-synchronize all NEs, FOs, and sections in the database;
- Show Element Agents.

You can refresh the services status via the “Refresh Services Info” button.

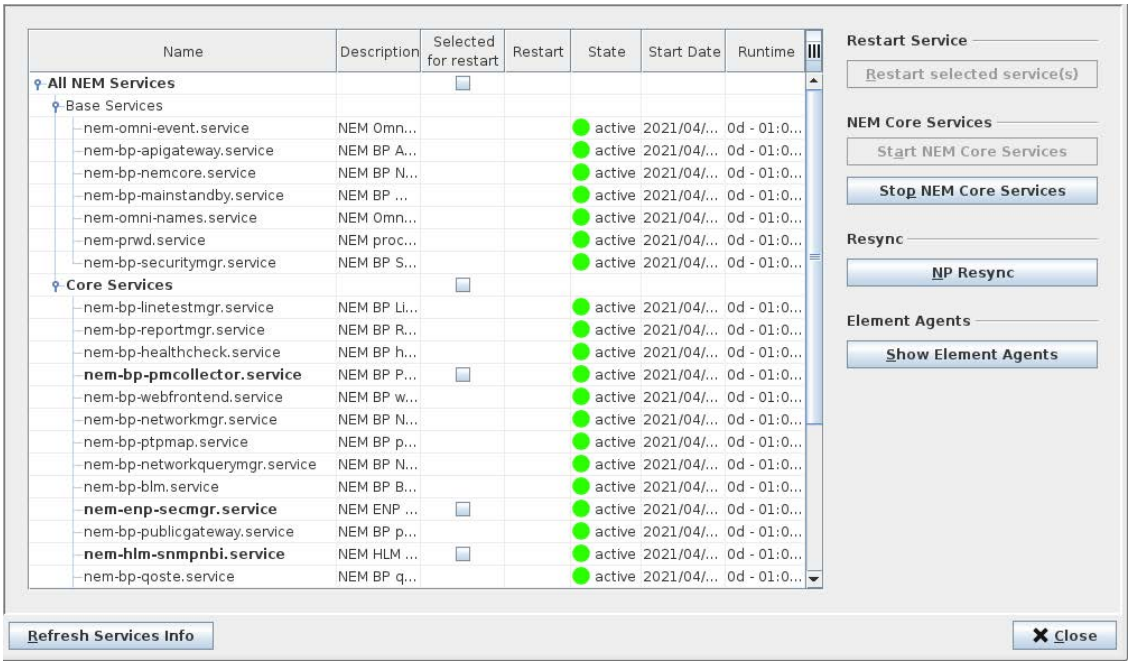


Figure 14: Services Management dialog

The most likely reasons for using the “Start/Stop Services” function are:

- To display the current status of the FOXMAN-UN system (the command “lsnem” also shows these status indications).
- To stop the FOXMAN-UN system for restoring the database from the backup (the FOXMAN-UN core must be inactive for this process).
- To stop and restart just the core for the purpose of activating changes made to the configuration file “nem.conf”.
- To try and recover from some error conditions (indicated for instance by deteriorated performance) by stopping and restarting the system or selected services.

10.3.4 Element Agents

Element Agent (EA) information is provided in the “Services Management” dialog, which is called via the “Start/Stop Services” button. Click the “Show Element Agents” button to open the dialog.

EA Name, Host Name, Server Name, Port, Manager ID, NAT Manager ID, Process ID (PID), Admin status, current status, and EA ID in the database are shown for each Element Agent.

Please note:
Similar results may be obtained by issuing the command: `lsea`

10.3.5 Inventory Information

The three sub-chapters below describe information shown in the Remote Admin Tool. For a graphical display of Disk space, memory usage, and CPU load you can also use the Metrics Database tool available in the FOXMAN-UN NEM Desktop menu (System - Metrics Database…) and on the Homepage.

10.3.5.1 Disk Information

This information is provided in the “Inventory Info” dialog. The disk information is provided in raw format, i.e. for each of the logical/physical disk devices it shows the device name, mount point, total size, available size, and usage.

For disk partition details refer to user manual “FOXMAN-UN Installation - User Manual” [1KHW002426] and “FOXMAN-UN Release Note” [1KHW002499].

10.3.5.2 Memory Information

Information on memory is provided in the “Inventory Info” dialog as follows:

Total, used, free, shared, cached, and available memory is shown for both RAM and swap space.

10.3.5.3 CPU Information

CPU information is provided in the “Inventory Info” dialog as follows:

For each of the CPU cores, CPU information is displayed in a way similar to the Linux command “vmstat”.

10.3.6 Database Backup and Restore

For description of how to use the DB Backup and Restore functions, refer to 11.5 "Backup of the FOXMAN-UN Database" and 11.6 "Restore the FOXMAN-UN Database".

10.3.7 Managing Main/Standby Configuration

Detailed information on the setup and configuration of server redundancy, i.e. the Main/Standby configuration, is provided in the two documents

- User manual “Main/Standby Solution” [1KHW029097],
- Application note “Main/Standby Solution” [1KHW029089-R18].

11 FOXMAN-UN Administration

11.1 Introduction

This chapter describes some of the administrative tasks that are usually required in a FOXMAN-UN system. The main tasks are:

- Ensuring that the FOXMAN-UN database is backed up regularly.
- Restoring the FOXMAN-UN database from a backup.
- Performing FOXMAN-UN configuration changes as required.
- Making sure that the FOXMAN-UN system is operating correctly.

These tasks have to be performed by a FOXMAN-UN security administrator.

11.2 The FOXMAN-UN Security Administrator

Please note:
The FOXMAN-UN installation script creates a user account for the FOXMAN-UN administrator with the name “nemadm” which is the owner of the installed file system. It is however not a user that can be used for logging in to FOXMAN-UN.

Most of the FOXMAN-UN administrator tasks are associated with the system role “NMS security administrator - SECADM”.

Any user that has the system role SECADM assigned can execute system management tasks for the FOXMAN-UN system. In practice this means:

- With a few exceptions, all files and directories relating to the FOXMAN-UN software are owned by “nemadm”.
- The FOXMAN-UN database is owned by “postgres”.
- The FOXMAN-UN database may only be backed up and restored by users with the security administration role assigned.
- The first user of the FOXMAN-UN must be a NMS security administrator. Nobody else can do anything useful unless the security administrator (a Linux user to be defined before installation and to be entered at the beginning of the installation) has set up the security system (users and roles).

  The idea behind is that the Linux administrator can apply whatever security constraints they want to apply to accounts, including the NMS security administrator. The Linux administrator could even remove the access to this user later on, so effectively no user could tamper with FOXMAN-UN except root.
- The agents, as well as the daemon processes associated with the core component, can only be started or stopped by a security administrator. Other users may not do these things (except for root, who can kill any process).

A result of this is that virtually all tasks that are directly associated with the FOXMAN-UN system settings can only be performed by a security administrator, without having to log in as root. This has been done by design so that the root password does not have to be revealed to the FOXMAN-UN administrator, thereby increasing security as a whole.

11.2.1 Logging in as “nemadm”

Please note:
Login as user “nemadm” is no longer supported from release R18 onwards.

→ By default, the FOXMAN-UN installation requires an initial NMS security administrator who shall assign roles to users. Only such users are allowed to log in to FOXMAN-UN.

If you are working on a non-FOXMAN-UN machine and want to log into a FOXMAN-UN server, in the Linux world you use the Linux command

```
ssh -X

Example: ssh -X nemsecadm@nemserver.mycompany.com
```

for getting the same user interface as if you were on the FOXMAN-UN server.

11.2.2 Logging in as “root”

There are 3 main ways of logging in as root (also referred to as the “superuser”) or to execute specific commands as root:

- from the login screen,
- using the su command,
- using sudo (requires setup by root for specific users).

Due to the nature of the root account, namely that it is often used for relatively short activities, many people prefer using the su command, rather than logging out and logging back in again. In this case you should read the comments about the su command in the previous section.

It is important to realize that root should not be using FOXMAN-UN. For example, root should not try to start the GUIs, nor should they try to use the NEM RAT.

The only time that root is required is when installing, upgrading or removing the FOXMAN-UN software or its components.

11.3 NEM Supervision Service

The NEM Supervision Service scope is to monitor NEM server resources and generate notifications / alarms in case the resources are passing given thresholds.

The threshold can be configured for

- minor level,
- major level,
- critical level.

The supervision service is generating system alarms which are user clearable. If an alarm is cleared by the user and the resource situation persists, the alarm is again generated.

The following resources are monitored:

- partition usage,
- database connections.

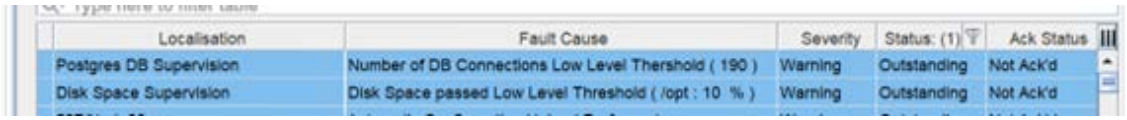
The NEM Supervision Service is implemented based on the linux systemd timer services (nem-supervision.timer, set to 20 seconds) and the supervision service (nem-supervision.service). The status of the NEM Supervision Service is shown with the *lsnem* command.

The configuration file `/opt/nem/etc/nem_supervision.yaml` is read by the service each time the nem-supervision.service is executed by the nem-supervision-timer. Therefore, changes can be made at any time (NEM administration permissions required). The default content of the `nem_supervision.yaml` file is as follows:

```
# nem supervision logging to file
supervision_LOG: False
# nem Supervision configuration file
supervision_DEBUG: False
# Data Base connections Supervision
DB_connections_DEBUG: False
DB_LOW_LEVEL_CNT: 250
DB_HIGH_LEVEL_CNT: 270
DB_CRITICAL_LEVEL_CNT: 290
```

```
# Disk partition usage Supervision
DISK_partitions_DEBUG: False
DISK_partitions_db_name: 'NEM_DATABASE'
DISK_partitions: [
'/': [70, 85, 98] ,
'/var': [70, 85, 98],
'/opt': [70, 85, 98]
]
SERVICES_SUPERVISED_DEBUG: False
SERVICES_SUPERVISED_CLEAR: True
SERVICES_SUPERVISED: [
'telegraf',
'nem-influxdb',
'nem-voyager-pm',
'nem-pb-collector',
'nem-bp-pmasyncmgr'
]
```

Example of generated alarms:



Localisation	Fault Cause	Severity	Status: (1)	Ack Status
Postgres DB Supervision	Number of DB Connections Low Level Thershold (190)	Warning	Outstanding	Not Ack'd
Disk Space Supervision	Disk Space passed Low Level Threshold (/opt : 10 %)	Warning	Outstanding	Not Ack'd

The `supervision_LOG` can be set to `True`. This will generate a nem-supervision.log file containing results / status information for each run of the nem-supervision.

The `DEBUG` settings can be set to true to expand the logging information.

The Database connections supervision settings need to be adjusted according to the scaling of the system and should not be changed by the user.

The disk partitions settings define the used space percentage of the partition at which the alarms are generated.

To configure the NEM-Supervision timer:

The following systemd configuration file can be modified to execute the nem_supervision at intervals:

- file: `/usr/lib/systemd/system/nem-supervision.timer`
- add/modify to run each interval: OnUnitActiveSec=120
- modify to run based on a calendar definition: OnCalendar=*-*-* *:*:00,20,40

To activate the changes in `nem-supervision.timer` execute the following systemd command (root permissions required):

- systemctl daemon-reload
- systemctl restart nem-supervision.timer

11.4 FOXMAN-UN Configuration Files

11.4.1 Introduction

This chapter describes FOXMAN-UN configuration files. All of these files are located in the directory /opt/nem/etc.

The following files are described in this document or referenced:

- nem.conf
- wdgd.conf
- database.conf
- cst.conf

- alarming.conf
- eventlogmanager-system.properties
- eventlogmanager-security.properties
- mplstp.conf
- np.conf
- prwd.conf
- snmpagentd.conf
- nbcli.conf
- tasks.conf
- version
- crosslaunch.properties - see the application note “SNMP Southbound Interface” [1KHW029018]
- NMS.properties
- firewall.conf - also see the application note “FOXMAN-UN in Firewalled Environment” [1KHW029012]
- logger.conf
- mgNetworkAgentMgr.cfg
- mgprot.cfg
- sectionalarmmapping.cfg (Section alarm mapping)
- neAlarmFilterServices.cfg
- singlePathServiceAlarmMapping.cfg
- multiPathServiceAlarmMapping.cfg

The details of most configuration parameters in these files are explained in the sections below.

11.4.2 nem.conf

Customer specific labeling:	
company_name	Hitachi Energy Ltd This parameter is not intended to be modified by the user.
product_name	FOXMAN-UN This parameter is not intended to be modified by the user.
build	18.x.y-abc This parameter is not intended to be modified by the user.
buildtime	dd/mm/yyyy-hh:mm:ss This parameter is not intended to be modified by the user.
General parameters:	
new_services_domain_name <domain_name>	Add this parameter with <domain_name> set to the name of the domain to which you want new services to be added upon creation. When added to nem.conf, all services will be added to that domain upon creation. If the option is set to a domain that does not exist, there will an ERROR trace in the log file.
lic_if	You may add this parameter with value “enp4s0” or a similar expression stating the LAN interface name of your core machine used for the license validation. Example: lic_if ens3 The interface name can be found via the command “ifconfig”.
cst_create_esw_control	Add this parameter with the option “on” to enable storing ESW to the NEM database upon automatic upload from a FOX61x node: cst_create_esw_control on
ifpoint_data_xmlrpc1_support	Add this parameter with the option “enable” to enable FOX660 support in NP: ifpoint_data_xmlrpc1_support enable

ifpoint_data_koap_support	Add this parameter with the option “enable” to enable FOX61x support in NP: ifpoint_data_koap_support enable
nbi_inventory_oss_address	Set the northbound inventory listening port IP address. The address can be set as follows: To listen on localhost: - localhost - LOCALHOST - 127.0.0.1 To listen on any / all addresses (not recommended for security reasons): - ANY - any - "" (empty) - 0 To listen to a specific IP address: - <IPdot Address> (e.g.: 172.31.41.21) Note: The listening port “nbi_inventory_oss_port” is defined in 11.4.13 "nbcli.conf".
nbi_linetest_oss_address	Set the northbound linetest listening port IP address. The address can be set as follows: To listen on localhost: - localhost - LOCALHOST - 127.0.0.1 To listen on any / all addresses (not recommended for security reasons): - ANY - any - "" (empty) - 0 To listen to a specific IP address: - <IPdot Address> (e.g.: 172.31.41.21) Note: The listening port “nbi_linetest_oss_port” is defined in 11.4.13 "nbcli.conf".
fo_ttps_num_vc12_transparent	The number of VC12 transparent TTPs in each VC4 related to STM-n interfaces on NEs of type FO. Set this parameter only if you need to terminate at least 1 VC12 on the FO’s STM-n interface. Default value: 63
fo_ttps_num_vc12_terminated	The number of VC12 terminated TTPs in each VC4 related to STM-n interface on NEs of type FO. Set this parameter only if you need to terminate at least 1 VC12 on the FO’s STM-n interface. Default value: 0
fo_ttps_num_vc12_clock	The number of VC12 clock TTPs in each VC4 related to STM-n interfaces on NEs of type FO. Set this parameter only if you need to terminate at least 1 VC12 on the FO’s STM-n interface. Default value: 0

11.4.3 wdgd.conf

The following parameters are automatically set during installation of the FOXMAN-UN software. It is unlikely that you will modify these values.

bp_core_host	Name or IP address of the workstation where the FOXMAN-UN database has been installed. In practice this is the workstation where the core component is installed. In a core installation, this defaults to “localhost”.

11.4.4 database.conf

The following parameters for database backup and recovery are used by the NEM RAT, as well as the edbbackup and edbrestore commands. The parameters are only relevant for the workstation on which the core component has been installed.

database	Name of the NEM database This defines the name and location of the Element Database, and is of the form db_name, where db_name is the database name, Default value: NEM_DATABASE The NEM database cannot be renamed.
local_backup_device	Configuration Parameters for local backups This parameter is used by edbbackup, edbrestore and NEM RAT as path/location where the backup file will be stored.
Configuration parameters for hook functions called on backup and restore. These parameters are used by the edbbackup and edbrestore commands.	
edbbackup_prehook_script	Backup pre-execution hook script path Default path: /opt/nem/nemadm/bin/edbbackup_prehook_script
edbbackup_posthook_script	Backup post-execution hook script path Default path:/opt/nem/nemadm/bin/edbbackup_posthook_script
edbbackup_hook_uncond	Backup hook execution to be done unconditionally, edbbackup, hooks executed: 1: even without cmd line switch –e set (as long as scripts exist) 0: the hooks are executed only if the cmd line switch –e set (and if scripts exist) Default value is set to 0
edbrestore_prehook_script	Restore pre-execution hook script path Default path:. /opt/nem/nemadm/bin/edbrestore_prehook_script
edbrestore_posthook_script	Restore post-execution hook script path Default path: /opt/nem/nemadm/bin/edbrestore_posthook_script
edbrestore_hook_uncond	Restore hook execution to be done unconditionally, edbrestore, remrestore hooks executed: 1: even without cmd line switch –e set (as long as scripts exist). 0: the hooks are executed only if the cmd line switch –e set (and if the scripts exist). Default value is set to 0.
Add-ons for the database plugin to store the NE configs into file.	
db_neconfigs_to_file	This parameter enables/disables the NE configuration storage into file system. Valid values are “true” and “false”. The default is set to “false”, which means by default the NE configuration backups are stored in the database. Note: If this parameter is set to “true”, it is the responsibility of the user to maintain a backup of the NE configuration files. These files will not be part of the FOXMAN-UN Database Backup and Restore.
db_neconfigs_dir	This parameter defines the location for the NE configuration files. The default location is set at “/opt/nem/var/neconfigs”.

11.4.5 cst.conf

The following parameters control the visibility of a FOXCST and ECLI launch option in the client GUI.

client_ecst_enabled	Controls showing FOXCST in the NEM Client Possible value: true | false Default is set to “true”

client_cst_doubleclick_default	Defines which CST is launched for NE double-click when both are enabled Possible value: ecst Default is set to “ecst”
client_ecli_enabled	Controls showing ECLI in the NEM Client Possible values: true | false Default is set to “true”

11.4.6 alarming.conf

Definitions that may be required depending on customer requirements.

In most cases the FOXMAN-UN software will choose the suitable default values, so you only need to comment out the definitions that you explicitly need to change.

remove_off_alarms	If set to “true”, the alarms specified as “OFF Alarms” will not be generated and hence not displayed in the alarm list. If set to “false”, the “OFF Alarms” are created and displayed in the alarm list. The default value is “true”.
alarm_auto_acknowledge	This parameter determines whether cleared alarms will automatically be acknowledged. If it is set to “On” cleared alarms will automatically be acknowledged, written to the alarm log file and removed from the database. By default this parameter is set to “Off”.
remove_bunch_alarms	FOXMAN-UN keeps count of the number alarms in the database for each NE. This is done to keep the database down in size. A limit is defined by “AlarmLogMaxSize” (default 50; defined in /opt/cst/nem/ucst.ini). If that limit is reached, FOXMAN-UN attempts to remove a bunch of alarms together for efficiency reasons (only cleared alarms can be removed). The size of this bunch is defined by “remove_bunch_alarms”. The default value is set to 5.
report_repeating_alarms	FOXMAN-UN allows disabling the reporting for repeating alarms. The default is set to “off”.
communication_lost_alarm	Auto generation of “communication lost” alarms: If active, loss of communication to a NE generates an alarm. It is automatically cleared when communication is restored. The default value is set to “off”.
automatic_upload_alarm	If set to “on” means that every automatic config upload from an NE will generate an automatic_upload alarm. The default value is set to “on”.
alarm_list_background_color	This parameter determines whether entries in the alarm list are displayed with their background color set to the alarm severity color of the related alarm or to the default color of the list. “color_on” = background color set to the alarm severity color of alarm “color_off” = background color set to the default color of the list By default this parameter is set to “color_on”.
alarm_config_background_color	This parameter determines whether entries in the “Default Alarm Configuration”, “Unit Alarm Configuration” and “Sub-unit Alarm Configuration” dialogs are displayed with their background color set to the alarm severity color of the related alarm or to the default color of the list. “color_on” = background color set to the alarm severity color of alarm “color_off” = background color set to the default color of the list By default this parameter is set to “color_on”.
ignore_cobux_alarm_text	If set to “true” means that alarm customizations in COBUX configurations (on NE level) will be ignored. By default this parameter is set to “false”
blink_timer	By default the blink “On” time is set to approximately 3 seconds. To change it, enter a value larger than 1. This will set the “on” time approximately n times 0.5 seconds. Note that a short “on” time increases the processor load.

double_click_period	This parameter defines the maximum period allowed between two (or several) mouse clicks, in order that they are considered as a single double-click. Default set to 500 ms If you do decide to change this value, then you will have to restart the Element Manager.
logfile_keep_time	Defines the number of days for which the log files are retained. This keep time can be defined between 2 and 730 days (2 years). The default value is set to 30 days.
alarm_forward_interval	Alarm forwarding interval. Defines the number of minutes between sending emails. Default is 15 (minutes)
alarm_forward_min_ontime	Alarm forwarding on time. Defines the minimum time in seconds an alarm must be Active before being forwarded in an email. Default is 5 (seconds)
Alarm Escalation (AE) Configuration	
ae_t1_activation_delay	T1 Alarm Activation Delay The number of seconds to delay from the occurrence of the alarm (T0) before activating all alarms. The default value is set to 180 secs (3 min).
ae_t2_hornbox_delay	T2 Hornbox Indications Delay The number of seconds to delay from T0 before turning on hornbox indications. The default value is set to 360 secs (6 min).
ae_t3_email_delay	T3 Email Notifications Delay The number of seconds to delay from T0 before sending emails. The default value is set to 540 secs (9 min).
ae_t2_hornbox_unack_pulse enable	T2 Hornbox Unacknowledge Alarms Pulse Set if the Hornbox Relay 3 (operators wakeup function) will be on constantly or will pulse on/off (1 sec on, 1 sec off). The default value is set to enable.
ae_t3_email_address	T3 Email Address The email address to use when sending T3 emails. The default value is set to <empty> Note: Alarms are only forwarded if they have remained unacknowledged until T3 has expired and the email is sent.
ae_hornbox_ipaddress	Hornbox IP Address The IP address of the W&T Web-IO hornbox device. The default value is <empty>.
ae_hornbox_port	Hornbox Port Number The port number of the W&T Web-IO hornbox device. The default value is set to 80.
ae_hornbox_password	Hornbox Password The password of the W&T Web-IO hornbox device. The default value is <empty>.
ae_include_major_alarms	Include Major Alarms Include major alarms in the T2 and T3 indications. Default value is set to enable.
ae_include_minor_alarms	Include Minor Alarms Enable or disable minor alarms for activating the “All Alarm” hornbox summary output (#2). Default value is set to disable.
ae_include_warning_alarms	Include Alarms with Severity “Warning” Enable or disable alarms of severity “warning” for activating the “All Alarm” hornbox summary output (#2). Default value is set to disable

ae_inactive_times	Inactive Times Set the time periods when Alarm Escalation handling is NOT applied. For example not during normal working hours. Format is “DDD,HS[:MS]-HE[:ME]; DDD,HS[:MS]-HE[:ME];…” Where DDD = first three letters of day of the week, e.g. mon (for Monday) HS = Hour Start, starting hour of the interval (24 hour time) MS = Minute Start, starting minute of the interval (this is optional) HE = Hour End, ending hour of the interval (24 hour time) ME = Minute End, ending minute of the interval (this is optional). The default is: mon,9:00-17:00;tue,9:00-17:00;wed,9:00-17:00;thu,9:00-17:00;fri,9:00-17:00
syslog_facility	Defines with which level the alarms are logged into syslog. This syslog facility must be defined in /etc/rsyslog.conf. Default is LOG_LOCAL6

11.4.7 eventlogmanager-system.properties

System Event Log Configuration	
nem.eventlogmanager.backends.syslog.enabled	true: system events are forwarded to syslog (default). false: no system events are forwarded to syslog.
nem.eventlogmanager.logRotation.enabled	true: log rotation is enabled, i.e. the parameters below are applied (default). false: log rotation is disabled, i.e. no history files are written.
nem.eventlogmanager.logRotation.threshold	The maximum number of event entries stored in the Database. When the limit is reached the oldest system events will be pushed to a history file. Default is 100000.
nem.eventlogmanager.logRotation.purgePercent	When the Max Number of system events is reached a percentage of existing events is removed from the database and written to history files. Default is “20” (percent). “0” purges a single event at a time.
nem.eventlogmanager.logRotation.purgeFile.path	The path for the history files. Default is the relative path var/log, corresponding to /opt/nem/var/log
nem.eventlogmanager.logRotation.purgeFile.namePrefix	The prefix for history files written to the history path for events purged from the database. Default is “events”.
nem.eventlogmanager.logRotation.purgeFile.nameExtension	The extension of the history files. Default is eventDump.log

11.4.8 eventlogmanager-security.properties

Security Event Log Configuration	
nem.eventlogmanager.backends.syslog.enabled	true: security events are forwarded to syslog (default). false: no security events are forwarded to syslog.
nem.eventlogmanager.logRotation.enabled	true: log rotation is enabled, i.e. old entries are purged. false: log rotation is disabled, i.e. no entries are purged (default).

11.4.9 mplstp.conf

enp_node_domain_name	Defines the E-NP domain name. The default is ENP-Nodes.
mplstp_data_koap_support	Activates/Deactivates in the EA the reading of MPLS-TP data on devices. Valid values are enable and disable. The default is enable.

11.4.10 np.conf

np_querylistmaxsize	Defines the maximum number of entries returned from a query. The default is “10000”.
np_max_applicationmanager	Defines the maximum number of NP sessions that can be concurrently performing edit operations. The default is “5”.
np_max_elementmanager	Defines the maximum number of Element Agents (Downloads) that can be concurrently under control of an NP session. The default is “5”.
np_circuit_data_fields	Defines the names and number of the data fields that are offered in the circuit dialog, to describe an individual circuit. By changing the names or adding or removing them, the number of descriptive attributes for circuits can be customized to suit the operators' requirements.
np_circuit_ep_data_fields	Defines the names and number of the data fields that are offered in the end point dialog, to describe an individual circuit end point. By changing the names or adding or removing them, the number of descriptive attributes for each circuit end point can be customized to suit the operators' requirements.
np_service_values_list	Defines the names and number of the menu items that are offered in the “Services” Combo selection box of the circuit dialog, to describe what service is being offered by an individual circuit. By changing the names or adding or removing them, the number of types of circuits can be customized to suit the operators' requirements.
np_ttp_autoactivation	If this is true, set external TTP active when creating circuits with NP. The default is “true”.
np_tti_autosetting	If this is true, set default TTI of TTP active when creating trails with NP. The default is “true”.
np_report_dir	Defines the default repository directory when creating NP reports.
path_cost_calc_model	Defines the calculation model for cost based routing. The following values are supported: 1 CostWorking + CostProtecting 2 (CostWorking + CostProtecting) / 2 3 (CostWorking * CostProtecting) / (CostWorking + CostProtecting) Default is “1”, the parameter is disabled by default.
trail_data_koap_support	Add this parameter with option “true” for the FOX61x units to be reported to NP.
trail_data_xmlrpc1_support	Add this parameter with option “enable” for FOX660 support in NP.
trail_data_xmlrpc1_temp_support	Add this parameter with option “enable” for FOX660 support in NP.
np_conflict_detect_channels	Add this parameter with option “enable” to provide finer granularity for conflict detection. Default is “disable”.
np_use_topote_in_avoidne_check	Add this parameter with option “true” to make sure that “Avoided NEs” is also considering intermediate NEs to be avoided when routing topological TEs, and not only A-End and Z-End NEs of found trails. NP service (nem-np-networkmgr.service) needs to be restarted for this option to take effect.
np_service_sync_add	Enable adding a circuit at deployment to the service supervision: np_service_sync_add enable Default is: “disable”[1].
np_service_sync_add_related	Enable adding A-Ports / Z-Ports of the circuit to the service supervision: np_service_sync_add_related enable Default is: “disable”[1].
np_service_sync_add_sections	Enable adding circuit sections to the service supervision: np_service_sync_add_sections enable Default is: “disable”[1].
np_service_sync_del	Enable deletion of a circuit from service supervision at circuit removal: np_service_sync_del enable Default is: “disable”[1].

1. If enabled, this only creates entries in advanced service supervision to represent the Circuit and Trail that do not have any relation to the system services.

11.4.11 prwd.conf

Event Log Configuration	
autostart	Set the delay for starting processes. no: wait for command “prwdctl start”, yes: start immediately. Default is “no”.
tcpport	The TCP port to be used for procctl. Default is “4800”.
waitbeforekill	Wait time in seconds, after a process is SIGTERM’ed until SIGKILL. Default is “6”.
retries	The number of restart attempts in case of failures. Default is “5”.
fatal	The error classification if restart fails. yes: fatal, no: non-fatal. Default is “yes”.
waittime	Wait time in seconds between a failure and a restart. Default is “5”.
uptime	Uptime in seconds until the failure counter is reset. Default is “20”.

11.4.12 snmpagentd.conf

For details on the HLM SNMPv3 integration refer to the application note FOXMAN-UN HLM SNMPv3 Integration [1KHW029203].

snmp_trap_port	Remote port where alarms are sent; default is 10162.
snmp_request_port	Local host’s listening port for SNMP requests from the remote host; default is 10161.
snmp_hlm_host	HLM host IP address; default is: 127.0.0.1
snmp_no_cards_alarms_table	By enabling (value = enable) this flag would set the NBI/FOXMAN-UN to trap only mode and HLMs are prevented from accessing the FOXMAN-UN ne, card and alarm tables. Default: disabled
snmp_community	Community name between agent and HLM, default is “public”.
snmp_trap_community	Trap community name between agent and HLM, default is “public”.
snmp_clear_alarm_ack	Automatic clear of alarm acknowledgment, default is “disable”.
snmp_raise_alarm_ack	Automatic raise of alarm acknowledgment, default is “disable”.
snmp_send_clear_ack_trap	Send acknowledge trap when cleared alarm is acknowledged. Default is “disable”.
snmp_send_raise_ack_trap	Send acknowledge trap when raised alarm is acknowledged. Default is “disable”.
snmp_hlm_host2	Second HLM host IP address for traps Default is -
snmp_trap_port2	Remote host for the second HLM host Default is “0”.
snmp_v3_security	Turns on and off the SNMP V3 security Default is “enable”.
snmp_v3_userid	Username setup for SNMP V3 security Default is: “big_chief”. If not set or set to empty string, it uses the ‘big_chief’ value (i.e. usually ‘nemadm’).
snmp_v3_auth_protocol	Authentication protocol used for the SNMP V3 user. Possible protocols are “none”, “SHA” or “MD5”. Default is “SHA”.

snmp_v3_priv_protocol	Privacy protocol for the SNMP V3 user. Possible protocols are “none” or “DES”. Default is “DES”.
snmp_v3_usm_access	Allow snmpv3 user access USM (user) tables. Default is “enable”.
snmp_trap_version	Defines if FOXMAN-UN sends SNMPv1, v2 or v3 traps / notifications. Valid values are: “1” (for SNMPv1 traps), “2” (for SNMPv2 notifications), “3” (for SNMPv3 traps and notifications). Default is “3”.
snmp_v1v2_support	Define the SNMP version to be used by default for GET requests. Valid values are: disable, enable. Default is “disable”. If disabled, SNMP v1/v2 is not used, but only v3.
snmp_show_cleared_alarms	Define if cleared alarms are shown in the Northbound SNMP alarm table. Valid values are: disable, enable. Default is “disable”.
snmp_alarm_ne_card_batch_size	Define the chunk size of the alarm, ne, and card traps sent to HLM by NBI. Default size is “5”.
snmp_include_services	Define if supervision services are included in the NE table, and service alarms included in the alarm table. Valid values are: “disable”, “enable”. Default is “disable”.

11.4.13 nbcli.conf

ECLI Proxy Configuration	
nbi_eclip_oss_port	Configures the tcp listen port of the ECLI proxy daemon default set to “2600”.
nbi_eclip_max_number_of_sessions	Defines the number of ECLI proxy sessions started by default on NEM startup The maximum number of sessions is “100”.
nbi_eclip_protocol	Defines the ECLI proxy protocol. Valid values are “telnet”, “ssh”, Default is “telnet”
Linetest, Inventory Configurations	
nbi_cli_max_connections	Defines the linetest CLI, inventory CLI number of connections. Default is set to “5”.
nbi_linetest_oss_port	Configures the tcp listen port of the linetest CLI. Default is set to “2700”.
nbi_inventory_oss_port	Configures the tcp listen port of the inventory CLI. Default is set to “2500”.

11.4.14 tasks.conf

Inventory Service Reporting	
service_sync_enabled	Enable/Disable the automatic upload of service data from NE to NEM database. “1” enabled, “0” disabled, Default is “0”. This is a heavy operation that can affect the overall system performance if used too often, especially for a large network.
service_sync_interval	The frequency of uploading service data from the NE to the NEM DB. Valid options are: “daily”, “weekly”, “monthly”. Default is “daily”.

service_sync_time_offset	Defines the scheduled time when the service synchronization takes place. It is highly recommended that the schedule should be during the non-peak business hours. Valid values are as follows: - If interval is “daily”: defines the number of elapsed hours after midnight, - If interval is “weekly”: defines the number of elapsed hours after Monday midnight, - If interval is “monthly”: defines the number of elapsed days after 1st day of the month, time is fixed to midnight. The default value is set to “2”. With the default daily “service_sync_interval”, this means the service synchronization will take place daily at 02:00.
Business Logic Manager Configuration	
bp_blm_max_cfg_ringbuffer_size	The maximum number of configuration backups stored and then made available for restore. Default value is “5”.
bp_blm_ringbuffer_sync_interval	The frequency of checking of the NE Config changes and is then updated in the ring buffer. Valid values are “none”, “immediately”, “hourly”, and “daily”. Default is “daily”. Setting “none” will disable backups being stored to the ring buffer.
bp_blm_ringbuffer_sync_time_offset	The number of minutes past the interval period start that the sync will take place. Valid values ranges from “0” to “1440”. Default is “60”.
bp_blm_linetest_addr_map_file	The mapping file for port address translations. This should be filled by the operator. Default entry is: ${NEM_HOME}/etc/blm_linetest_addr_map.cfg
bp_blm_linetest_addr_map_check_interval	The number of minutes between checks of the Port Address Mapping File for changes. Valid range is 1 to 120 (minutes). Default is “5” minutes.
bp_blm_ignored_boardId_for_ESW_download	The list of board IDs which will be ignored by the NE wide ESW download functionality. List of board IDs separated with ';' Default is “406;412;416”

11.4.15 version

Includes the detailed version information that is also displayed as part of the output from the nemsysinfo command.

11.4.16 NMS.properties

Defines client properties.

Configuration parameters for the NEM desktop	
desktop.enabled	Enables/disables the use of the NEM desktop as dialog container. Valid values: true, false Default value: false
desktop.fit2InitialWindow	Sets the NEM desktop to a size fitting the initial window. Valid values: true, false Default value: false
desktop.dockingEnabled	Enables/disables the use of the NEM desktop as dialog container. Valid values: true, false Default value: true
desktop.percentageOfWidth desktop.percentageOfHeight	Sets the size as percentage of the screen size of the NEM desktop window if not maximized. Default value: 100 Default value: 100

desktop.showBaseStatusPanel	Enables/disables the status panel at the bottom of the NEM desktop. Valid values: true, false Default value: false
desktop.enableToggleBaseStatus-Panel	Enables the user to switch the status panel on or off. Valid values: true, false Default value: false
monitorIdleBusyInterval	Sets the interval in milliseconds for NEM desktop idle or busy messages. Default value: 10000
help.helpSetName	Defines the name of the NEM Java help file. Default value: Help.hs

Definition of NEM application launch paths	
path.launch.ecst_gui	Path for the FOXCST GUI application launcher. Default is ${NEM_HOME}/bin/private/ecstguistart
path.launch.ucst_gui	Path for the UCST GUI application launcher. Default is ${NEM_HOME}/cst/bin/ducst
path.launch.hwview	Path for the UCST HW view application launcher. Default is ${NEM_HOME}/cst/bin/hwview

Settings for the object request broker (ORB)	
server.ping.interval	Calling interval for isAlive messages. Default value: 20000
ns_binding	Name service binding. Default value: NameService
ns_port	Name service TCP port. Default value: 2809

rest_port	REST interface TCP port.
	Default value: 9005 # to be used with https protocol
	
	Note:
	When changing the port and protocol for the REST interface on client side, the respective settings also need to be done on the server and in the firewall settings if applicable. The server settings are defined in the file “/opt/nem/voyager/etc/apigateway.properties”. For a port change on the server edit the entry
	`server.httpsPort=<PortNumber>`
	and restart the server processes by entering the commands
	`nembasestop`
	`nemstart`
	After this the client can only connect via the new port provided the firewall settings have been changed accordingly.

rest_legacy_port	REST interface legacy TCP port. Default value: 9006 # to be used with http protocol
rest_protocol	REST interface protocol. Default value: https # to be used with port 9005 Optional value: http # to be used with port 9006
get_version_timeout	Timeout for /nemcore/versions GET request during login in milliseconds. Default value: 20000
get_version_poll_interval	Poll interval for /nemcore/versions GET request during login in milliseconds. Default value: 3000
get_version_poll_timeout	Poll timeout for /nemcore/versions GET request during login in milliseconds. Default value: 180000
notificationPort	UDP port for notifications. Default value: 20736
snmpNotificationPort	UDP port for SNMP notifications. Default value: 162

Settings for the NEM client GUI in /opt/nem/etc/NMS.properties:

format.date.pattern	The date format to be used in the GUI. Default value: yyyy/MM/dd
format.time.pattern	The time format to be used in the GUI. Default value: HH\:mm\:ss
format.datetime.pattern	The separator between date and time to be used in the GUI. Default value: %s - %s
table.persistentFilters	Enables/disables the use of persistent filters in tables. Valid values: true, false Default value: true
table.popupMessage.whenFiltered	Enables/disables pop-up messages when filters are applied in tables. Valid values: true, false Default value: true
table.coalesceUpdateEvents	Enables/disables coalescent update events in tables. Valid values: true, false Default value: true
popupMessage.showTime.ms	The display duration in milliseconds for pop-up messages. Default value: 4000
enpmgr.maxDeployDeleteSelection	The maximum number of items that can be deleted at a time in ENP. Default value: 5
enpmgr.emptyServiceTunnelName	Determines whether a service / tunnel name is empty when creating a service or tunnel. Valid values: true, false Default: true
onMapOpen.autoOpen.alarmSummary	Enables/disables the automatic opening of the alarm summary view when opening a map (NEM Network Browser). Valid values: true, false Default value: false
autoLogoff.nms.time.ms	Auto logout timeout in milliseconds for the NEM Client. Default value: 7200000 (equal to 2 h)
autoLogoff.rat.time.ms	Auto logout timeout in milliseconds for the NEM Remote Admin Tool. Default value: 1800000 (equal to 30 min)
restClient.serverCert.strictCheck	Enables/disables the strict certificate handling for the client when connecting to the server. Valid values: true, false Default value: true
restClient.clientTruststorePassword	Shows a hash of the REST client stored password. Do not modify this value.
blm.legacy	Applicable to FOXMAN-UN R18. Enable or disable legacy Business Logic Manager (BLM) functionality on the Client. This applies to the NEM Desktop “Network” menu features - Inventory Request… - Task View… - NE Password Tasks… - Profile & CPS Tasks… Valid values: true, false Default for Windows client: false Default for Linux client running on server: true When the client is installed on the server machine or if the core is installed with the “-t” option (Make CORBA Naming Service remotely available via TCP (default: via SSL)), this is set to true by default on the core machine, and the client, when running on the same machine as the core, will read the same setting from /opt/nem/etc/NMS.properties. For the NEM client for Windows® it is set to false by default in C:\Program Files\FOXMAN-UN_18.0.0\etc\NMS.properties. Enabling this feature is not recommended as it activates insecure TCP connections between client and server.
putty.autoLogin	If putty.autoLogin is true (default: false) the password is passed automatically to PuTTY session. Default: false

encoding.processArguments.windows	Character encoding for passing arguments to launched processes for NEM client for Windows®. Default: ISO-8859-1
encoding.processArguments.linux	Character encoding for passing arguments to launched processes for Linux. Default: UTF-8

11.4.17 firewall.conf

Defines the port ranges of the FOXMAN-UN processes in order to deploy the FOXMAN-UN in firewalled environment. For more details on firewall configuration refer to the specific application note on this subject: [1KHW029012] FOXMAN-UN in Firewalled Environment - Application Note.

Port range for core processes	
core_server_range	Port range used by PM collector daemon. No definition means any ports. Default: 40000-40099.
Port range for the GUI clients	
GUI clients listening ports for notifications and callbacks	For the UCST GUI clients that listen for notifications and callbacks, the ORB is listening on a port in the ranges defined below. It is possible to define the same range for all the GUI client; in this case the next available port is used. Default: 55000-55200. - nemdesktop_server_range (recommended range: 54200-55200) - hwview_server_range - ucst_server_range
GUI clients that connect to the core	
nemdesktop_client_range	Port range used by the ORB. No definition means any ports. Default: 48000-48020

11.4.18 logger.conf

All FOXMAN-UN Client Connection activity are logged to the FOXMAN-UN Event Log function. A log entry is written when:

- a FOXMAN-UN Client connects,
- a FOXMAN-UN Client disconnects,
- a FOXMAN-UN Client connect fails,
- a FOXMAN-UN Client connection times out and is released.

The connection logs can be turned on/off.

All changes to FOX515, FOX61x, and FOX660 must be logged to a file. A log must be written when:

- a FOX515 partial download is performed,
- a FOX61x Trail configuration change is reported,
- a SPO1410 Trail configuration is reported,
- a BLM function successfully changes the NE.

The configuration change log can be turned on/off.

Configuration parameters for FOXMAN-UN logging	
client_connection_logging	Enables/disables the client connection logging. Valid values: enable, disable Default value: disable
ne_config_diff_logging	Enables/disables the ne configuration change logging. Valid values: enable, disable Default value: disable

ne_config_change_file_name	For customizing the name and location of the file for ne configuration change logging. Default name and location: /opt/nem/var/log/neConfigChange.log
ne_config_diff_syslog	For directing the output of the ne configuration change logging to syslog and stops the ne configuration changes being written to user specified file. Valid values: enable, disable Default value: disable
syslog_facility_logger	Sets the default syslog facility. Default value: LOG_LOCAL0

11.4.19 mgNetworkAgentMgr.cfg

This file resides in /opt/nem/etc/genea	
hb_num_missed_hb_for_log	Number of missed heartbeats until a log entry is made default: 3
hb_num_missed_hb_for_alarm	Number of missed heartbeats until an alarm is raised default: 6
EF: Event Filtering. Event Filtering mechanism which sends to the flooding list the NEs driving the EA event rate over the Continuous Event Rate (CER) and Burst Event Rate (BER) threshold. The system ignores all the alarm events of the NEs included in the flooding list. Alarms will be resynchronized automatically when the rate returns to normal values. On Systems with more than 60 tunnels configured going through a node, set these 2 values to the maximum number of expected configured tunnels, plus an additional 10% (rounded up) to avoid delay on alarms. To apply the defaults, keep the property commented with a preceding #. Uncomment desired property and change its value if required to apply different settings.	
ef_enabled	Enable or disable Event Filtering mechanism on FOX61x agent. default: true (set to false to disable)
ef_ne_cer_per_min	Continuous Event Rate (CER) threshold default: 60
ef_ne_ber_per_min	Burst Event Rate (BER) threshold default: 120

There are more parameters in this file - do not modify those entries in the file as that would pose a risk for system stability.

11.4.20 mgprot.cfg

Allows you to tune some DCN parameters and change the timing behavior for some DCN related options. It is however not recommended to modify these without having clear advice from technical support.

This file resides in /opt/nem/etc/genea	
poll_interval_long	default: 1800
poll_interval_short	default: 60
heartbeat_interval	Heartbeat interval in seconds default: 30
heartbeat_registration_interval	Registration interval in seconds. default: 86400
max_config_change_wait_time	default: 30
max_config_change_wait_-time_trail	default: 0
allow_bulkrequest	default: yes
allow_multirequest	default: yes
allow_bulk_getdiscover	default: yes

doCleanupOnCreateError	default: yes
secuUnitNames	default: SENC1
calcIndexList	MPLSXC,MEG,BFD,LPS default: MPLSXC
hash_track_tables	default: KmQosDscpPhbTable KmMplsQosExtExpTrafficClassTable KmMplsQosExtPhbExpTable KmMplsQosExtPhbTable KmMplsQosExtPscTrafficClassTable KmBridgeExtQoSSchedulingProfileTable KmBridgeExtQoSUserPriorityTrafficClassTable KmMplsQosExtUserPriorityExpTable
min_backup_delay_minutes	default: 60
max_backup_delay_minutes	default: 300
min_delay_between_backup_minutes	default: 10
save_mgr_active	default: true
min_idle_secs_before_save	default: 600
agent_connect_userid	default: nmssystem

11.4.21 Section alarm mapping

The section alarm mapping is used to define the highest alarm severity of the section end points. The highest alarm severity defines the alarm severity for the section on the map and the coloring of the section endpoint in the section management.

11.4.21.1 Default section alarm mapping

An alarm affects a section if:

- the alarm flag “isTrafficAffected” is TRUE and
- the alarm NE id and the section NE id match and
- the alarm TPAddress and the section slot, subslot and port number match,

or

- the alarm flag “isTrafficAffected” is TRUE and
- the alarm NE id and the section NE id match and
- the alarm TPAddress is a NullAddress and
- the alarm SbuAddress and the section slot number match.

The first “if” statement is used with traffic alarms like LOS and AIS Received. The second statement is used for general unit alarms like Unit not assigned, No application software, Loss of Signal on SDH Clock source.

11.4.21.2 sectionalarmmapping.cfg

The sectionalarmmapping.cfg is a configuration file to allow customer-specific section alarm mapping. It allows you to specify if an alarm affects or does not affect a section.

The whole list of entries of this file are checked:

- if an alarm matches an entry, the ‘affect section’ value is used
- if an alarm matches several entries of the configuration file, the last value is used
- if an alarm does not match any of he entries, the default section alarm mapping is processed.

The default config file is shown below:

```
# Defines the customer-specific section alarm mapping, one line per entry
# Affect section true/false; Alarm text (* allowed); Location; TPAddress(Slot/
SubSlot/Port/TTPId); SbuAddress(SlotId); NEFamily; NEId;

#true on all alarms if NE id and TPAddress or SbuAddress match
#true;*;;(c/*/*/*)
```

```
#false on all alarms
#false;*

#true if "LOS on SDH Clock Source" alarm and NE id and TPAddress or SbuAddress
match
#true;Loss of Signal on SDH Clock Source*

#false if "AIS Received" alarm, the location contains "SAMO", alarm
#TPAddress slot matches the section slot, the alarm subslot = 0 and
#the alarm TPAddress port will not be checked
#false;AIS Received;SAMO;(c/0/*/*);

#false if "Unit not Assigned" alarm, the TPAddress is null, the SbuAddress
#slot is 12 and the NEFamily is 0 or 1
#false;Unit not Assigned;null;(12);;0,1

#true if "EQP*" alarm, the TPAddress or SbuAddress match on NE 3 and 24
#true;EQP*;;;;;3,24
```

Defines the customer-specific section alarm mapping, one line per entry		
Affect section	Defines if the alarm affects the section or not. This value overwrites the “isTrafficAffected” flag of the alarm. Valid values: true, false	
Alarm text (*allowed)	Defines the alarm text of the alarm. The comparison is not case sensitive. If no alarm text is defined the entry is invalid.	
	Valid values:	
	*	All Alarms
	*Shutdown	The alarm text ends with “Shutdown”
	SETS	The alarm text contains “SETS”
	Loss of Signal*	The alarm text starts with “Loss of Signal”
	Loss of Signal	The alarm text is equal “Loss of Signal”
Location	Checks if the alarm location contains the defined string. If nothing is defined, no check is done.	
TPAddress (Slot/SubsSlot/Port/TTPid)	Defines the TPAddress with slot, subslot, port number, and TTP Id. If no TPAddress is defined, the slot, subslot and port number of the alarm must match with the section endpoint. All parameters has to be defined or none.	
	Valid values:	
	“null”	TPAddress equal null.
	’c’	TPAddress member must match with endpoint member.
	’0…’	TPAddress and endpoint member match with the indicated number.
	’*’	No check is done on this member.
	Note: The possible values for the slot are ‘c’ or ‘0…’. It is not possible to avoid a check on the slot.	
SbuAddress (Slot)	Defines the SbuAddress slot. If no SbuAddress is defined, no check is done except the alarm TPAddress is null. Valid values:	
	’c’	SbuAddress slot must match with endpoint slot.
	’0…’	SbuAddress and endpoint slot match with the indicated number.
	’*’	No check is done on the slot.

NEFamily	Defines the NE family. A list of families can be defined separated by ‘,’. If no NE family is defined, no check is done on it. Valid values:	
	0	FOX-U Family
	1	FOX515 Family
	2	Desktop Family
	3	FOX61x Family
	4	SNMP Family
	5	XMLRPC Family
	6	Service Family
NEId	Defines the NE id. A list of NEs can be defined separated by ‘,’. If no NEs are defined, no check is done on it.	

11.4.22 neAlarmFilterServices.cfg

The neAlarmFilterServices.cfg is a configuration file to allow customer-specific service alarm mapping. It allows you to specify if an alarm is to be processed or ignored by Service Supervision.

The default config file is shown below:

```
# Defines the customer-specific mapping for alarms to processed or ignored by
Service Supervision, one line per entry
#
# LINE FORMAT:
# <To Be Processed, true|false>; <Alarm text (* allowed)>; <Location>;
<TPAddress(Slot/SubSlot/Port/TTPId)>; <SbuAddress(SlotId)>; <NEFamily>; <NEId>;
#
# EXAMPLES
#
#true on all alarms if NE id and TPAddress or SbuAddress match
#
#true;*;;(c/*/*/*)

#false on all alarms
#
#false;*

#true if "LOS on SDH Clock Source" alarm and NE id and TPAddress or SbuAddress
match
#
#true;Loss of Signal on SDH Clock Source*

#false if "AIS Received" alarm, the location contains "SAMO", alarm TPAddress
slot matches the section slot, the alarm subslot = 0 and the alarm TPAddress
port will not be checked
#
#false;AIS Received;SAMO;(c/0/*/*);

#false if "Unit not Assigned" alarm, the TPAddress is null, the SbuAddress slot
is 12 and the NEFamily is 0 or 1
#
#false;Unit not Assigned;null;(12);;0,1

#true if "EQP*" alarm, the TPAddress or SbuAddress match on NE 3 and 24
#
#true;EQP*;;;;;3,24

# filter IN all FOX515 "Signal Failure" alarms
true;Signal Failure;;;;0,1
```

```
# Filter OUT all FOX515 "Far End Unacceptable Performance" alarm
false;Far End Unacceptable Performance;;;;0,1

# Filter OUT all FOX tunnel "Maintenance Function Active" alarms
false;Maintenance Function Active;tunnel;;;3
```

Please refer to 11.4.21.2 "sectionalarmmapping.cfg" as reference.

11.4.23 singlePathServiceAlarmMapping.cfg

The singlePathServiceAlarmMapping.cfg is used to define service alarm thresholds for Service Supervision for Cleared, Warning, Minor, Major, and Critical severities.

```
AlarmStatus=Cleared
MinPercentRoutesPrimaryAvailable=100
MinPercentRoutesProtectingAvailable=100
AlarmStatus=Cleared
MinPercentRoutesPrimaryAvailable=100
MinPercentRoutesProtectingAvailable=NA

AlarmStatus=Minor
MinPercentRoutesPrimaryAvailable=100
MinPercentRoutesProtectingAvailable=0

AlarmStatus=Major
MinPercentRoutesPrimaryAvailable=0
MinPercentRoutesProtectingAvailable=100

AlarmStatus=Critical
MinPercentRoutesPrimaryAvailable=0
MinPercentRoutesProtectingAvailable=0
AlarmStatus=Critical
MinPercentRoutesPrimaryAvailable=0
MinPercentRoutesProtectingAvailable=NA
```

11.4.24 multiPathServiceAlarmMapping.cfg

The multiPathServiceAlarmMapping.cfg is used to define service alarm thresholds for Service Supervision for Cleared, Warning, Minor, Major, and Critical severities.

The default config file is shown below:

```
AlarmStatus=Cleared
MinPercentRoutesPrimaryAvailable=100
MinPercentRoutesProtectingAvailable=100
AlarmStatus=Cleared
MinPercentRoutesPrimaryAvailable=100
MinPercentRoutesProtectingAvailable=NA

AlarmStatus=Warning
MinPercentRoutesPrimaryAvailable=100
MinPercentRoutesProtectingAvailable=50

AlarmStatus=Minor
MinPercentRoutesPrimaryAvailable=100
MinPercentRoutesProtectingAvailable=0
AlarmStatus=Minor
MinPercentRoutesPrimaryAvailable=50
MinPercentRoutesProtectingAvailable=50
AlarmStatus=Minor
MinPercentRoutesPrimaryAvailable=0
MinPercentRoutesProtectingAvailable=100

AlarmStatus=Major
```

```
MinPercentRoutesPrimaryAvailable=50
MinPercentRoutesProtectingAvailable=0
AlarmStatus=Major
MinPercentRoutesPrimaryAvailable=50
MinPercentRoutesProtectingAvailable=NA

AlarmStatus=Critical
MinPercentRoutesPrimaryAvailable=0
MinPercentRoutesProtectingAvailable=0
AlarmStatus=Critical
MinPercentRoutesPrimaryAvailable=0
MinPercentRoutesProtectingAvailable=NA
```

11.4.25 legalMessages.json (NEM login banner)

To customize the legal message appearing on the NEM Login dialog (i.e., the NEM login banner), the default message can be replaced by a customized Message. To do so, create a file named “legalMessages.json” and store it in the folder “/opt/nem/share” of the FOXMAN-UN core machine.

When ever a client connects to the core, the NEM Login dialog will show this message.

The contents of the file “legalMessages.json” should be in accordance with the following sample (default message used here). Use \n for line breaks.

```
{
    "securityBaseline": "Access to FOXMAN-UN services is provided for the
exclusive use by authorized personnel.\nUnauthorized use is prohibited."
}
```

11.4.26 FOX61x Specific Parameters

11.4.26.1 FOX61x Default Passwords

FOX61x NEs use a hierarchy of 5 user classes, each class protected by a separate password. The default passwords at FOXMAN-UN installation time are undefined (empty).

If all FOX61x NEs managed by FOXMAN-UN are to be protected by a specific set of 5 not empty passwords, these have to be entered every time a FOX61x NE is created. Alternatively the default passwords can be modified accordingly. Then during NE creation, the passwords need not be set.

Syntax for default password entries in the nem.conf file

encrypted password	user class
dflt_sessionmgr_pwd	session manager
dflt_manager_pwd	manager
dflt_maintenance_pwd	maintenance
dflt_information_pwd	information

The passwords entered in nem.conf have to be in encrypted form. The tool for encryption is the following.

```
Usage: stringtool StringValue | [ -h ]

Options:  StringValue to convert
          -h : Displays this help
```

Example:

```
[nemsecadm@nemsrv]$ stringtool test
9319E552E4F98B53
```

Sample entry in nem.conf for user class manager:

```
[nemsecadm@nemsrv]$ /opt/nem/bin/private/getvar -l
dflt_manager_pwd                                9319E552E4F98B53
```

Please note:

- The default values for manager and session manager usernames and passwords are encrypted as “nemadm” and “sessionmanager”, respectively.
- The usernames and passwords should be the same as those set in the radius server
- The user controlled sessions include all connections to a NE that are directly user controlled such as FOXCST GUI, CLI and CLI MUX NBI.
  FOXMAN-UN uses the operator’s username and passwords when connecting to a FOX61x NE.

11.4.26.2 Configuration for RADIUS Authenticated Users

FOXMAN-UN needs the following userclasses for access to a FOX61x node:

- Manager,
- SessionManager.

For this access, FOXMAN-UN uses two dedicated users for the initial connection of a HLM which are defined with default settings and should be changed via an entry in nem.conf.

Userclass	**default**		**nem.conf tag**	
	username	**password**	**username**	**password**
Manager	nemadm	nemadm	nem_remote_auth_admin_user	nem_remote_auth_admin_user_pwd
SessionManager	sessionmanager	sessionmanager	nem_remote_auth_session_user	nem_remote_auth_session_user_pwd

For security reasons it is strongly recommended to change the defaults from the beginning and use a dedicated user for manager and for sessionmanager.

To adapt these default usernames and passwords to usernames and passwords which are available on installation side the following steps have to be done:

1 create encrypted passwords with stringtool:
  /opt/nem/bin/stringtool <password >
  Example:
  /opt/nem/bin/stringtool nemadm
  7E1C4B1DE2EA7879
  /opt/nem/bin/stringtool sessionmanager
  B261E2B152ECADD7EF40733064D77107
2 insert usernames / passwords into nem.conf:
  nem_remote_auth_admin_user mymanageruser
  nem_remote_auth_admin_user_pwd 7E1C4B1DE2EA7879
  nem_remote_auth_session_user mysessionmanageruser
  nem_remote_auth_session_user_pwd B261E2B152ECADD7EF40733064D77107
3 To apply the settings, restart FOXMAN-UN by executing “nemstop”, followed by “nemstart”.

Sample setup for nem.conf:

```
[nemadm@fox16b-nms etc]$ cat nem.conf
#
# Customer specific labeling
# ------------------------

company_name            Hitachi\ Energy\ Switzerland\ Ltd
product_name            FOXMAN-UN
current_release         R16B_PC4
build                   16.2.3-0
buildtime               26/03/2024-16:14:09

lic_if enp1s0

cst_create_esw_control  on
nem_remote_auth_admin_user      mymanageruser
nem_remote_auth_admin_user_pwd  A8A08E76EA7C1A4D827C2BF71F26B347
nem_remote_auth_session_user    mysessionmanageruser
nem_remote_auth_session_user_pwd        67FACE732288ABA036D7DA8EDBE49748
[nemadm@fox16b-nms etc]$
```

Sample setup for RADIUS configuration:

```
[root@radiusserver raddb]# vi users
[root@radiusserver raddb]# more users
nemadm  Cleartext-Password := "...                    "
        HitachiEnergy-Userclass = "information",
        HitachiEnergy-Userclass = "manager",
        HitachiEnergy-Userclass = "maintenance",
        HitachiEnergy-Userclass = "sessionmanager"
mymanageruser  Cleartext-Password := "...                    "
        HitachiEnergy-Userclass = "manager",
        HitachiEnergy-Userclass = "information"
mysessionmanageruser Cleartext-Password := "...                    "
        HitachiEnergy-Userclass = "sessionmanager"
#root   Cleartext-Password := "...                    "
luca    Cleartext-Password := "...                    "
        HitachiEnergy-Userclass = "information",
        HitachiEnergy-Userclass = "manager",
        HitachiEnergy-Userclass = "maintenance",
        HitachiEnergy-Userclass = "sessionmanager"
dina    Cleartext-Password := "...                    "
        HitachiEnergy-Userclass = "information",
        HitachiEnergy-Userclass = "manager",
        HitachiEnergy-Userclass = "maintenance",
        HitachiEnergy-Userclass = "sessionmanager"
user2   Cleartext-Password := "...                    "
admin   Cleartext-Password := "...                    "
##############################################
# EDS500 users
edslogin Cleartext-Password :="edslogin"
kmlogin  Cleartext-Password :="...                    "
```

11.4.27 Configuration Files Format

Configuration files consist of a number of lines of the form:

parameter_name parameter_value

For example:

```
database                NEM_DATABASE
```

It is important to realize that the parameter value is interpreted as it stands, i.e. wildcard and variable expansions are not performed.

For example, the definition:

```
local_backup_device /local/r18_backup/nem_r18*
```

will not work as intended, as the wildcard character '*' is not expanded.

Comments are indicated by the '#' character, and continue to the end of the line. Multi-line comments must have a '#' at the start of each line. The following examples show valid comments:

```
#this is a comment
```

```
#this is a longer comment that
#spans more than one line
#remove_off_alarms       XXXX
database                 my_db  # this is a comment
```

Notice that in the examples above, the “remove_off_alarms” parameter has been commented out, while the “database” parameter is set to “my_db”.

The parameter value must not contain any white space (i.e. space or tab characters).

If the parameter value contains a “#” character, then this must be prefixed by a backslash “ \ ” to prevent it being treated as a comment.

If the parameter value contains a space or tab character, then this must be prefixed by a backslash “ \ ”.

11.4.28 Editing the Configuration Files

The configuration files may only be modified by a NEM administrator.

Some parameters may be modified using the NEM RAT (e.g, the parameters relating to database backup and recovery). Other parameters must be modified manually, i.e. using a text editor.

It is important to realize that the various components of the FOXMAN-UN system, i.e. GUIs, agents etc. only read the nem.conf file once, when they start up. This means that you have to stop and restart core the component or the relevant GUI for the change to become effective.

For further details refer to the comments within the configuration files.

11.5 Backup of the FOXMAN-UN Database

Please note:
The database names NEM_DATABASE, PM_DATABASE, NEMSEC_DATABASE, and DIRAC_DATABASE are fixed and cannot be changed.

11.5.1 General

Experience has shown that hard disks sometimes fail; hence you should ensure that your workstation(s) are backed up regularly. In practice you will have to ensure that two different types of backup are made:

- A backup of the entire workstation, i.e. the contents of the hard disk(s).
- A separate backup of the FOXMAN-UN database, which automatically includes any files that are stored in the directory

`/opt/nem/var/backuped_dir`

The first of these is normally the responsibility of the system administrator, rather than the FOXMAN-UN administrator. If your site already has a system administrator, then check how the workstations are backed up. Backup policies vary from site to site, with some sites backing up all their systems regularly, some sites only back up some of their systems, while other sites do not backup their systems at all.

In some cases you may not have a separate system administrator, in which case you will have to decide how to backup the workstation yourself (refer to 13.3 "Backup").

It may seem sufficient to make regular backups of the workstation, without making separate database backups. After all, the database is also stored on the hard disk, hence it will be backed up along with the rest of the data. Unfortunately this is not the case, and a separate database backup is required. The problem is that the database is likely to be active during the

backup, with the result that the standard backup tools generate error messages complaining that the database files are active, and cannot be backed up.

To overcome this problem, FOXMAN-UN offers the command “edbbackup” which will create a complete backup from a running database. As an alternative you may use the backup feature of the NEM Remote Admin Tool, which is described in section 10 "Remote Admin Tool (RAT)" and in the user manual “NEM GUI Help System” [1KHW002412].

Given that the database must be backed up regularly, the first step is to determine the backup medium. FOXMAN-UN supports backing up to a file on a hard disk. There are a number of possible options to be considered, as explained in the following sections:

- Backup policies,
- Backup contents,
- Backup methods,
- Manual backup,
- Automatic backup,
- Backup and restore parameters,
- Listing backup details.

11.5.2 Backup Policies

It is strongly recommended that the FOXMAN-UN database be backed up regularly. If your network is relatively active, i.e. there are large numbers of alarms and/or configuration changes, then you may prefer to backup the database daily, probably during the early hours of the morning. If your network is relatively inactive, i.e. relatively few alarms and/or configuration changes, then you may prefer to backup the database once a week, or maybe even once a month.

You should note the following:

- The database does not have to be stopped to perform the backup. The core component, agents and GUIs may all be active while the database is being backed up.
- Only a NEM administrator user may backup the database. Other users do not have permission to do this.
- Make sure that the NEM administrator user has the appropriate access right to the directory where the backup file is to be stored.

11.5.3 Backup Contents

The following data from “/opt/nem/” is backed up by default:

Basic files:

- NEM_DATABASE
- var/log/alarms.txt
- list of FOXMAN-UN users
- PM_DATABASE (schedule only)
- alarms file
- ENP files
- PM quick monitoring files
- DIRAC database

Additional files:

- var/backuped_dir
- etc/<configuration files>, e.g. nem.conf, database.conf, etc.
- cst/ucst.ini
- etc/smtool.cfg

For maintenance purposes the backup of the additional files can be suppressed when using the command line (refer to 11.5.5.2 "Local Backup via Command Line").

Using the NEM RAT only the complete backup is possible.

Also the restore commands offer the possibility of suppressing the restoration of the additional files when using the command line (refer to 11.6.4 "Local Restore via Command Line").

The NEM RAT does not allow suppressing the restoration of the additional files.

11.5.4 Backup Methods

11.5.4.1 Backup to Local File

For the purposes of this discussion, the term “local file” refers to a file that is visible to the local file system. For most FOXMAN-UN installations, this means that the backup is written to a file on the local hard disk. If your workstation is connected to a network with a file server, then the file might be stored on a file system that has been exported using NFS (Network File System). In this case the backup is actually stored on a hard disk that is physically connected to a different workstation.

If you decide to backup to a local file, then you should ensure that it is not located on the same physical disk as the FOXMAN-UN database (If the disk fails, the backup will be lost too.)

Backing up to a local file is performed using the edbbackup (and edbrestore) commands, or using the NEM RAT.

11.5.4.2 Manual and Automatic Backup

Backup may be started manually or automatically. Automatic backups can be run daily, weekly or monthly at a defined time, e.g. early in the morning when there is little or no management activity. The main advantage of automatic backups is that they are performed regularly and without operator intervention.

11.5.5 Manual Backup

The easiest way to perform manual backups is using the NEM RAT. Alternatively, as required when writing scripts, you may prefer to use edbbackup via the command line of a terminal.

In the NEM RAT main dialog the “Backup Database Manually…” button calls the “Backup Database” dialog. Click the “Create New Backup…” button, enter a backup filename, and click OK.

11.5.5.1 Local Backup via Remote Admin Tool

To backup the database manually, click on the “Backup Database Manually” button in the Remote Admin Tool main dialog.

Refer to section “6.1.9 "Backup Database Dialog"” in the user manual "Main/Standby Solution" for a description of the database backup process via the NEM RAT.

11.5.5.2 Local Backup via Command Line

The “edbbackup” command is very simple to use. If the FOXMAN-UN configuration file

/opt/nem/etc/database.conf

has been edited to contain the appropriate value for the “local_backup_device”, then the database can be backed up simply by entering the command:

```
edbbackup
```

The output should look similar to the following:

```
Starting 'NEM Database Backup'
==============================

Backing up NEM user list                          : Performed
```

```
Backing up BP database 'NEM_DATABASE'              : Performed
Backing up PM database 'PM_DATABASE'               : Performed
Backing up additional files                        : Performed
Backing up alarms file(s)                          : Performed
Backing up ENP files                               : Performed
Backing up PM quickmonitoring files                : Performed
Backing up DIRAC database                          : Performed
Creating backup header file                        : Performed
Creating backup identifier file                    : Performed
Packing backup data                                : Performed

The 'NEM Database Backup' has completed successfully.
```

The edbbackup command has the following options:

```
[nemadmin@nemsrv ~]$ edbbackup --help

Usage: edbbackup [OPTION]...

Options:
-b, --backup=FILENAME            Backup device name. This parameter is optional.
                                 The default value first is defined by the variable
                                 'local_backup_device' of the 'database.conf' file. If
                                 variable is set as 'UNDEFINED' then we use default name
                                 'nembackup_<CURRENT_DATE_TIME>.bck'
-d, --database=DB_NAME           Database name. This parameter is optional.
                                 The default value is defined by the variable 'database' of
                                 the 'database.conf' file.
-n, --skip-additional-files      Skip all 'additional' files in backup. Only the database
                                 and the file: alarms.txt is backed up.
-w, --no-progress-cursor         Without progress cursor. This parameter is optional.
                                 The default behavior is with progress cursor.
-t, --timestamp                  With timestamp
                                 The default behavior is without timestamp
-e, --run-hook-explicit          Run pre/post execution hook script(s) explicitly.
                                 This parameter is optional. (see also database.conf,
                                 edbbackup_hook_uncond)
-a, --with-alarm-history-files   With alarm history file(s)
                                 The default behavior is without alarm history file(s)
-x, --with-influxdb              With influxDB backup
                                 The default behavior is without influxDB backup
-r, --encrypt                    The output file is encrypted and protected by password.
-p, --password=PASSWORD          Pass 'password' directly in command line instead of prompt.
                                 works only with '-r' option.
-f, --force-overwrite            Forces to overwrite already existing backup file.
-s, --skip-esws                  Skip rows related to ESWs from table 'dbdata' during backup
                                 of BP Database. This parameter is optional.
                                 This option requires NEM to be stopped.
-h, --help                       Print this message.

Examples: edbbackup -b /dev/rmt/0mnb -d NEM_DATABASE
          edbbackup -b /local/nem/nemdatabase.bck -d NEM_DATABASE
          edbbackup -b nemdatabase.bak -d NEM_DATABASE -r
          edbbackup -b nemdatabase.bak -d NEM_DATABASE -r -p veryhardpassword
```

Please note:
To store the backup files on a remote server, you can use hookscripts. Please refer to /opt/nem/etc/database.conf file for hookscripts related parameters to configure.

11.5.6 Automatic Backup

Refer to section “6.1.8 "Schedule Periodic Database Backup Dialog"” in the user manual "Main/Standby Solution" for a description of the automatic backup process via the NEM RAT.

11.5.7 Listing the Backup Details

The backup details may be needed to successfully restore a database from a backup.
The backup details can be listed using the command:

```
edbrestore -l
```

The output should look similar to the following:

```
NEM Backup Informations
=======================

Backup label        : NEM_BACKUP_20240229_0858
Backup date         : Mon May 26 05:57:18 PM CEST 2025
Backup size in MB   : 822
Workstation name    : nemsrv
NEM version         : R18
Database name       : NEM_DATABASE
PM database name    : PM_DATABASE
Database creator    : nemadm
```

Make sure that the backup date and time are correct.

11.6 Restore the FOXMAN-UN Database

11.6.1 General

Before starting to restore the database, determine the database name. The default name is NEM_DATABASE.

Please note:
The database names (NEM_DATABASE, PM_DATABASE, NEMSEC_DATABASE, and DIRAC_DATABASE) are fixed and cannot be changed.

If a backup from an older release with a changed database name needs to be restored, do the following (command line example given):

→ check the details of the database:
`edbrestore -l -b DB_BACKUP_NAME`

→ restore the database backup file:
`edbrestore -i -b DB_BACKUP_NAME`

Please note:
The default restore process as performed via “Local Restore” of the Remote Admin Tool or via the “edbrestore” command without options restores/overwrites all files with the exception of “nem.conf” and “ucst.ini”.

The default restore process provides a copy of these two files containing a time stamp in the file name. The restore process log shows a corresponding message.

11.6.2 Restore Methods

There are different restore methods, corresponding to the way the backup was created

- Using the Remote Admin Tool, which can handle local files. It provides a user friendly graphical interface to the “edbrestore” command.

- Using the “edbrestore” command. If you wish to restore the backup from a local file, then you may use the “edbrestore” command.

Please note:
Before starting a restore, make sure that you do not overwrite an existing database you still need.

Only a NEM administrator may restore the database. Other users do not have permission to do this.

The FOXMAN-UN system must be inactive to restore the database. This can be achieved using the “Start/Stop Services” function of Remote Admin Tool or the “nemstop” command.

11.6.3 Local Restore via Remote Admin Tool

To restore the database from a local file, click on the “Restore Database Backup” button in the Remote Admin Tool main dialog.

Refer to section “6.1.10 "Restore Database Backup Dialog"” in the user manual "Main/Standby Solution" for a description of the restore database process via the NEM RAT.

11.6.4 Local Restore via Command Line

If the “//opt/nem/etc/database.conf”configuration file has been edited as described above, in particular, the “local_backup_device” has been set to the appropriate value, then the database can be restored by entering the command:

```
edbrestore
```

The edbrestore command has the following options:

```
[nemadmin@nemsrv ~]$ edbrestore --help

Usage: edbrestore [OPTION]...

Options:
-b, --backup=FILENAME              Backup device name. This parameter is optional.
                                   The default value first is defined by the variable
                                   'local_backup_device' of the 'database.conf' file. If package is
                                   encrypted, script prompts to password.
-d, --database=DB_NAME             Database name. This parameter is optional.
                                   The default value is defined by the variable 'database' of the
                                   'database.conf' file.
-f, --force-full-restore           Force full restore of all files. No files are preserved during
                                   restore.
-l, --show-backup-info             List the backup information.
-u, --list-user-backups            Show user backup list.
-w, --without-progress-cursor      Without progress cursor. This parameter is optional.
                                   The default behavior is with progress cursor.
-i, --ignore-db-name               Ignore the database name in the backup file. Use the default
                                   database name or the given name with the option -d
-e, --run-hook-explicit            Run pre/post execution hook script(s) explicitly. This parameter is
                                   optional. (see also database.conf, edbrestore_hook_uncond)
-a, --run-agents-fix               Run the 'edb_fix_agents' script. This parameter is optional.
-x, --restore-influx-data          Restore influx data if present in the backup. This parameter is
                                   optional
-p, --password=PASSWORD            Before restore procedure, decrypt input file with provided
                                   password. This parameter is optional
-o, -output-logs-filepath=FILEPATH Filepath where logs from script are stored.
                                   This parameter is optional. Default: /opt/nem/var/log/
                                   edbrestore_<current_datetime>.log
-s, --suspend-agents               Make agents suspended when starting NEM after restore.
                                   This parameter is optional
-h, --help                         Print this message.
```

```
Examples: edbrestore -b /dev/rmt/0mnb -d NEM_DATABASE
          edbrestore -b /local/nem/nemdatabase.bck -d NEM_DATABASE
          edbrestore -b /local/nem/nemdatabase.bck -d NEM_DATABASE -r passwd
          edbrestore -l -b /local/nem/nemdatabase.bck
          edbrestore -o /home/nemsec/edbrestore_important_day.log -b /local/nem/nemdatabase.bck
```

The output of the command “edbrestore” should look similar to the one shown below:

```
Starting 'NEM Database Restore'
===============================

Unpacking backup data                              : Performed
Removing the old BP database 'NEM_DATABASE'        : Performed
Removing the old PM database 'PM_DATABASE'         : Performed
Create a new BP database 'NEM_DATABASE'            : Performed
Create a new PM database 'PM_DATABASE'             : Performed
Restoring BP database 'NEM_DATABASE'               : Performed
Restoring PM database 'PM_DATABASE'                : Performed
Restoring alarms file(s)                           : Performed
Restoring DIRAC backup                             : Performed
Restoring additional files                         : Performed

The 'NEM Database Restore' has completed successfully.
```

Please note:
To restore the backup files from a remote server, you can use hookscripts. Please refer to /opt/nem/etc/database.conf file for hookscripts related parameters to configure. For further support, please contact customer support.

11.6.5 Post Restore Tasks

- After completion of the restore process the following has to be done:
- Restart FOXMAN-UN using the command “nemstart”.
- Alarm synchronization:

  Start a NEM Network Browser and use the menu “System - NE Synchronisation” for synchronization of the alarms of all NEs with the database.

Please note:
This has to be done regardless of the method used for restoring the database.

11.7 PM_DATABASE

The collected Performance Management data is stored in the PostgreSQL database called the PM_DATABASE. This database is automatically created at installation time.

To access data collected and stored in the PM_DATABASE, use the Web UI “Performance Monitoring” applications or the tools described in the application note “FOXMAN-UN Metrics Database” [1KHW029196].

11.7.1 PM_DATABASE Schedule Backup and Restore

The PM_DATABASE schedule is included in the FOXMAN-UN Database (e.g. NEM_DATABASE) backup file. The PM_DATABASE is never restored from a backup file.

Please note:
The user should not restore the PM_DATABASE using psql or pgAdmin tools.

11.8 Performing Configuration Changes

The following lists configuration activities that have to be performed by a FOXMAN-UN administrator. Appropriate permissions are required and can be set up via the Web UI security application “User and Role Management”.

11.8.1 Customizing Graphics

The following types of graphics can be replaced or added via the Map Manager application in the Web UI:

- Map backgrounds
- NE symbols
- FO symbols
- Group symbols
- System NE symbols

Refer to 5.2.3.1 "Map Backgrounds" and 5.2.3.4 "Symbols" for more information.

11.9 Monitoring the FOXMAN-UN system

11.9.1 Log Files

A number of log files are maintained by the core component to help in debugging if problems should arise and also to record information about the start-up of the daemon processes and creation/restoration of the database. The log files are by default located in the directory /opt/nem/var/log.

This directory also contains the alarm and activity log files. For detailed information refer to 9.3 "The Alarm Log and History Files" and 9.4 "The Event Log and History Files".

For more details on the FOXMAN-UN logging feature refer to the product feature description FOXMAN-UN Logging [1KHW029166].

11.9.2 Watchdog

FOXMAN-UN has a watchdog process that monitors the critical processes. If it discovers processes that have terminated abnormally, it will try to restart them.

11.9.3 System Monitoring Tool (smtool)

The smtool is a script that monitors a number of FOXMAN-UN system functions. It is part of the FOXMAN-UN system installation and must be executed by a FOXMAN-UN administrator.

smtool generates alarms of the type “Environmental” assigned to the System NE as well as entries to the file

```
/opt/nem/var/log/smtool.txt
```

From this file, history files are generated automatically using the same naming conventions as for the alarm and activity history.

11.9.3.1 Supervised Items

The following FOXMAN-UN processes are checked:

- Check if database exists
- Agent daemon

- Watchdog
- CORBA daemon
- Agents
- SNMP daemon
- File system size check as specified in “smtool.cfg”.

11.9.3.2 Smtool Configuration

Several parameters defining the operation of smtool can be configured in the file “/opt/nem/etc/smtool.cfg”:

The configuration file contains the necessary help information.

```
#!/bin/bash
#
# This is the configuration file for the System Monitoring tool
#
# Change history :
#
# 05.06.2014  NEM R9C version

# These are the severity options for alarms
#
# LEVEL  Severity           CHECK
#   0 Critical              0 OFF
#   1 Major                 1 ON
#   2 Minor
#   3 Warning
#   4 Indeterminate
#

# Enable/disable checks
# SNMP
CHECK_SNMP=0
LEVEL_SNMP=3

# Exclude given ip addresses from check
# <ip1>,<ip2>,<ip3>
PPP_EXCLUDE="10.2.2.3,10.3.2.1"

# Filesystems to check
#
<mountpoint_of_filesystem_1>:<percentage_1>,<mountpoint_of_filesystem_2>:<perc
entage_2>
# e.g. "/var:90,/opt:85"

# In the example above, a system alarm is raised,
# when /var exceeds 90% and/or /opt exceeds 85%
#
# There will be a notification if the filesystem does not exist
CHECK_DISKS="/:90"
LEVEL_DISKS=2
```

Default settings in smtool.cfg are

- No SNMP check
- Disk check
  90 % for / (root)
  80 % for /opt partition

11.9.3.3 Smtool Output

The script delivers the following output, if the smtool.cfg file has been modified accordingly:

- System alarms, assigned to the “System Alarm NE”:
  - “No SNMP Agent Daemon was found”;
  - “filesystem $disk does not exist”;
    “filesystem $disk is over $level % full”.
- Entries to smtool.txt file:

  System alarms as well as the remaining supervised items cause an entry into the log file every time the smtool script is run if the check returns a defect.

11.10 Alarm Synchronization after Standby

11.10.1 General

In situations where a standby FOXMAN-UN is to be brought from idle to working status, there is a requirement to perform an alarm synchronization on all NEs in the network. This brings the alarm database in line with the current alarm status of the entire managed network.

For situations where no GUI is accessible or where there is a need to automate the switch-over from working to standby system, a FOXMAN-UN command performing the alarm synchronization of the entire network is provided.

11.10.2 Command

The following command has to be executed by a NEM administrator to perform the network wide alarm synchronization:

`netalarmsynch`

The FOXMAN-UN core must be running for the command to execute properly.

11.11 Time Synchronization

This section is applicable for FOX515 NEs only.

11.11.1 General

Time synchronization for FOX515 NEs sets the local NE date and time to the date and time of the workstation the FOXMAN-UN core is running on. This may be required after a change of date / time in the workstation or after the date / time of a NE has been modified locally via the local configuration software tool UCST.

Time synchronization of all NEs in the managed network is performed automatically every 24 hours at 03:01 via a 'cronjob' that is created at FOXMAN-UN installation time.

The automatic synchronization can be stopped by a NEM administrator through editing the relevant “crontab” file.

11.11.2 Modifying Cronjobs

The “crontab” file contains jobs (cronjobs) that have to be executed on a regular, time based schedule. FOXMAN-UN creates two such jobs at installation time:

- “`logcycle`” rotates the alarm and event log files every day at 23:55.
- “`nettimesynch`” synchronizes the time and date of all NEs in the network every day at 03:01.

`FOXMAN-UN cronjobs can be edited by a NEM administrator with the command`

`crontab -e`

```
This opens an editor showing the FOXMAN-UN cronjobs:

55 23 * * * /opt/nem/bin/private/logcycle
01 03 * * * /bin/sh -c "/opt/nem/bin/private/nettimesynch > /dev/null 2>&1"
```

An existing cronjob can be stopped by simply turning it into a comment. Add a # in front of the command line as shown for the time synchronization in the screenshot below:

```
55 23 * * * /opt/nem/bin/private/logcycle
#01 03 * * * /bin/sh -c "/opt/nem/bin/private/nettimesynch > /dev/null
2>&1"
```

The job can be reactivated by removing the # in front of it.

The existing FOXMAN-UN cronjobs can be listed by a NEM administrator with the command

`crontab -l`

11.12 FOXMAN-UN Commands

11.12.1 Introduction

Even though most of the FOXMAN-UN system operation and maintenance is done through its various GUIs, the FOXMAN-UN offers a number of user commands that can be run from the command line. This is to meet certain customer requirements that need to have a command line interface for certain functionality so that this functionality may be incorporated into scripts.

The following section does not attempt to describe all commands that are available as some of these should only be used if instructed by Hitachi Energy customer support.

The commands can be divided into three types:

- Command intended for use by all FOXMAN-UN users. The “nemlogin”. command starts the login process.
- Commands intended for use by a FOXMAN-UN administrator, such as “edbcreate”, “edb-backup”, “nemstart”, “nemstop”, “corestart“, “corestop”, “nemtool”. Most of these commands may only be used by a NEM administrator, some may be used by other FOXMAN-UN users too, e.g. “lsea”.
- Commands from the third party SW applications used to implement parts of the FOX-MAN-UN application functionality, such as the PostgreSQL database system and omniORB CORBA daemons. These commands should only be used by the FOXMAN-UN administrator on instruction by the Hitachi Energy customer support.

11.12.2 Commands

backupneconfig	Saves a copy of the current configuration of all NEs into the directory //opt/nem/cst/cfg/backup
corestart	Starts all daemons associated with the core component (agents and GUIs can only perform their tasks while these processes are running). Starts the daemons (handling the FOXMAN-UN internal communications) and the database if they are not already running. Reactivates any suspended connections of open GUIs to the database.
corestop	Stops all daemons associated with the core component and the HLM daemons. Does not stop the IT daemons and the database.

edbbackup	Used to backup the FOXMAN-UN database located on the local workstation. The database name and the backup device are specified by the default values in the FOXMAN-UN configuration file. The database can be backed up at any time. It is not necessary to stop daemons associated with the core component or to stop the agents or GUIs. For command options see 11.5.5 "Manual Backup".
edbcreate	Used to (re)create an empty FOXMAN-UN database (or clear an existing database). The database name and the backup device are specified by the default values in the FOXMAN-UN configuration file. There is no command to delete or clear a database. Note that the edbcreate command (with the -f option; force full restore) automatically deletes the old database. An empty database is created automatically when the core component is installed. For command options see 3.2.3 "Creation of the FOXMAN-UN Database".

edblist	Lists the available database(s). Command options:
	`[nemadmin] edblist --help`
	`Usage: edblist [OPTION]...`
	`Options:`
	`-l, --full-list Display all databases with full information.`
	`-h, --help Print this message.`

edbrestore	Used to restore the FOXMAN-UN database backed up with the edbbackup command. Restoration can only be performed when the database is not active. This means that the daemons associated with the core component, as well as the agents and GUIs must all be stopped (i.e. with the Remote Admin Tool or the nemstop command). The database name and the backup device are specified by the default values in the /opt/nem/etc/database.conf file. For command options see 11.6.4 "Local Restore via Command Line".
enpcorestop	Used to stop the ENP core. Only to be used after importing, adding or editing Class-Types during the basic commissioning of the Ethernet Networking package. The command is called via /opt/nem/bin/private/enpcorestop.
enpcorestart	Used to start the ENP core. Only to be used after the ENP core has been stopped with the command enpcorestop. The command is called via /opt/nem/bin/private/enpcorestart.
Force Polling	Initiates a polling of the current configuration, inventory and alarm states from a selected NE. Available in the GUI (NEM Browser and NEM Configurator).

killem	Kills the EM (client). Command options:
	`[nemadmin] killem --help`
	`Usage: killem [OPTION]...`
	`Options:`
	`-p, --process-id=ID Process ID`
	`-l, --hostname=HOSTNAMEHostname`
	`-u, --user=USERNAME Username`
	`-h, --help Print this message.`

lsbackup	Lists the details of the last local backup created via command line. Command options:
	`[nemadm] lsbackup --help`
	`Usage: lsbackup [OPTION]...`
	`Options:`
	`-b, --backup=FILENAME Backup device name. This parameter is optional.`
	`The default value is defined by the variable`
	`'local_backup_device' of the 'nem.conf? file.`
	`-h, --help Print this message.`
	`Examples: lsbackup -b /local/nem/nemdatabase.bck`

lsea	Lists information about the agents. Command options:
	`[nemadm] lsea --help`
	`Usage: lsea [OPTION]...`
	`Options:`
	`-l, --full-list Display the full EA's information.`
	`-h, --help Print this message.`

lsem	Lists the number of running GUIs (NEM Network Browsers, NEM Configurators, FOXCSTs, UCSTs, Synchronization Maps).
	
	Note:
	Alarm Views and Hardware Views are only counted if they were started from the NEM Configurator. If they are started from the NEM Network Browser they cannot be counted.
	Command options:
	`[nemadm] lsem --help`
	`Usage: lsem [OPTION]...`
	`Options:`
	`-x, --connected-processesShow all connected EM processes of all users`
	`-a, --local-processes Show all local EM processes of all users`
	`-u, --local-processes-current-user Show all local EM processes of the current user`
	`-h, --help Print this message.`

lslicense	Lists information about the License Key and which options are enabled. Command options:
	`[nemadm] lslicense --help`
	`Usage: lslicense [OPTION]...`
	`Options:`
	`-t, --product-type_TYPEShows information about BASE only.`
	`-h, --help Print this message.`

lsnem	Lists information about all the FOXMAN-UN components. It is a combination of the output of the lscore, lsea commands. Command options:
	`[nemadm] lsnem --help`
	`Usage: lsnem [OPTION]...`
	`Options:`
	`-b, --base-only Shows information about BASE only.`
	`-c, --core-only Shows information about CORE only.`
	`-l, --hlm-only Shows information about HLM only.`
	`-n, --np-only Shows information about NP only.`
	`-h, --help Print this message.`

nemlogin	Starts the Login GUI
nembasestart	Starts the NEM base services.
nembasestop	Stops the NEM base services. Note: Once completed, FOXMAN-UN is not running anymore.
nemstart	Starts all daemons associated with the core component as well as the installed and licensed HLM daemons, the IT daemons and the database. Reactivates any suspended connections of open GUIs to the database.
nemstop	Stops all daemons associated with the core component and stops the HLM daemons and the database. Suspends the connections of all open GUIs to the database..
nemsysinfo	Lists detailed FOXMAN-UN system information, including the system ID, NEM version, installed NEM and database packages, and the NEM license.

nemuser	A shell script to simplify host user creation in Linux. The script executes the “useradd” system call with the appropriate options to create the user with home directory in “/home”. The script is installed in /opt/nem/bin.
	You must be root to execute this command. Command options:
	`[root] nemuser --help`
	`Usage: nemuser -a -u user | -b backup_device [-f]> [-d parent_dir_for_home]`
	`nemuser -r -u user`
	`Options:`
	`-a, --add Add the user`
	`-r, --remove Remove the user (and the home directory)`
	`-u, --user=USERNAME Name of the user`
	`-b, --backup=FILENAME Backup device or file name, where to extract user list from, by default only users having passwd file format entries will be taken, override this with the -f option.`
	`-f, --force-non-passwd-format-user When using -b option force to also add users without passwd file format entries, by default the parent directory for these users will be '/home', override this with the -d option.`
	`-d, --parent-directory=DIR Parent directory for the user's home. Optional, default: '/home'. When using -b and -f options this specifies the parent directory for those users not having a passwd file format entry in the user list`
	`-h, --help Print this message.`
	`Note: Before using nemuser with the -b option show the user list using the following command:`
	`su nemadm -c 'edbrestore -u -b nem.bkp'`
	`Examples: nemuser -a -u operator`
	`Adds the user 'operator', creating home dir: /home/operator`
	`nemuser -r -u operator`
	`Removes the user 'operator')`
	`nemuser -a -u operator -d /opt/nem`
	`Adds the user 'operator', creating home dir: /opt/nem/operator)`
	`nemuser -a -b nem.bkp`
	`Adds the users found in the specified NEM backup file, creating home dir: as defined in the backup)`

netalarmsynch	Synchronizes the alarm database with the current alarm status of the entire managed network. Useful when activating a standby FOXMAN-UN system.

npgenreports	Runs the NP Reporting Tool which generates a set of 10 report files containing information on NEs, units, ports, applications, customers, sections and transport entities. The files are written into a time stamped directory under /opt/nem/var/reports. Command options:
	`[root] npgenreports --help`
	`Usage: npgenreports [OPTION]...`
	`Options:`
	`-x, --extra-reports-only Generates extra reports only. Exit code is number of errors.`
	`-h, --help Print this message.`

npresynch	Used to synchronize the NP objects with BP NE data. Command options:
	`[root] npresynch --help`
	`Usage: npresynch [OPTION]...`
	`Options:`
	`-F, --Force-resync Force resynchronization of provided NEs`
	`-f, --force-kill-np-service Force kill NP service`
	`-t, --generate-endpoint-labels Generate transport entity and point labels`
	`-h, --help Print this message.`
	`Examples: npresynch [ -F "NEName1" "NEName2" …] [ -f ]`

npresynchfo	Used to synchronize the NP objects with BP FO data.
smtool	Runs the system monitoring script. This checks a number of system functions and generates alarms to the system alarm NE and entries to the “/opt/nem/var/log/smtool.txt” file.
snmpstart	Starts the SNMP daemon.
snmpstop	Stops the SNMP daemon.

stringtool	Encrypts FOX61x access passwords for entry as FOX61x default passwords in the nem.conf file.

12 FOXMAN-UN Upgrade

This section provides general information related to the upgrade. For more specific information related to the upgrade procedure refer to [1KHW028779] Upgrading FOXMAN-UN and FOX61x - Application Note.

12.1 Introduction

12.1.1 General

For the list of available upgrade paths refer to the release note of FOXMAN-UN R18.

Please note:
For upgrade scenarios that are not officially supported, and which are executed without support by Hitachi Energy, Hitachi Energy accepts no liability whatsoever. We recommend to contact your local Hitachi Energy sales representative for a service estimation and offer.

Please note:
Before an upgrade always check the latest release notes for the current release to make sure you have the appropriate information regarding supported upgrade procedures.

12.1.2 Upgrade Types

Depending on size and complexity of the FOXMAN-UN network, rebuilding of the FOXMAN-UN database can be an extensive task. For larger networks a FOXMAN-UN upgrade with database migration is therefore recommended.

12.1.2.1 FOXMAN-UN Upgrade without DB Migration

This type of upgrade consists of

- an OS upgrade to the Linux version supported by the current FOXMAN-UN version,
- the removal of the previous FOXMAN-UN version,
- the installation of the new FOXMAN-UN version, and
- the subsequent rebuilding of the FOXMAN-UN database for the new FOXMAN-UN version.

This scenario is recommended for networks where the restoration of the NE configuration from the network and the new creation of sections is reasonably fast (small database).

After the installation of the FOXMAN-UN application, such a migration requires the re-creation of all agents, network elements (which includes upload of the configuration and inventory data), sections, foreign objects, maps etc. as well as the security.

This upgrade procedure is appropriate for networks with less than 200 NEs and/or less than 100 sections if none of ENP, DIRAC or ALS is in use.

12.1.2.2 FOXMAN-UN Upgrade with DB Migration

This scenario is applicable to any network size. It is particularly recommended for larger networks where the restoration of the NE configurations from the network, the recreation of foreign objects, sections and maps as well as redefining FOXMAN-UN security amount to a lot of work or any of ENP, DIRAC or ALS are in use.

The procedure consists of two steps. The existing FOXMAN-UN database is first migrated to make it compatible with the new FOXMAN-UN release, and then it is imported into the newly installed FOXMAN-UN. Depending on the old release, some of the new features in the new release require manual additions to the migrated database.

Please note:
This type of upgrade procedure should only be used for a stable network.

12.2 Database Migration

The database conversion procedure consists of some preliminary tasks and two main phases with possibly an OS upgrade in between.

The sequence of the conversion activities can be different depending on whether the new FOXMAN-UN release is installed on the existing workstation or on a new one.

The upgrade procedures described here must be followed explicitly to ensure success.

12.2.1 Preliminary Tasks

Before starting any activities you must complete the following tasks.

- Log out of all the FOXMAN-UN users.
- Shut down of the FOXMAN-UN core.
- Make a backup of the current database; see details given in section Backup of the FOXMAN-UN Database.
- Log in as root or make sure you have sudo permissions.

12.2.2 Phase 1: Perform a database backup

- Execute the edbbackup command with -a option to include alarm history (details are given in Local Backup via Command Line), or using the Remote Admin Tool (details are given in Local Backup via Remote Admin Tool) to create a backup of the NEM database.
- Store the generated file in a safe location (ftp-site, CD-ROM, etc).

12.2.3 OS Upgrade / FOXMAN-UN Installation

- Install a RHEL 9.x Server. For details refer to the User Manual for “FOXMAN-UN Installation and Configuration” [1KHW002426] that is part of the user documentation. For the supported RHEL versions refer to the FOXMAN-UN release note.
- Install the latest FOXMAN-UN software with its latest Service Pack, if available.
- Import the latest license key.

12.2.4 Phase 2: Restore the database backup

- Restore the database backup from phase 1 using the edbrestore command (details are given in Local Restore via Command Line).

12.2.5 Post Upgrade Tasks

- Make sure that all FOXMAN-UN users in the database also exist as OS users. Refer to 7.5 "Creation of FOXMAN-UN User Accounts".
- Start up the FOXMAN-UN system.
- Start up the agents.

  To avoid a workstation overload on start up, all agents are suspended after the upgrade. Start the agents one after the other at intervals to keep processor load reasonable.
- Execute a forced polling.

  Specially for nodes with MPLS-TP functionality a “Force Polling” command needs to be executed after the agent(s) startup.

- ENP Resync

  For nodes with MPLS-TP functionality the Expert Mode option in the Ethernet Networking Package (ENP) “Network - Synchronize” needs to be executed to make sure all node configurations are synchronized with the database.
- Alarm synchronization.

  Start a NEM Network Browser and use the menu “System - NE Synchronisation” for synchronization of all alarms with the database.
- Verify system functions.
- After the database upgrade has been completed successfully the database upgrade directory and its contents can be deleted.

13 System Administration

13.1 Introduction

This chapter concentrates on the miscellaneous administration activities that are not directly associated with FOXMAN-UN. Most of the topics described in this chapter would normally be referred to as System Administration, as opposed to FOXMAN-UN administration.

System administration is a large subject, and this chapter can only provide a brief introduction. For further details the appropriate system documentation has to be consulted.

Most of the activities described in this chapter require root privileges.

The following subjects are briefly described:

- Policies for dealing with (and preventing) hardware failures.
- Backing up the workstation.
- Preparing for disk failure.
- Creating and managing user accounts.
- Managing disk space.
- Shutting down the workstation.

13.2 Disaster Prevention and Recovery Policies

One of the most important tasks for a system administrator is to ensure that the amount of downtime is kept to a minimum in the event of a major problem, such as disk failure, etc. This section describes the problems that might be encountered in practice, and for which the system administrator should be prepared.

13.2.1 Hard Disk Failure

Unfortunately, experience has shown that hard disk failure is not as infrequent as it should be, and that very little that can be done other than replacing the disk with a new one. You should therefore consider the following questions:

- What data will be lost if a disk fails? The FOXMAN-UN Database? The operating system? User accounts? etc.
- How long does it take to get a replacement disk?
- Is the disk covered by warranty?

Preventive measures may include:

- Setting up a RAID1 or RAID5 to have disk redundancy,
- Performing a full RHEL disaster recovery backup on tape,
- Regularly saving / exporting the FOXMAN-UN database backup on external server / disk,
- Implementing cold/warm standby.

13.2.2 Disk Full

Running out of disk space can always happen if disk space is not monitored and preventive actions aren’t taken in due time.

If your server runs out of disk space in the FOXMAN-UN installation parent folder /opt, the following recovery actions may help:

- free up sufficient space on the /opt partition, e.g. by
  - removing logs that are not required any longer;
  - removing old database backups, or moving them to a different storage;
  - removing node ESW archives that are no longer required.

- restart base services,
- reboot the server (HW or VM),
- restart base services again.
- In case of a main-standby setup, the main-standby database may be corrupted, and, as a consequence, the main-standby services may fail to activate. If this is the case, delete the current /opt/nem/var/mainstandby.mv-db, then restart the main-standby services via systemctl.

13.2.3 Miscellaneous Hardware Failures

Experience has also shown that other hardware components are also subject to failure, although this is relatively infrequent. You should therefore consider the following:

- What are you going to do if the workstation motherboard needs to be replaced? What about the monitor? etc.
- Do you have (or would you like to have) a maintenance contract with the workstation supplier?

13.2.4 Power Failure / Accidental Power Loss

It is important that the operating system be properly shutdown before the power to the workstation is switched off. Failure to follow the proper shutdown procedures may result in data loss, in some cases even a corrupted file system.

If you are in an area with relatively unstable mains power, then you should consider purchasing an uninterruptible power supply (UPS). Even if your power supply is fairly stable, there are plenty of opportunities for accidental power loss. For example:

- Do you have overzealous security guards who insist on switching off unused equipment to save power? (This is not a joke - this has been known to occur)
- Do you have a large number of power cables plugged into various random power sockets? What are the chances that somebody accidentally removes the wrong cable, and switches off your workstation?

13.3 Backup

In practice there are two separate backups to perform:

- Backup of the workstation,
- Backup of the FOXMAN-UN database.

13.3.1 Backup of the Workstation

It is strongly recommended that your workstations be backed up on a regular basis.

There are a number of different ways to back up your workstations. The method you choose depends on your requirements, and will require some planning. Use the appropriate tools that are available from the operating system.

Please note:
It is strongly recommended that you use the verify options of the backup tools. Just producing the backup does not mean it will be usable when needed. Use only certified media for the production of backups.

13.3.2 Backup of the FOXMAN-UN Database

Please note:
The FOXMAN-UN database must be backed up separately, as the standard operating system tools will NOT back up the database correctly. Refer to section Backup of the FOXMAN-UN Database.

13.4 Creating User Accounts

Regardless of the number of user accounts currently installed on your workstations, the chances are high that new ones will need to be created at some time, e.g. with the arrival of a new member of staff.

For details refer to 7.5 "Creation of FOXMAN-UN User Accounts".

If your FOXMAN-UN system consists of multiple workstations, you should install the user accounts via Active Directory (AD) integration to distribute them to all your workstations. This eliminates the need to create the same account separately on each workstation, and also means that you can use the same password and home directory regardless of where you log in. For details refer to [1KHW029190] FOXMAN-UN Integration with Active Directory (AD).

13.5 Managing Disk Space

Most computer systems run out of disk space at some time. In practice one of the main tasks of any system administrator is to check that none of the partitions run out of space. This should be done on a regular basis.

FOXMAN-UN offers two simple ways for checking available disk space:

- The Remote Admin Tool contains a disk status function. This shows the percentage of disk space used for any partition. For details refer to 10.3.5.1 "Disk Information".
- The System Monitoring Tool can be programmed to create alarms if particular partitions exceed a specified of disk space used. The tool has to be run to perform the checks. This can be done manually or on a regular basis using a cronjob. For details refer to 11.9.3 "System Monitoring Tool (smtool)".

13.6 Shutdown of the Workstation

There are a number of different ways to shutdown a workstation. In most cases the method you choose will depend on personal preference.

Before describing the different methods, some background information may be useful. In general, there are 2 main reasons for shutting down a workstation:

1 You wish to halt the system, after which the power will be switched off. After the workstation has halted, a message will be displayed indicating that the power may be turned off.
2 You wish to reboot (restart) the system. In most cases the workstation will reboot automatically.

There are a number of possible options, the most important of which are:

- Do you wish to shutdown the workstation immediately, or do you wish to give the other workstation users a 'grace period' so that they can save their work, etc.
- If you are sure that nobody else is using the workstation, then you will probably prefer to shutdown the workstation immediately. If however other people are using the workstation, they will probably be grateful if they are given a warning message and a suitable grace period (e.g. 10 minutes) to save their work.
- Do you wish to perform a graceful shutdown, whereby each process is given the chance to tidy up and exit gracefully, or do you wish to force a relatively quick shutdown, whereby the various processes will be forcibly terminated.

In most cases a graceful shutdown is not necessary. The exception to this is certain database systems, and other software packages that must be given a chance to shutdown gracefully.

The main ways to shutdown a workstation are:

- Using the shutdown command,
- Using the reboot command,
- Using the power switch.

13.6.1 Shutdown Command

The shutdown command can be used to halt the workstation in order to switch it off (-h option), or to reboot it (-r option). It is also possible to specify a grace period. The shutdown command will then attempt to perform a graceful shutdown, which means that it is relatively slow.

For further details refer to the shutdown manual page, using the command:

```
man shutdown
```

13.6.2 Reboot Command

The reboot command is similar to the shutdown command. In practice the main difference is that a graceful shutdown is not performed, i.e. processes are forcibly terminated. The main advantage of reboot is that it is relatively fast.

For further details refer to the reboot manual page, using the command:

```
man reboot
```

13.6.3 Power Switch

If for some reason you are using an old workstation, then you MUST NOT use the power switch until after the workstation has been halted using one of the commands described above. Failure to halt the workstation first may result in a corrupted file system.

More recent workstations incorporate a soft switch which forces a shutdown while maintaining power to the motherboard and hard disk. In practice this means that the power switch may be used to switch off the workstation provided that no applications are running which explicitly require a graceful shutdown.

14 Error Codes

The tables below list known error codes from FOXMAN-UN error code yml files.

Table 1: generic.yml

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
id	0	name	GenericInfo	message	Generic Purpose Information message	arguments	None		
id	0	name	GenericWarning	message	Generic Purpose Warning message	arguments	None		
id	0	name	NoStatusCode	message	The response doesn't contain a status code.	arguments	None		
exception	string								
stacktrace	string								
id	1	name	UnhandledExceptionError	message	Internal error exception: ${exception}\n stacktrace: ${stacktrace}	defaultHttpStatusCode	500		
url	string								
media	string								
headers	string								
id	50	name	ClientResponseAcceptanceNotFull-filled	message	The clients acceptance criteria couldnt be fullfilled \n service: ${url}\n supportedMe-diaTypes: ${media}\n accepted: ${headers}	defaultHttpStatusCode	500		
url	string								
response	string								
status	int								
stacktrace	string								
id	51	name	HTTPStatusClientRequestFailed	message	An internal request of the service failed \n service: ${url}\n received response status :${status}\n response details : ${response} \n stacktrace: ${stacktrace}	defaultHttpStatusCode	500		
url	string								
message	string								
id	52	name	HTTPMethodArgumentNotValid	message	Method argument not valid \n service: ${url}\n problem: ${message}	defaultHttpStatusCode	500		
id	400	name	BadRequest	message	The server cannot or will not process the request due to an apparent client error.	defaultHttpStatusCode	400	arguments	None
id	401	name	Unauthorized	message	Authentication is required but has failed or has not yet been provided.	defaultHttpStatusCode	401	arguments	None
id	402	name	PaymentRequired	message	Payment Required	defaultHttpStatusCode	402	arguments	None
id	403	name	Forbidden	message	Forbidden	defaultHttpStatusCode	403	arguments	None
id	404	name	NotFound	message	Not Found	defaultHttpStatusCode	404	arguments	None
id	405	name	MethodNotAllowed	message	Method Not Allowed	defaultHttpStatusCode	405	arguments	None
id	406	name	NotAcceptable	message	Not Acceptable	defaultHttpStatusCode	406	arguments	None
id	407	name	ProxyAuthenticationRequired	message	Proxy Authentication Required	defaultHttpStatusCode	407	arguments	None
id	408	name	RequestTimeout	message	Request Timeout	defaultHttpStatusCode	408	arguments	None
id	409	name	Conflict	message	Conflict	defaultHttpStatusCode	409	arguments	None
id	410	name	Gone	message	Gone	defaultHttpStatusCode	410	arguments	None
id	411	name	LengthRequired	message	Length Required	defaultHttpStatusCode	411	arguments	None

Table 1: generic.yml (continued)

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
id	412	name	PreconditionFailed	message	Precondition Failed	defaultHttpStatusCode	412	arguments	None
id	413	name	PayloadTooLarge	message	Payload Too Large	defaultHttpStatusCode	413	arguments	None
id	414	name	RequestUriTooLong	message	Request-URI Too Long	defaultHttpStatusCode	414	arguments	None
id	415	name	UnsupportedMediaType	message	Unsupported Media Type	defaultHttpStatusCode	415	arguments	None
id	416	name	RequestedRangeNotSatisfiable	message	Requested Range Not Satisfiable	defaultHttpStatusCode	416	arguments	None
id	417	name	ExpectationFailed	message	Expectation Failed	defaultHttpStatusCode	417	arguments	None
id	418	name	ImATeapot	message	I'm a teapot	defaultHttpStatusCode	418	arguments	None
id	421	name	MisdirectedRequest	message	Misdirected Request	defaultHttpStatusCode	421	arguments	None
id	422	name	UnprocessableEntity	message	Unprocessable Entity	defaultHttpStatusCode	422	arguments	None
id	423	name	Locked	message	Locked	defaultHttpStatusCode	423	arguments	None
id	424	name	FailedDependency	message	Failed Dependency	defaultHttpStatusCode	424	arguments	None
id	426	name	UpgradeRequired	message	Upgrade Required	defaultHttpStatusCode	426	arguments	None
id	428	name	PreconditionRequired	message	Precondition Required	defaultHttpStatusCode	428	arguments	None
id	429	name	TooManyRequests	message	Too Many Requests	defaultHttpStatusCode	429	arguments	None
id	431	name	RequestHeaderFieldsTooLarge	message	Request Header Fields Too Large	defaultHttpStatusCode	431	arguments	None
id	444	name	ConnectionClosedWithoutResponse	message	Connection Closed Without Response	defaultHttpStatusCode	444	arguments	None
id	451	name	UnavailableForLegalReasons	message	Unavailable For Legal Reasons	defaultHttpStatusCode	451	arguments	None
id	499	name	ClientClosedRequest	message	Client Closed Request	defaultHttpStatusCode	491	arguments	None
id	500	name	InternalServerError	message	Internal Server Error	defaultHttpStatusCode	500	arguments	None
id	501	name	NotImplemented	message	Not Implemented	defaultHttpStatusCode	501	arguments	None
id	502	name	BadGateway	message	Bad Gateway	defaultHttpStatusCode	502	arguments	None
id	503	name	ServiceUnavailable	message	Service Unavailable	defaultHttpStatusCode	503	arguments	None
id	504	name	GatewayTimeout	message	Gateway Timeout	defaultHttpStatusCode	504	arguments	None
id	505	name	HttpVersionNotSupported	message	HTTP Version Not Supported	defaultHttpStatusCode	505	arguments	None
id	506	name	VariantAlsoNegotiates	message	Variant Also Negotiates	defaultHttpStatusCode	506	arguments	None
id	507	name	InsufficientStorage	message	Insufficient Storage	defaultHttpStatusCode	507	arguments	None
id	508	name	LoopDetected	message	Loop Detected	defaultHttpStatusCode	508	arguments	None
id	510	name	NotExtended	message	Not Extended	defaultHttpStatusCode	510	arguments	None
id	511	name	NetworkAuthenticationRequired	message	Network Authentication Required	defaultHttpStatusCode	511	arguments	None
id	599	name	NetworkConnectTimeoutError	message	Network Connect Timeout Error	defaultHttpStatusCode	599	arguments	None
id	0	name	Generic						

Table 2: agent.yml

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
neName	string								

Table 2: agent.yml (continued)

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
neId	int								
id	1	name	Unmanageable	message	NE ${neName} (${neId}) is not manageable.	defaultHttpStatusCode	400		
neName	string								
neId	int								
request	string								
id	2	name	NoResponse	message	No Response on NE ${neName} (${neId}) Request ${request}	defaultHttpStatusCode	400		
neName	string								
neId	int								
request	string								
errorCode	int								
errorStr	string								
id	3	name	BadResponse	message	Error Response on NE ${neName} (${neId}):\n Request ${request}\n Error Code ${errorCode}, Error ${errorStr}	defaultHttpStatusCode	400		
AgentId	int								
neId	int								
id	4	name	NotConfigured	message	NE (${neId}) is not managed by agent ${AgentId}.	defaultHttpStatusCode	404		
uc	string								
id	5	name	InvalidUserClass	message	Invalid userclass ${uc} requested.	defaultHttpStatusCode	404		
id	6	name	WrongPassword	message	Login failed password failure	defaultHttpStatusCode	403		
id	7	name	MaxSessionNumbers	message	Login failed no more sessions available on NE	defaultHttpStatusCode	503		
uc	string								
id	8	name	UserClassOccupied	message	Login failed userclass ${uc} already in use	defaultHttpStatusCode	503		
uc	string								
id	9	name	UninitializedUserclass	message	Userclass ${uc} is not initialized on NE	defaultHttpStatusCode	400		
am	string								
id	10	name	AuthMethodNotSupported	message	Requested authentication method ${am} not supported on NE	defaultHttpStatusCode	400		
id	11	name	AuthServerNotReachable	message	Server for remote authentication is not reachable	defaultHttpStatusCode	503		
id	12	name	NoDefaultUserclass	message	Login without userclass not possible as default userclass is not defined	defaultHttpStatusCode	400		
uc	string								
user	string								
allowed	string								
id	13	name	UserClassNotAllowed	message	Userclass ${uc} not allowed for user ${user}, allowed userclasses: ${allowed}	defaultHttpStatusCode	403		
error	string								
id	14	name	UnknownLoginFailure	message	Login failed with error: ${error}	defaultHttpStatusCode	400		
error	string								
id	15	name	KeaConfirmationException	message	Confirmation Exception: ${error}	defaultHttpStatusCode	400		

Table 2: agent.yml (continued)

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
error	string								
id	16	name	KeaCommunicationException	message	Commuinictaion Exception: ${error}	defaultHttpStatusCode	400		
error	string								
id	17	name	KeaProcessingException	message	Processing Exception: ${error}	defaultHttpStatusCode	400		
error	string								
id	18	name	KeaIllegalArgumentException	message	Illegal Argument Exception: ${error}	defaultHttpStatusCode	400		
error	string								
id	19	name	UnknownCommunicationFailure	message	Communication failure with NE: ${error}	defaultHttpStatusCode	400		
id	20	name	FailedtoaccessNE	message	Internal error sending request to NE	defaultHttpStatusCode	500		
neId	int								
unit	int								
subslot	int								
port	int								
id	21	name	PortNotFound	message	Port not found NE ${neId}, unit ${unit}, subslot ${subslot}, port ${port}	defaultHttpStatusCode	400		
id	22	name	PublicKeyFailure	message	NE rejects public/private key	defaultHttpStatusCode	400		
actual	string								
accepted	string								

Table 3: enp.yml

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
id	1	name	PortSelectable	message	The UNI port is selectable	arguments	None		
id	2	name	PortNotSelectable	message	The UNI port is NOT selectable	arguments	None		
id	3	name	PortNotConnectedToVlan	message	The port is not connected to the Vpls VLAN	arguments	None		
id	4	name	PortNotVpwsCreateable	message	Cannot create new Vpws on this port	arguments	None		
id	5	name	PortNotVplsCreateable	message	Cannot add this port to a new Vpls	arguments	None		
id	6	name	ScheduleProfileNotChangeable	message	Required scheduling profile is in conflict with already existing service	arguments	None		
id	7	name	CosTypeMissmatch	message	Required Cos Type is in conflict with already existing service	arguments	None		
id	8	name	CosPriorityMissmatch	message	Required Cos Priority is in conflict with already existing service	arguments	None		
id	9	name	PortbaseServiceNotCreateable	message	Cannot create a port based service on this port	arguments	None		
id	10	name	RatelimiterNotCreateable	message	Cannot add ratelimiter on port level, other services already exist	arguments	None		
id	11	name	ServiceWithSameVlanExist	message	A service with the same VLAN exists on this port	arguments	None		
id	12	name	UntaggedServiceNotCreateable	message	Cannot create a untagged service on this port	arguments	None		
needed_bandwidth	int								
new_bandwidth	int								
tunnelid	int								

Table 3: enp.yml (continued)

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
id	13	name	ActionIncreaseTunnelBandwidth	message	Tunnel bandwidth has to be increased (by ${needed_bandwidth} kbps, new bandwidth: ${new_bandwidth})				
needed_bandwidth	int								
id	14	name	TunnelHasNotEnoughBandwidth	message	Tunnel bandwidth has not enough bandwidth (bandtwith shortage by ${needed_bandwidth} kbps)				
id	15	name	TunnelIsUnprotected	message	Tunnel is unprotected	arguments	None		
id	16	name	TunnelIsProtected	message	Tunnel is protected	arguments	None		
id	17	name	TunnelIsInvalid	message	Tunnel is invalid	arguments	None		
lsp_name	string								
id	18	name	TunnelHasIncompatibleLabels	message	Tunnel labels of ${lsp_name} path does not meet the requirements				
current_label	int								
required_label	int								
id	19	name	TunnelMinimumLabelIsTooSmall	message	Tunnel minimum label is too small (current min label: ${current_label}, required min label: ${required_label})				
current_label	int								
required_label	int								
id	20	name	TunnelMaximumLabelIsTooBig	message	Tunnel maximum label is too big (current max label: ${current_label}, required max label: ${required_label})				
lsp_name	string								
id	21	name	TunnelHasIncompatibleEncryptionSettings	message	Tunnel encryption of ${lsp_name} path does not meet the requirements				
current_profile	int								
required_profile	int								
id	22	name	TunnelAEndHasWrongEncryptionProfile	message	Tunnel A-End encryption profile is wrong (current profile: ${current_profile}, required profile: ${required_profile})				
current_profile	int								
required_profile	int								
id	23	name	TunnelZEndHasWrongEncryptionProfile	message	Tunnel Z-End encryption profile is wrong (current profile: ${current_profile}, required profile: ${required_profile})				
id	24	name	TunnelHasIncompatibleLpsSettings	message	Tunnel has wrong LPS Session settings	arguments	None		
id	25	name	TunnelHasIncompatibleBfdSettings	message	Tunnel has wrong BFD Session settings	arguments	None		
id	26	name	TunnelWorkingLspHasWrongMaxHops	message	Tunnel working LSP is too long (max hops requirement is not met)	arguments	None		
id	27	name	TunnelProtectingLspHasWrongMaxHops	message	Tunnel prtecting LSP is too long (max hops requirement is not met)	arguments	None		
id	28	name	TunnelWorkingLspHasWrongMaxCost	message	Tunnel working LSP cost is too big (max cost requirement is not met)	arguments	None		
id	29	name	TunnelProtectingLspHasWrongMaxCost	message	Tunnel protecting LSP cost is too big (max cost requirement is not met)	arguments	None		
id	30	name	TunnelLspsAreNotDistinct	message	Tunnel does not have distinct paths	arguments	None		
id	31	name	TunnelHasMissingBfdSession	message	Tunnel does not have BFD Session defined	arguments	None		

Table 3: enp.yml (continued)

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
id	32	name	PwTunnelCreateNewTunnel	message	Create new tunnel	arguments	None		
id	33	name	PwTunnelUseExistingTunnel	message	Use Existing tunnel, no modification required	arguments	None		
newBw	int								
id	34	name	PwTunnelIncreaseTunnelBw	message	Require increase Tunnel BW to ${newBw} [kbit/s]				
newBw	int								
id	35	name	PwTunnelIncreaseTunnelBwAddBfd-Session	message	Require increase Tunnel BW to ${newBw} [kbit/s] and add BFD Session				
id	36	name	PwTunnelAddBfdSession	message	Require add BFD Session	arguments	None		
tunnelName	string								
id	1	name	NoDistinctTunnel	message	Routing failed. No distinct path found for ${tunnelName}	defaultHttpStatusCode	400		
linkId	int								
id	2	name	LinkNotFound	message	EnpLink not found ${linkId}	defaultHttpStatusCode	404		
id	3	name	ServiceProfileNameConflict	message	Service profile with the same name exists already	defaultHttpStatusCode	409	arguments	None
id	4	name	ServiceProfileIdConflict	message	Service profile with the same id exists already	defaultHttpStatusCode	409	arguments	None
name	string								
id	5	name	DeleteUsedServiceProfileConflict	message	The service profile ${name} cannot be deleted, it is used by a service	defaultHttpStatusCode	409		
id	6	name	DeleteSectionBasedLinkConflict	message	The link cannot be deleted, it is based on a section.\nIf you like to delete the link you have to delete the section	defaultHttpStatusCode	409	arguments	None
id	7	name	CannotCreateLink	message	Cannot create link	defaultHttpStatusCode	400	arguments	None
tunnelId	string								
lspType	string								
id	8	name	DelayMeasurementsFailedToStart	message	The Delay measurement task cannot be started for the Tunnel (${tunnelId}) on the ${lspType} LSP.	defaultHttpStatusCode	400		
id	9	name	DelayMeasurementsFailedToFinish	message	Cannot obtain results for the specified delay measurement task. The task has failed to start on the NE, was manually stopped or was not queried for more than 200 seconds. You have to query results of the task within 200 seconds, otherwise it is considered to be inactive and deleted from the NE.	defaultHttpStatusCode	400	arguments	None
tunnelId	string								
id	10	name	InvalidTunnel	message	Tunnel ${tunnelId} has invalid configuration!	defaultHttpStatusCode	400		
id	11	name	RequestedTimeInPast	message	Requested time is in the past, cannot schedule at this time!	defaultHttpStatusCode	400	arguments	None
id	12	name	ServiceProfileEncryptionConflict	message	The service profile contains encryption profile but encryption is not enabled	defaultHttpStatusCode	409	arguments	None
id	13	name	WrongQosTaskType	message	Wrong task type	defaultHttpStatusCode	400	arguments	None
id	14	name	BPTaskManagerRequestFailed	message	Couldn't perform BP Task Manager Request	defaultHttpStatusCode	400	arguments	None
id	15	name	BPCoreRequestFailed	message	Couldn't perform BP Core Request	defaultHttpStatusCode	400	arguments	None
status	string								
id	16	name	UploadDataFromNeFailed	message	Cannot upload data from NE. Action response status: ${status}.	defaultHttpStatusCode	400		
id	17	name	ApplAuthenticationFailed	message	Application authentication failed	defaultHttpStatusCode	401	arguments	None
bandwidth	long								

Table 3: enp.yml (continued)

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
usedBw	long								
id	18	name	TunnelBwBelowUsedBw	message	Change bandwidth failed. The tunnel bandwidth ${bandwidth} [kbit/s] cannot be below the used bandwidth ${usedBw} [kbit/s]	defaultHttpStatusCode	400		
id	19	name	PwLockedByOtherUser	message	Cannot create Session. PseudoWires are locked by another user	defaultHttpStatusCode	409	arguments	None
id	20	name	DeployMgrMaximumNumberOfSessions	message	Maximum number of concurrent sessions reached!	defaultHttpStatusCode	409	arguments	None
reason	string								
id	21	name	DeployMgrActionFailed	message	Failed to apply configuration to the network: ${reason}	defaultHttpStatusCode	400		
tunnelId	int								
id	22	name	TunnelNotFound	message	The ENP Tunnel ${tunnelId} doesn't exist!	defaultHttpStatusCode	404		
pwid	int								
id	23	name	PseudowireNotFound	message	The ENP Pseudowire ${pwid} doesn't exist!	defaultHttpStatusCode	404		
serviceid	int								
id	24	name	ServiceNotFound	message	The ENP Service ${serviceid} doesn't exist!	defaultHttpStatusCode	404		
id	25	name	UpdateSavedPseudowireFailed	message	Failed to update pseudowire in database	defaultHttpStatusCode	400	arguments	None
id	26	name	ServiceResourcesUnavailable	message	Service resources are temporarily unavailable	defaultHttpStatusCode	409	arguments	None
id	27	name	TunnelResourcesUnavailable	message	Tunnel resources are temporarily unavailable	defaultHttpStatusCode	409	arguments	None
name	string								
id	28	name	CannotDeployService	message	Failed to deploy service '${name}'	defaultHttpStatusCode	400		
name	string								
id	29	name	CannotRemoveService	message	Failed to remove service '${name}'	defaultHttpStatusCode	400		
name	string								
id	30	name	CannotModifyService	message	Failed to modify service '${name}'	defaultHttpStatusCode	400		
name	string								
id	31	name	CannotDeployTunnel	message	Failed to deploy tunnel '${name}'	systemEvent	TRUE	defaultHttpStatusCode	400
name	string								
id	32	name	CannotRemoveTunnel	message	Failed to remove tunnel '${name}'	defaultHttpStatusCode	400	systemEvent	FALSE
name	string								
id	33	name	CannotModifyTunnel	message	Failed to modify tunnel '${name}'	defaultHttpStatusCode	400		
name	string								
id	34	name	CannotDeployPseudowire	message	Failed to deploy pseudowire '${name}'	defaultHttpStatusCode	400		
name	string								
id	35	name	CannotRemovePseudowire	message	Failed to remove pseudowire '${name}'	defaultHttpStatusCode	400		
name	string								
service_name	string								

Table 3: enp.yml (continued)

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
id	36	name	CannotRemoveValidPseudowire	message	Failed to remove valid pseudowire '${name}'. In order to remove this pseudowire, please, remove the service '${service_name}' instead.	defaultHttpStatusCode	400		
name	string								
id	37	name	CannotModifyPseudowire	message	Failed to modify pseudowire '${name}'	defaultHttpStatusCode	400		
id	38	name	ServiceSessionIsCommitting	message	Service is committing	defaultHttpStatusCode	409	arguments	None
tunnelid	int								
username	string								
hostname	string								
id	39	name	TunnelSessionLockedByOtherUser	message	Get tunnel session failed, Tunnel: ${tunnelid} is currently hold by ${user-name}@${hostname}	defaultHttpStatusCode	409		
serviceid	int								
username	string								
hostname	string								
id	40	name	ServiceSessionLockedByOtherUser	message	Get service session failed, Service: ${serviceid} is currently hold by ${user-name}@${hostname}	defaultHttpStatusCode	409		
tunnelId	int								
lspId	int								
id	41	name	TunnelLSPNotFound	message	The Tunnel ${tunnelId} doesn't have LSP ${lspId}	defaultHttpStatusCode	404		
neid	int								
id	42	name	EnpNodeNotFound	message	Node ${neid} doesn't exist in the E-NP domain	defaultHttpStatusCode	404		
minLabel	int								
maxLabel	int								
id	43	name	InvalidMinMaxLabelValues	message	Invalid Min Max Label values. Min Label ${minLabel} is higher than the Max Label ${maxLabel}	defaultHttpStatusCode	404		
neName	string								
neId	int								
portLabel	string								
id	44	name	UniPortDoesNotExist	message	UNI Port does not exist on NE ${neName} (${neId}) ${portLabel}	defaultHttpStatusCode	404		
pwName	string								
id	45	name	NoTunnelSetForPseudoWire	message	No Tunnel is specified for Pseudo Wire ${pwName}	defaultHttpStatusCode	404		
name	string								
reason	string								
id	46	name	SaveTunnelFailed	message	Save Tunnel ${name} failed with reason:${reason}	defaultHttpStatusCode	404		
name	string								
id	47	name	SaveServiceFailed	message	Save Service ${name} failed	defaultHttpStatusCode	404		
name	string								
reason	string								

Table 3: enp.yml (continued)

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
id	48	name	SaveServiceFailedWithReason	message	Save Service ${name} failed with reason:${reason}	defaultHttpStatusCode	404		
name	string								
id	49	name	CannotDeplyServiceTunnelDeploy-Failed	message	Cannot deploy Service ${name}, not all tunnels are correctly deployed	defaultHttpStatusCode	404		
neid	int								
id	50	name	LspNodeHasInvalidConfiguration	message	LSP Node on neid: ${neid} is invalid	defaultHttpStatusCode	500		
label	int								
id	51	name	LspNodeEncryptionConfigurationMis-match	message	Encryption configuration is incorrect for label ${label}	defaultHttpStatusCode	500		
id	52	name	XCLabelConflict	message	XC has a label conflict	defaultHttpStatusCode	500	arguments	None
type	string								
id	53	name	InvalidLSP	message	Label Switch Path (${type}) is invalid	defaultHttpStatusCode	500		
id	54	name	IncompleteLSP	message	Label Switch Path is incomplete (holes detected)	defaultHttpStatusCode	500	arguments	None
id	55	name	InvalidLSPMissingInitiator	message	Missing or invalid Initiator node	defaultHttpStatusCode	500	arguments	None
id	56	name	InvalidLSPMissingTerminator	message	Missing or invalid Terminator node	defaultHttpStatusCode	500	arguments	None
node_name	string								
id	57	name	InvalidBFDSessionEndpoint	message	BFD Session is invalid on ${node_name}	defaultHttpStatusCode	500		
node_name	string								
id	58	name	InvalidLPSEndpoint	message	LPS configuration is invalid on ${node_name}	defaultHttpStatusCode	500		
id	59	name	MissingEncryptionSegmentEndpoint	message	Incomplete Encryption Segment - missing endpoint	defaultHttpStatusCode	500	arguments	None
node_name	string								
node_version	string								
id	60	name	EncryptionSegmentsAreNotSupported	message	Encryption Segments are not supported in this NE version neid: ${node_name}, esw version: ${node_version}	defaultHttpStatusCode	400		
id	61	name	CrossConnectionIsPresentInTheNet-work	message	Cross Connection on the NE or Label on the Encryption Unit is still present in the net-work	defaultHttpStatusCode	400	arguments	None
id	62	name	CrossConnectionIsMissingInTheNet-work	message	Cross Connection on the NE or Label on the Encryption Unit is missing in the network	defaultHttpStatusCode	400	arguments	None
label	int								
neid	int								
port	string								
id	63	name	UnexpectedEncryptedLabel	message	Detected encrypted label (${label}) on unencrypted Node neid: ${neid}, port: ${port}	defaultHttpStatusCode	500		
name	string								
id	64	name	CannotAlignService	message	Cannot align Service ${name}	defaultHttpStatusCode	404		
id	65	name	NoServiceProfileSetInService	message	No Service Profile is set in the service	defaultHttpStatusCode	404	arguments	None
reason	string								
id	66	name	AlignServiceFailed	message	Align Service failed: ${reason}	defaultHttpStatusCode	404		
id	67	name	BfdSessionIsPresentInTheNetwork	message	BFD Session has been detected in the network	defaultHttpStatusCode	400	arguments	None

Table 3: enp.yml (continued)

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
id	68	name	BfdSessionIsMissingInTheNetwork	message	BFD Session is missing in the network	defaultHttpStatusCode	400	arguments	None
id	69	name	MeIsPresentInTheNetwork	message	ME has been detected in the network	defaultHttpStatusCode	400	arguments	None
id	70	name	MeIsMissingInTheNetwork	message	ME is missing in the network	defaultHttpStatusCode	400	arguments	None
id	71	name	ModifyTunnelFailedCannotChan-geEdgeNodes	message	Path is not empty! - cannot change Initiator or Terminator NE	defaultHttpStatusCode	400	arguments	None
id	72	name	ModifyTunnelFailedUnableToAllo-cateBw	message	Unable to allocate the bandwidth	defaultHttpStatusCode	400	arguments	None
neid	int								
id	73	name	NodeIsNotPartOfENPDomain	message	Node with id ${neid} is not part of the E-NP domain!	defaultHttpStatusCode	400		
id	74	name	ModifyTunnelFailedCannotChange-ClassTypeOfNonEmptyTunnel	message	Cannot change the Class Type when LSP is not empty	defaultHttpStatusCode	400	arguments	None
linkName	string								
id	75	name	TunnelRoutingLinkAlreadyExists	message	Link ${linkName} already exists in the path!	defaultHttpStatusCode	400		
linkName	string								
id	76	name	TunnelRoutingLinkNotFound	message	Link ${linkName} NOT FOUND!	defaultHttpStatusCode	400		
linkName	string								
id	77	name	TunnelRoutingLinkCannotBeAdded	message	Cannot add Link ${linkName}	defaultHttpStatusCode	400		
id	78	name	TunnelLabelAllocationFailed	message	Cannot allocate labels	defaultHttpStatusCode	400	arguments	None
id	79	name	TunnelPathNotFound	message	Cannot find a path!	defaultHttpStatusCode	400	arguments	None
id	80	name	TunnelRoutingAborted	message	Automatic routing was aborted by the user	defaultHttpStatusCode	400	arguments	None
id	81	name	TunnelHasNoEdgeNodeDefined	message	Initiator or Terminator Node is not set!	defaultHttpStatusCode	400	arguments	None
id	82	name	TunnelSaveFailedMaximumNumberOf-Sessions	message	Cannot save tunnel: the maximum number of simultaneous sessions reached	defaultHttpStatusCode	400	arguments	None
reason	string								
id	83	name	TunnelSaveFailed	message	Save ENP Tunnel failed: ${reason}	defaultHttpStatusCode	400		
reason	string								
id	84	name	TunnelDeployFailed	message	Deploy ENP Tunnel failed: ${reason}	defaultHttpStatusCode	400		
id	85	name	TunnelDeployFailedMaximumNumber-OfSessions	message	Cannot deploy tunnel: maximum number of concurrent sessions reached!	defaultHttpStatusCode	400	arguments	None
tunnelname	string								
id	86	name	TunnelDeleteFailedUsedByMcc	message	Failed to delete tunnel: Tunnel ${tunnelname} is used as MCC	defaultHttpStatusCode	400		
reason	string								
id	87	name	TunnelDeleteFailed	message	Delete ENP Tunnel failed: ${reason}	defaultHttpStatusCode	400		
id	88	name	TunnelDeleteFailedMaximumNumber-OfSessions	message	Cannot delete the tunnel: maximum number of concurrent sessions reached!	defaultHttpStatusCode	400	arguments	None
id	89	name	LinkLockedByOtherUser	message	Cannot create Session. Link is locked by another user	defaultHttpStatusCode	409	arguments	None
id	90	name	LinkEndpointsNotDefined	message	Some of the link MPLS interfaces are not defined	defaultHttpStatusCode	409	arguments	None
id	91	name	LinkEndpointsOnEqualNode	message	Both link MPLS interfaces are defined are defined on the same node	defaultHttpStatusCode	409	arguments	None

Table 3: enp.yml (continued)

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
id	92	name	CannotDeleteLink	message	Cannot delete Link	defaultHttpStatusCode	409		
id	93	name	LinkReferencedByTunnel	message	Link is used by Tunnel(s)	defaultHttpStatusCode	409		
diff	string								
id	94	name	LspNodeConfigurationMismatch	message	LSP Node has different configuration on the NE: ${diff}	defaultHttpStatusCode	409		
neid	int								
id	95	name	LspNodeHasMissingEgressLink	message	LSP Node (${neid}) has missing egress link	defaultHttpStatusCode	500		
neid	int								
id	96	name	LspNodeHasMissingIngressLink	message	LSP Node (${neid}) has missing ingress link	defaultHttpStatusCode	500		
neid	int								
id	97	name	LspNodeHasInvalidEgressLink	message	LSP Node (${neid}) has invalid egress link	defaultHttpStatusCode	500		
neid	int								
id	98	name	LspNodeHasInvalidIngressLink	message	LSP Node (${neid}) has invalid ingress link	defaultHttpStatusCode	500		
id	99	name	XCLabelsMismatch	message	Different XC labels detected on the NE	defaultHttpStatusCode	500	arguments	None
lsp_name	string								
id	100	name	InvalidBFDSession	message	BFD Session on ${lsp_name} path is invalid	defaultHttpStatusCode	500		
id	101	name	InvalidLPS	message	LPS configuration is invalid	defaultHttpStatusCode	500	arguments	None
diff	string								
id	102	name	TunnelIsModified	message	Different configuration of the tunnel is present in the network (${diff})	defaultHttpStatusCode	500		
id	103	name	TunnelIsAlreadyDeployed	message	Tunnel is already deployed	defaultHttpStatusCode	500	arguments	None
id	104	name	ModifyTunnelFailedCannotRemoveBfdFromDeployedTunnel	message	Cannot remove BFD Session from already deployed tunnel	defaultHttpStatusCode	400	arguments	None
id	105	name	ModifyTunnelFailedCannotRemoveProtectionFromDeployedTunnel	message	Cannot remove protected LSP from already deployed tunnel	defaultHttpStatusCode	400	arguments	None
id	106	name	ModifyTunnelFailedCannotChangeLSPOfEncryptedTunnel	message	Cannot modify LSP of encrypted tunnel. Please, remove encryption first.	defaultHttpStatusCode	400	arguments	None
id	107	name	InvalidXC	message	XC has invalid configuration	defaultHttpStatusCode	500	arguments	None
id	108	name	ModifyTunnelFailedCannotModifyBfdOfDeployedTunnel	message	Cannot modify BFD Session parameters of already deployed tunnel	defaultHttpStatusCode	400	arguments	None
id	109	name	ModifyTunnelFailedCannotModifyLpsOfDeployedTunnel	message	Cannot modify LPS Session parameters of already deployed tunnel	defaultHttpStatusCode	400	arguments	None
bandwidth	long								
minBw	long								
id	110	name	ModifyTunnelFailedCannotSetBandwidthBelowServiceProfile	message	Cannot set bandwidth ${bandwidth} [kbit/s] below defined one in the Service Profile ${minBw} [kbit/s]	defaultHttpStatusCode	400		
id	111	name	CannotStartAutoRouting	message	Failed to start automatic routing	defaultHttpStatusCode	400	arguments	None
type	string								
id	112	name	InvalidLSPEncryption	message	Label Switch Path (${type}) has invalid encryption	defaultHttpStatusCode	500		
name	string								

Table 3: enp.yml (continued)

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
id	113	name	VplsNodeAlreadyExist	message	Cannot add Vpls instance to the service, the vpls instance already exists on node ${name}	defaultHttpStatusCode	500		
vlanId	int								
name	string								
id	114	name	SviAlreadyExist	message	Svi already exist, cannot create svi with vlanId ${vlanid} on node ${name}	defaultHttpStatusCode	500		
name	string								
id	115	name	VplsNodeNotExitCannotConnect	message	Cannot add spoke node, the connecting vpls instance on node ${name} does not exist	defaultHttpStatusCode	500		
name	string								
id	116	name	VplsNodeIsDeletingCannotConnect	message	Cannot add spoke node, the connecting vpls instance on node ${name} is set to be removed	defaultHttpStatusCode	500		
id	117	name	CannotChangeServiceType	message	Cannot change the service type of an existing service	defaultHttpStatusCode	500		
name	string								
id	118	name	VplsNodeSpokeConnectToSpoke	message	Cannot add spoke node, the connecting vpls instance on node ${name} is attached to this node as spoke	defaultHttpStatusCode	500		
id	119	name	PeDualHomeNotDefinedInServicePro-file	message	Cannot create PE Dual-Home group. Dual Home flag is disabled in the Service Pro-file	defaultHttpStatusCode	500		
name	string								
id	120	name	PeDualHomeNotAllowedOnNode	message	Cannot create PE Dual-Home group. The ESW release on node ${name} does not allow PE Dual-Home group	defaultHttpStatusCode	500		
aEndServiceProfil-eId	int								
zEndServiceProfil-eId	int								
id	121	name	PwWrongAcsServiceProfiles	message	Different Service Profile Ids on the ACs (aEnd: ${aEndServiceProfileId}, zEnd: ${zEndServiceProfileId})	defaultHttpStatusCode	500		
aEndCwPreference	int								
zEndCwPreference	int								
id	122	name	PwWrongAcsCwPreferences	message	Different CwPreferences detected on the ACs (aEnd: ${aEndCwPreference}, zEnd: ${zEndCwPreference})	defaultHttpStatusCode	500		
id	123	name	PeDualHomeCwError	message	PE dual home group detected, but CwPreferences not set on the AC(s)	defaultHttpStatusCode	500	arguments	None
node	string								
diff	string								
id	124	name	AcConfigurationMismatch	message	AC on ${node} has different configuration in ENP than on the NE: ${diff}	defaultHttpStatusCode	500		
id	125	name	PeGroupInvalidConfiguration	message	PE group has invalid configuration	defaultHttpStatusCode	500	arguments	None
id	126	name	PeGroupHasNoPws	message	PE group has no pseudowires	defaultHttpStatusCode	500	arguments	None
id	127	name	PeGroupHasOnlyOnePw	message	PE group has only one pseudowire	defaultHttpStatusCode	500	arguments	None
id	128	name	PeGroupHasNoPrimaryPseudowire	message	PE group has no pseudowire with role Primary	defaultHttpStatusCode	500	arguments	None
count	int								
id	129	name	PeGroupHasInvalidPseudowires	message	PE group has invalid ${count} pseudowire(s)	defaultHttpStatusCode	500		

Table 3: enp.yml (continued)

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
id	130	name	PeGroupPseudowiresWithoutCw	message	PE group has pseudowire(s) without control word enabled	defaultHttpStatusCode	500	arguments	None
id	131	name	PwInvalidConfiguration	message	Pseudowire has invalid configuration	defaultHttpStatusCode	500	arguments	None
id	132	name	InvalidConfiguration	message	Invalid configuration	defaultHttpStatusCode	500	arguments	None
id	133	name	ServiceHasDifferentServiceProfiles	message	Different Service Profile Ids	defaultHttpStatusCode	500	arguments	None
node	string								
id	134	name	ServiceHasInvalidNode	message	Service has invalid configuration on node: ${node}	defaultHttpStatusCode	500		
id	135	name	ServiceHasInvalidCWConfiguration	message	Service has Pseudowire(s) with PW Control Word enabled for non dual-home capable service! PTP Services could be affected	defaultHttpStatusCode	500	arguments	None
id	136	name	ServiceDoesNotSupportPEGroups	message	Service has PE Dual Home groups defined for non dual-home capable service	defaultHttpStatusCode	500	arguments	None
id	137	name	ServiceHasMissingCW	message	Service has Pseudowire(s) without PW Control Word enabled for dual-home capable service!	defaultHttpStatusCode	500	arguments	None
id	138	name	InvalidVplsInstance	message	VPLS Instance is invalid	defaultHttpStatusCode	500	arguments	None
id	139	name	InvalidSVI	message	VPLS Instance has invalid SVI. Please, resynchronize ENP Node	defaultHttpStatusCode	500	arguments	None
name	string								
id	140	name	VplsNodeHasInvalidPw	message	VPLS Node has invalid pseudowire ${name}	defaultHttpStatusCode	500		
id	141	name	VplsNodeHasInvalidPEDualHome-Group	message	VPLS Node has invalid PE DualHome group	defaultHttpStatusCode	500	arguments	None
id	142	name	ServiceHasInvalidSNIPorts	message	Service has invalid SNI port(s)	defaultHttpStatusCode	500	arguments	None
node	string								
diff	string								
id	143	name	VplsNodeConfigurationMismatch	message	VPLS Instance on ${node} has different configuration in ENP than on the NE: ${diff}	defaultHttpStatusCode	500		
id	144	name	PEDualHomeNotEnabledOnService	message	PE Dual Home not enabled on service, cannot add PE Dual Home Groups	defaultHttpStatusCode	500	arguments	None
id	145	name	PEDualHomeNotAvailableOnNode	message	PE Dual Home functionality is not available in this NE software version	defaultHttpStatusCode	500	arguments	None
count	int								
id	146	name	ServiceSessionCannotChangeCwPref-erence	message	Cannot change PW control word, when some Dual Home groups are already defined (${count}). Please, at first remove all Dual Home groups from the service	defaultHttpStatusCode	500		
count	int								
id	147	name	ServiceSessionCannotChangeDhEn-abledFlag	message	Cannot change Dual Home Capable flag, when some Dual Home groups are already defined (${count}). Please, at first remove all Dual Home groups from the service	defaultHttpStatusCode	500		
id	148	name	ServiceSessionCannotLoadService-Profile	message	Cannot load Service Profile, Service Type does not match	defaultHttpStatusCode	500	arguments	None
name	string								
id	149	name	ServiceSessionNameAlreadyUsed	message	Service name ${name} already used	defaultHttpStatusCode	500		
message	string								
id	150	name	TunnelAutomaticCreationFailed	message	Failed to create automatically tunnel: ${message}	defaultHttpStatusCode	500		
message	string								
id	151	name	ServiceSessionSaveFailed	message	Save Service failed: ${message}	defaultHttpStatusCode	500		
message	string								

Table 3: enp.yml (continued)

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
id	152	name	ServiceSessionDeployFailed	message	Deploy Service failed: ${message}	defaultHttpStatusCode	500		
count	int								
name	string								
id	153	name	MaximumNumberOfVplsInstances-Reached	message	Maximum number of VPLS Instance (${count}) reached on the node ${name}	defaultHttpStatusCode	500		
id	154	name	ServiceSessionDeployFailedWith-outReason	message	Deploy Service failed	defaultHttpStatusCode	500	arguments	None
aEndName	string								
zEndName	string								
id	155	name	PseudowireHasDifferentNamesDefine-dOnEndpoints	message	Pseudowire has different names defined on endpoints Initiator: ${aEndName}, Termi-nator: ${zEndName}. Please, modify and redeploy the service in order to set the cor-rect name	defaultHttpStatusCode	500		
id	156	name	VplsHasDifferentNamesDefinedOn-Nodes	message	Service has different names defined on VPLS Instances. Please, modify and rede-ploy the service in order to set the correct name	defaultHttpStatusCode	500	arguments	None
name	string								
id	157	name	VplsNodeHasDifferentNameDefined	message	VPLS Instance has different name than service: ${name}. Please, modify and rede-ploy the service in order to set the correct name	defaultHttpStatusCode	500		
count	int								
max	int								
name	string								
id	158	name	MaximumNumberOfTransitTunnel-sReached	message	Maximum number of Transit Tunnels (${count} / ${max}) reached on ${name}	defaultHttpStatusCode	500		
count	int								
max	int								
name	string								
id	159	name	MaximumNumberOfTerminatedTunnel-sReached	message	Maximum number of Terminated Tunnels (${count} / ${max}) reached on ${name}	defaultHttpStatusCode	500		
count	int								
max	int								
name	string								
id	160	name	MaximumNumberOfFastBfdSession-sReached	message	Maximum number of Fast BFD Sessions (${count} / ${max}) reached on ${name}	defaultHttpStatusCode	500		
count	int								
max	int								
name	string								
id	161	name	MaximumNumberOfMediumBfdSes-sionsReached	message	Maximum number of Medium BFD Sessions (${count} / ${max}) reached on ${name}	defaultHttpStatusCode	500		
count	int								
max	int								
name	string								

Table 3: enp.yml (continued)

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
id	162	name	MaximumNumberOfSlowBfdSessionsReached	message	Maximum number of Slow BFD Sessions (${count} / ${max}) reached on ${name}	defaultHttpStatusCode	500		
name	string								
id	163	name	CannotEnableProtectionNoBfdSessionsLeft	message	Cannot enable protection - no BFD sessions left on ${name}	defaultHttpStatusCode	500		
id	164	name	InvalidTunnelBfdConfiguration	message	BFD Session(s) is invalid	defaultHttpStatusCode	500	arguments	None
id	165	name	CannotChangePwBwNoAvailabeTunnel	message	Cannot change pseudowire bandwidth, there is not enough available bandwith on the tunnel	defaultHttpStatusCode	500	arguments	None
id	166	name	CannotChangeTunnelForPwTunnelIsNotValidOrExist	message	Cannot select tunnel, the tunnel is not valid or does not exist	defaultHttpStatusCode	500	arguments	None
id	167	name	CannotChangeTunnelForPwTunnelDoesNotMatchServiceProfile	message	Cannot select tunnel, the tunnel does not match the service profile requirements	defaultHttpStatusCode	500	arguments	None
id	168	name	CannotChangeTunnelForPwTunnelIsCreated	message	Cannot select another tunnel, the tunnel is already created	defaultHttpStatusCode	500	arguments	None
id	169	name	CannotChangeTunnelForPwPwIsSaved	message	Cannot select another tunnel, the pseudowire is already saved or deployed	defaultHttpStatusCode	500	arguments	None
nename	string								
reason	string								
id	170	name	CannotChangeGlobalNodeId	message	Cannot change Global Id and/or Node Id on NE {nename} with reason: {reason}	defaultHttpStatusCode	500		
id	171	name	TunnelAutomaticRoutingFailed	message	Automatic tunnel routing failed	defaultHttpStatusCode	500	arguments	None
node	string								
id	172	name	CannotRemoveLastPwFromVplsInstance	message	Cannot remove the last pseudo wire from the VPLS instance on node: ${node}	defaultHttpStatusCode	500		
node	string								
id	173	name	CannotRemoveLastPwFromPeDualHome	message	Cannot remove the last pseudo wire from the PE Dual-Home instance on node: ${node}	defaultHttpStatusCode	500		
name	string								
value	int								
min	int								
max	int								
id	174	name	ValueOutOfRange	message	Provided value for parameter ${name} is out of range: ${value} (${min}..${max})	defaultHttpStatusCode	500		
message	string								
id	175	name	QosDeployFailed	message	Deploy HQoS configuration failed: ${message}	defaultHttpStatusCode	500		
node	string								
id	176	name	CannotRemoveVplsInstanceUsedAsSpokeEndpoint	message	Cannot remove VPLS instance, ${node} uses it as spoke endpoint	defaultHttpStatusCode	500		
node	string								
id	177	name	CannotRemoveVplsInstanceUsedAsPeDualHomeEndpoint	message	Cannot remove VPLS instance, ${node} uses it as PE Dual-Home endpoint	defaultHttpStatusCode	500		
id	178	name	CannotRemoveVplsInstanceVpwsPortIsAttachedToId	message	Cannot remove VPLS instance VPWS port(s) are connected to it	defaultHttpStatusCode	500	arguments	None

Table 3: enp.yml (continued)

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
node	string								
id	179	name	ShaperHasInvalidConfiguration	message	Shaper on node '${node}' is invalid	defaultHttpStatusCode	500		
node	string								
id	180	name	DropProfileHasInvalidConfiguration	message	Drop Profile on node '${node}' is invalid	defaultHttpStatusCode	500		
node	string								
diff	string								
id	181	name	ShaperConfigurationMismatch	message	Shaper on ${node} has different configuration in ENP than on the NE: ${diff}	defaultHttpStatusCode	500		
node	string								
diff	string								
id	182	name	DropProfileConfigurationMismatch	message	Drop Profile on ${node} has different configuration in ENP than on the NE: ${diff}	defaultHttpStatusCode	500		
shapers	int								
id	183	name	CannotRemoveHQosProfileClassType-Shapers	message	Cannot remove HQoS profile - there is/are ${shapers} class type shapers using this profile	defaultHttpStatusCode	500		
shapers	int								
id	184	name	CannotRemoveHQosProfileDefault-Shapers	message	Cannot remove HQoS profile - there is/are ${shapers} default shapers using this profile	defaultHttpStatusCode	500		
sniPort	string								
sniPortProfileId	int								
srvPortProfileId	int								
id	185	name	SniPortHasDifferentServiceProfileId	message	SNI Port ${sniPort} has a defined Service Profile Id ${sniPortProfileId} which is different to the Service Profile ${srvPortProfileId} of the service	defaultHttpStatusCode	500		
acid	int								
id	186	name	AcHasNoSniPort	message	Attachment Circuit ${acid} has no SNI Port defined	defaultHttpStatusCode	500		
node	string								
portlabel	string								
vlanid	int								
id	187	name	CvpAcPortHasUsedVlan	message	Attachment Circuit ${node}:${portlabel} has an used AC VLAN Id:${vlanid}	defaultHttpStatusCode	500		
serviceid	int								
id	188	name	ServiceProfileNotFound	message	The ENP Service Profile ${serviceid} doesn't exist!	defaultHttpStatusCode	404		
threshold	int								
id	189	name	HQoSDropProfileConfigThresholdAlreadyExist	message	A HQoS Drop Profile does already exist with the threshold: ${threshold}	defaultHttpStatusCode	409		
id	190	name	HQoSDropProfileConfigMaxNumberReached	message	Cannot create more than 50 HQoS Drop Profiles	defaultHttpStatusCode	409		
cir	int								
id	191	name	HQoSFirstRateConfigCirAlreadyExist	message	A HQoS First Rate Config with CIR: ${cir} already exist	defaultHttpStatusCode	409		
eir	int								

Table 3: enp.yml (continued)

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
id	192	name	HQoSSecondRateConfigEirAlreadyExist	message	A HQoS Second Rate Config with Eir: ${eir} already exist	defaultHttpStatusCode	409		
ct	int								
tc	int								
id	193	name	ClassTypeSharedTrafficClass	message	Class Type ${ct} is using shared Traffic Class (${tc}) with different Class Type	defaultHttpStatusCode	400		
ct	int								
nc	int								
id	194	name	ClassTypeSharedNetworkControl	message	Class Type ${ct} is using shared Network Control (${nc}) with different Class Type	defaultHttpStatusCode	400		
id	195	name	ClassTypeHasMissingCT0	message	Class Type configuration does not have CT0 defined	defaultHttpStatusCode	400		
node	string								
port	string								
id	196	name	OamDMPortTrafficMgrNotSupported	message	Node: ${node}, OAM DM not supported because of Traffic Management on port: ${port}	defaultHttpStatusCode	409		
id	197	name	LinkHasNotEnoughAvailableBandwidth	message	The link has not enough available bandwidth	defaultHttpStatusCode	409		
id	3	name	ENP						

Table 4: rest.yml

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
method	string								
user	string								
uri	string								
id	1	name	UserAccessNotAllowed	message	Method ${method} access for user ${user} not allowed on uri ${uri}	defaultHttpStatusCode	404		
parameter	string								
uri	string								
id	2	name	MissingMandatoryParameter	message	Missing mandatory parameter (${parameter}) on request ${uri}	defaultHttpStatusCode	403		
id	4	name	REST						

Table 5: client.yml

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
id	1	name	ParseXmlFile	message	Could not parse the XML File	arguments	None		
id	2	name	XmlSignature	message	Failed to verify the XML signature	arguments	None		
id	3	name	ExportedLinkParse	message	Could not parse the exported link(s)	arguments	None		
id	4	name	ImportLinks	message	Could not import link(s)	arguments	None		
directory	string								
id	5	name	ResourceDirNotDir	message	${directory} is not a directory.				
directory	string								

Table 5: client.yml (continued)

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
id	6	name	CannotCreateResourceDir	message	Unable to create resource directory ${directory}.				
resource	string								
id	7	name	CopyResourceFailed	message	Failed to copy ${resource}.				
resource	string								
host	string								
url	string								
id	8	name	QueryResourceFailed	message	Failed to query ${resource} versions from core ${host} (url=${url}).				
resource	string								
url	string								
language	string								
version	string								
id	9	name	DownloadResourceFailed	message	Failed to download ${resource}-${language}-${version} from core (url=${url}).				
resource	string								
id	10	name	DeleteResourceFailed	message	Unable to delete ${resource}.				
host	string								
id	11	name	QueryCoreVersionsFailed	message	Unable to connect to core on ${host}.				
clientIdl	string								
coreIdl	string								
id	12	name	IncompatibleVersions	message	Login is not possible because of incompatible IDL versions:\nClient version is ${clien-tIdl}\nCore version is ${coreIdl}				
file	string								
id	13	name	QuosteImportReferenceTableInvalid-File	message	Selected file ${file} does not contain valid refernce data.				
file	string								
id	14	name	NotPossibleToAccesFile	message	Selected file ${file} is not accessible.				
file	string								
id	15	name	UnableToAddJarToClasspath	message	Unable to add jar file ${file} to classpath.				
host	string								
id	16	name	ConnectingToCoreTimeout	message	Trying to connect to core on ${host} timed out.				
id	5	name	Client						

Table 6: blm.yml

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
neId	int								
id	1	name	NeNotExist	message	NE with id:${neId} does not exist	defaultHttpStatusCode	401		

Table 6: blm.yml (continued)

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
id	2	name	WrongAuthenticationToken	message	Authentication Token wrong formatted	defaultHttpStatusCode	401		
id	3	name	EmptyNeIdList	message	There are no Network Elements defined for the Task	defaultHttpStatusCode	401		
id	4	name	DifferentAgentType	message	Cannot apply ESW task to different types of Network Elements	defaultHttpStatusCode	401		
id	5	name	WrongStartAlgorithm	message	The task activates a new ESW on the central unit.\nThis should be done with the start algorithm: System Release Upgrade.\nDo you really want the start algorithm: Upgrade Units Only	defaultHttpStatusCode	401		
id	6	name	NoNeEswActionDefined	message	In the NE Esw Task are no action defined. Download, Activation and Delete are all set to false	defaultHttpStatusCode	401		
id	7	name	DeleteAndAdditionalActionDefined	message	In the NE Esw Task is Delete and Download and/or Activation defined	defaultHttpStatusCode	401		
id	8	name	EmptyEswTargetList	message	There are no ESW Targets defined for the Task	defaultHttpStatusCode	401		
id	9	name	ProfileIdInvalid	message	Profile Id does not exist	defaultHttpStatusCode	401		
id	10	name	InvalidDbDataType	message	The db data domain is invalid, MileGateProfile and MileGateCPS are allowed	defaultHttpStatusCode	401		
id	6	name	BLM						

Table 7: system.yml

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
id	3	name	SessionExpired	message	Session has expired.	defaultHttpStatusCode	401		
id	4	name	TokenExpired	message	Provided token is no longer valid (expired).	defaultHttpStatusCode	401		
userId	string								
id	5	name	LoginFailed	message	Provided user name '${userId}' or password is incorrect.	defaultHttpStatusCode	401		
missingConfiguration	string								
id	6	name	WrongConfiguration	message	Wrong configuration - ${missingConfiguration} is not configured or its configuration is wrong.	defaultHttpStatusCode	400		
nem	string								
id	7	name	NeIdsNotValid	message	One or more NE IDs do not exist in ${nem}.	defaultHttpStatusCode	404		
neId	int								
nem	string								
id	8	name	NeIdNotValid	message	NE ID ${neId} does not exit in ${nem}.	defaultHttpStatusCode	404		
scriptId	string								
id	9	name	ScriptWithGivenIdDoesNotExist	message	Script with ID: ${scriptId} is not available	defaultHttpStatusCode	404		
scriptId	string								
id	10	name	ExecutionWithGivenIdDoesNotExist	message	Execution with ID: ${scriptId} is not available	defaultHttpStatusCode	404		
id	11	name	ResultsNotReady	message	Cannot get results, the execution is ongoing	defaultHttpStatusCode	409	arguments	None
scriptId	string								
scriptName	string								
id	12	name	ExecutionFailure	message	Failed to execute script ${scriptId} - '${scriptName}'	defaultHttpStatusCode	400		
id	13	name	DigestMalformed	message	Cannot perform this operation, provided digest is not valid.	defaultHttpStatusCode	400	arguments	None
id	14	name	ManifestFileNotFound	message	Manifest file not found. Check if it has name: manifest.yaml	defaultHttpStatusCode	404	arguments	None

Table 7: system.yml (continued)

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
id	15	name	InvalidManifest	message	Manifest file has wrong format. Check file content.	defaultHttpStatusCode	400	arguments	None
id	16	name	DigestFileNotFound	message	Digest file not found. Check if it has '.digest' extension.	defaultHttpStatusCode	404	arguments	None
scriptName	string								
id	17	name	ScriptFileNotFound	message	Script file not found. Check if name ${scriptName} is correct.	defaultHttpStatusCode	404		
scriptId	string								
id	18	name	ScriptWithGivenIdAlreadyExists	message	Script with given ID: ${scriptId} already exists. Probably script with same functionality already exists or you should change ID in manifest.	defaultHttpStatusCode	409		
id	19	name	ScriptWithSystemScopeCannotBeDeleted	message	Script with system scope cannot be deleted	defaultHttpStatusCode	400		
id	20	name	ReadAgentInfoFailure	message	Error reading agent information	defaultHttpStatusCode	404		
serviceName	string								
id	21	name	ReadServiceInfoFailure	message	Error reading service information for service: ${serviceName}	defaultHttpStatusCode	404		
serviceName	string								
id	22	name	ReadIsLicensedFailure	message	Error reading IsLicensed information for service: ${serviceName}	defaultHttpStatusCode	404		
serviceName	string								
id	23	name	ReadServiceStateFailure	message	Error reading Service State for service: ${serviceName}	defaultHttpStatusCode	404		
targetName	string								
id	24	name	RequiredTargetMissing	message	Required target not found! ${targetName}	defaultHttpStatusCode	404		
id	8	name	System						

Table 8: securitymgr.yml

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
user	string								
id	1	name	InvalidLogin	message	Login failed for ${user}	defaultHttpStatusCode	401		
id	2	name	InvalidToken	message	Validation of token failed	defaultHttpStatusCode	401	arguments	None
id	3	name	ConfigFailureAccesToSecMgr	message	Configuration Failure	internal acccess to server not possible	defaultHttpStatusCode	500	arguments
id	4	name	ApplicationLoginFailure	message	Configuration Failure	internal acccess to server not possible	defaultHttpStatusCode	401	arguments
id	5	name	AppLoginTokenCreatInvalidToken	message	No valid token for access of application credentials	defaultHttpStatusCode	401	arguments	None
id	6	name	AppLoginTokenCreatNoAdmin	message	Only admin users are allowed to access application credentials	defaultHttpStatusCode	401	arguments	None
appname	string								
id	7	name	AppLoginTokenCreatConflict	message	Application with same name (${appname})exists already	delete existing one first	defaultHttpStatusCode	400	
message	string								
id	8	name	AppLoginTokenCreatInternalProblem	message	Internal problem during creation of application credentials: ${message}	defaultHttpStatusCode	500		
id	9	name	AppLoginAuthRequestError	message	Application login requires base authentication	defaultHttpStatusCode	400	arguments	None
appname	string								
id	10	name	AppLoginAuthNoCredentials	message	No credentials available for the application : ${appname}	defaultHttpStatusCode	400		
typeError	string								

Table 8: securitymgr.yml (continued)

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
id	11	name	AppLoginAuthCertMissmatch	message	Provided password does not match to stored credentials : ${ typeError}	defaultHttpStatusCode	400		
message	string								
id	12	name	AppLoginAuthCertError	message	Failed to read credentials from database : ${message}	defaultHttpStatusCode	500		
id	9	name	SecurityMgr						

Table 9: servicemgr.yml

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
id	1	name	NEMaintenanceModeNotExist	message	NE Maintenance Mode does not exist	defaultHttpStatusCode	404		
id	2	name	SLAIsReferencedByService	message	Cannot perform this operation, SLA is referenceed by at least one Service	defaultHttpStatusCode	400		
id	3	name	CustomerIsReferencedByService	message	Cannot perform this operation, Customer is referenceed by at least one Service	defaultHttpStatusCode	400		
id	10	name	ServiceMgr						

Table 10: dpm.yml

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
id	1	name	RestMappingFullDeleteRequestForbid-den	message	It is not allowed to make a full deletion of all mapping data!	defaultHttpStatusCode	400		
id	2	name	RestMappingNoResourceDefined	message	No resource was found under the provided data!	defaultHttpStatusCode	404		
id	3	name	RestMappingCEResourceNotDefined	message	Crypto Engine Location was not defined for the Mapping Creation!	defaultHttpStatusCode	400		
id	4	name	RestMappingInconsistentCEDataOn-Request	message	Crypto Engine Location was inconsistently defined for the Mapping Creation!	defaultHttpStatusCode	400		
id	5	name	RestMappingEPAResourceNotDefined	message	No central card slot/port was defined for the Mapping Creation!	defaultHttpStatusCode	400		
id	6	name	MappingDBPersistError	message	It was not possible to write mapping information to the database!	defaultHttpStatusCode	500		
id	7	name	MappingDBDeleteError	message	It was not possible to delete mapping information from the database!	defaultHttpStatusCode	500		
id	8	name	DPMNotActive	message	Enp Security Module is not Active!	defaultHttpStatusCode	503		
neid	long								
slot	short								
port	short								
id	9	name	CTPNotFound	message	Unable to find requested Crypto Termination Point: [Ne: ${neid}	Slot:${slot}	Port:${port}]	defaultHttpStatusCode	404
dataname	string								
id	10	name	ErrorAccessingDB	message	Problem accessing ${dataname} data in database!	defaultHttpStatusCode	500		
ceid	string								
id	11	name	CENotFoundOnCache	message	Unable to find Crypto Engine ${ceid}	defaultHttpStatusCode	404		
ceid	string								
id	12	name	CENotFoundOnDirac	message	Unable to find Crypto Engine ${ceid} on Security Key Manager	defaultHttpStatusCode	404		
ceid	string								
id	13	name	CEIsOutOfSync	message	Crypto Engine ${ceid} is Out of Sync!	defaultHttpStatusCode	424		

Table 10: dpm.yml (continued)

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
neid	long								
slot	short								
port	short								
id	14	name	CTPIsOutOfSync	message	Crypto Termination Point [Ne: ${neid}	Slot:${slot}	Port:${port}] is Out of Sync!	defaultHttpStatusCode	424
neid	long								
slot	short								
port	short								
id	15	name	CTPNotCryptoCapable	message	Crypto Termination Point [Ne: ${neid}	Slot:${slot}	Port:${port}] is Not Crypto Capable	defaultHttpStatusCode	404
id	16	name	LockTimeout	message	Failed to lock resources for task	defaultHttpStatusCode	423		
id	17	name	SendRequestFailure	message	Failed to Send Request Towards Security Key Manager	defaultHttpStatusCode	400		
commsta-tus	string								
id	18	name	DiracCommunicationIssue	message	Communication Issue detected bewtween NEM and Key Manager: ${commstatus}	diefaultHttpStatusCode	400		
code	int								
id	19	name	UnexpectedHttpStatusCodeOnDira-cResponse	message	Unexpected HTTP return code (${code}) received from Security Key Manager	defaultHttpStatusCode	500		
id	20	name	UnexpectedOrInvalidJsonData	message	Received Data is not the expected json	defaultHttpStatusCode	422		
ceid	string								
id	21	name	CENotManageable	message	Crypto Engine ${ceid} is currently Not Manageable	defaultHttpStatusCode	408		
ceid	string								
id	22	name	CEUnexpected	message	Unexpected error while communicating with Crypto Engine ${ceid}	defaultHttpStatusCode	500		
ceid	string								
segmentid	long								
id	23	name	CEMissingDataOnResponse	message	Received Response does not contains data for Crypto Configuration on ${ceid} ${segmentid}	defaultHttpStatusCode	404		
id	24	name	DiracOperationFailure	message	Operation towards Security Key Manager was not performed correctly	defaultHttpStatusCode	409		
ceid	string								
id	25	name	DCIResetFailure	message	It was not possible to reset ConfigId on Crypto Engine ${ceid}	defaultHttpStatusCode	409		
cc	string								
id	26	name	MissingDataOnCryptoConfiguration	message	There is missing data on the defined crypto configuration: ${cc}	defaultHttpStatusCode	400		
id	27	name	FailedToStartTask	message	FAILED to start Crypto Configurations task	defaultHttpStatusCode	400		
response	string								
id	28	name	InvalidResponse	message	Invalid response: ${response}	defaultHttpStatusCode	400		
id	29	name	FailedToDeploy	message	Failed to deploy Operation!	defaultHttpStatusCode	400		
ceid	string								

Table 10: dpm.yml (continued)

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
id	30	name	GetLeecErrorDueToNotCommunica-tion	message	Synchronization mechanism between NEM and Key Manager failed because there is not communication towards CE ${ceid}	defaultHttpStatusCode	500		
code	int								
error	string								
description	string								
id	31	name	DiracServerError	message	Key Manager Server reported error ${code}: ${error} ${description}	defaultHttpStatusCode	500		
code	int								
data	string								
id	32	name	UnexpectedHttpMessage	message	Server Response was not expected. Code: ${code}	Data: ${data}	defaultHttpStatus-Code	500	
explanation	string								
id	33	name	ConflictingData	message	Conflicting data detected: ${explanation}	defaultHttpStatusCode	409		
id	11	name	DPM						

Table 11: mainstandby.yml

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
partnerServer	string								
id	1	name	DuplicatePartnerServer	message	The Partner Server (${partnerServer}) has already been added!	defaultHttpStatusCode	500		
partnerServer	string								
id	2	name	PartnerServerNotFound	message	The Partner Server (${partnerServer}) could not been found!	defaultHttpStatusCode	500		
id	3	name	DatabaseOperationRunning	message	There is already a database operation running!	defaultHttpStatusCode	500		
location	string								
id	4	name	BackupLocationNotFound	message	The folder for backup location (${location}) could not been found!	defaultHttpStatusCode	500		
location	string								
id	5	name	BackupFolderNotCreated	message	Unable to create folder for backup location (${location})!	defaultHttpStatusCode	500		
filename	string								
location	string								
id	6	name	BackupDoesNotExist	message	The backup (${filename}) does not exist in location (${location})!	defaultHttpStatusCode	500		
filename	string								
location	string								
id	7	name	BackupNotDeleted	message	Unable to delete backup (${filename}) in location (${location}) !	defaultHttpStatusCode	500		
servername	string								
id	8	name	UnpairOnRemoteFailed	message	Unpair on remote server (${servername}) not possible !	defaultHttpStatusCode	500		
id	9	name	InstallLicenseFailed	message	Unable to install License on server!	defaultHttpStatusCode	500		
validationMes-sage	string								
id	10	name	ValidateLicenseFailed	message	The License is not valid!\n\n${validationMessage}	defaultHttpStatusCode	500		

Table 11: mainstandby.yml (continued)

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
filename	string								
id	11	name	BackupFileAlreadyExists	message	The backup (${filename}) already exists !	defaultHttpStatusCode	500		
filename	string								
id	12	name	BackupNotStored	message	Unable to store backup file (${filename}) !	defaultHttpStatusCode	500		
servername	string								
id	13	name	SetServerStateFailed	message	Unable to set main/standby on server '${servername}' !	defaultHttpStatusCode	500		
id	12	name	MainStandby						

Table 12: als.yml

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
unemNeId	int								
id	1	name	NeMappingFailed	message	no name for id '(${unemNeId})' found!	defaultHttpStatusCode	500		
id	13	name	ALS						

Table 13: np.yml

Type	Format	Type	Value	Type	Value	Type	Value	Type	Value
id	1	name	ApplConflictDetected	message	Application conflict detected. Please syncronize your changes with the other users	defaultHttpStatusCode	400	arguments	None
resource	string								
AppName	string								
user	string								
host	string								
id	2	name	ConflictingResource	message	Conflict resource: ${resource}. In use in Application ${AppName} by user ${user} on host ${host}	defaultHttpStatusCode	400		
id	14	name	Networkmanager						

15 Bibliography/Referenced Documents

15.1 Product Manuals

Ref.	Document
[1KHW002412]	FOXMAN-UN Help - User Manual
[1KHW028779]	Upgrading FOXMAN-UN and FOX61x - Application Note
[1KHW002416]	FOXMAN-UN Networking Package - User Manual
[1KHW002427]	FOXMAN-UN Northbound Interface - User Manual
[1KHW002426]	FOXMAN-UN Installation - User Manual
[1KHW002499]	FOXMAN-UN Release Note
[1KHW029018]	SNMP Southbound Interface - Application Note
[1KHW029012]	FOXMAN-UN in Firewalled Environment - Application Note
[1KHW029190]	FOXMAN-UN Integration with Active Directory (AD)
[1KHW029196]	FOXMAN-UN Metrics Database
[1KHW029097]	FOXMAN-UN Main/Standby Solution
[1KHW029166]	FOXMAN-UN Logging
[1KHW029203]	FOXMAN-UN HLM SNMPv3 Integration
[1MRC000084]	FOXMAN-UN Web UI
[1KHW002690]	ALS Configurator for FOXMAN-UN - User Manual
[1KHW002399]	ALS for FOXMAN-UN - Installation Manual

15.2 Document History

Table 14: Document History

Document ID	FOX-MAN-UN Release	Rev	Date	Changes since previous version
1KHW002414	R18	A	Jul 2025	Updated version for R18. - Added 7.5.4 "Creation without User Home". - Updated 11.4.2 "nem.conf".
1KHW002414	R17A	A	Sep 2024	Version published for R17A. - Added “NEM login banner” to title and text in section 11.4.25 legalMessages.json (NEM login banner) (on page 79). - Updated commands and command options for edb-create, edbbackup, edbrestore, install script, and more. - Updated section 7.3 Installation of NE/Unit SW and Custom Parameter Sets (on page 32). - Various editorial changes and updates to match current FOXMAN-UN version.
1KHW002414	R16B	A	July 2023	Version published for R16B. - Updated various configuration files and parameters in section 11.4 FOXMAN-UN Configuration Files (on page 60). - Added new customization for NEM login legal message in section 11.4.25 legalMessages.json (NEM login banner) (on page 79)

Table 14: Document History (continued)

Document ID	FOX-MAN-UN Release	Rev	Date	Changes since previous version
1KHW002414	R16A	A	2022-09-09	Version published for R16A. - Added sectionsection 14 Error Codes (on page 104); - Modified step 4 in section 7.10 Removing the FOX-MAN-UN Software (on page 40); - Modified the note in section 8.1 Introduction (on page 42); - Updated the lists in section 9.2 FOXMAN-UN Directories (on page 45); - Modified the option of NP resync listed in section 10.3.3 Start/Stop Services (on page 55); - Updated the list of parameters for section 11.4.2 nem.conf (on page 61); - Added 3 parameters in section 11.4.10 np.conf (on page 67); - Minor editorial changes.
1KHW002414	R16A	B	2022-12-08	Updated version for R16A; - Added reference to application note [1KHW029203] “FOXMAN-UN HLM SNMPv3 Integration” in section 11.4.12 snmpagentd.conf (on page 68). - Added document history; - Minor editorial changes.
1KHW002414	R16B	A	2023-05-09	Update for R16B: - Added note in parameter description of “ae_t3_e-mail_address” in section 11.4.6 alarming.conf (on page 64). - Updated options of edbbackup and edbrestore commands in section 11.5.5 Manual Backup (on page 84) and section 11.6.4 Local Restore via Command Line (on page 87). - Additional parameters added to 11.4.2 "nem.conf".

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