USER MANUAL

FOXMAN-UN
Installation Guideline

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Contents

1   Preface

1.1   Symbols and Notations

This User Manual uses the following symbols:

i	**Please note:**
	Shows significant information.
	→ Possible actions are given.

1.2   Other relevant Documents

The present document refers to the following important documents that need to be available to the reader to be able to follow some of the described steps:

[1KHW002499]   Release Note "FOXMAN-UN"

[1KHW002414]   User Manual "FOXMAN-UN under Linux"

[1KHW002089]   User manual "FOXMAN-UN Client for Windows®"

[1KHW029097]   User manual "FOXMAN-UN Main/Standby Solution"

[1KHW029089]   Application note "FOXMAN-UN Main/Standby Solution"

[1KHW029012]   Application note "FOXMAN-UN in Firewalled Environment"

[1KHW029081]   Installation instruction "DIRAC Server Installation"

[1KHW029191]   Application note "Client-Server setup in a secure network"

[1KHW029190]   Application note "Integration with Active Directory (AD)"

[1KHW029093]   Application note "FreeRADIUS Integration

[1MRC000126]   License Request Form Instructions

2   Purpose and Scope

This User Manual describes the procedure for installing an initial working FOXMAN-UN R18 system. For operational aspects refer to the manual "FOXMAN-UN under Linux - User Manual – Planning and Operation" [1KHW002414].

The present document does not include information related to the following subjects:

•   Installation of a virtual environment, e.g., KVM, VMware, for subsequent installation of FOX-MAN-UN on the VM;

•   FOXMAN-UN in High Availability and FOXMAN-UN in Large Scale Configuration.

For a FOXMAN-UN in a warm standby setup, refer to the user manual "FOXMAN-UN Main/Standby Solution [1KHW029097]".

2.1   General Information

| i |

Please note:
You must have "root" permissions to install FOXMAN-UN.

2.2   HW and OS Requirements

| i |

Please note:
The FOXMAN-UN system is verified using a recommended platform. Failure to adopt the recommendations can lead to system and application failure problems or complete failure.

→   Only start with the FOXMAN-UN installation after the server(s) / workstation(s) / PC(s) has been or have been set up with the required operating system and contain all the required patches.

| i |

Please note:
For recommendations of suitable servers/workstations refer to the section "HW and OS Requirements" in the FOXMAN-UN Release Note.

| i |

Please note:
This manual only covers the FOXMAN-UN installation on Linux. For the installation of the FOXMAN-UN R18 Client for Windows® refer to "FOXMAN-UN client for Windows - User Manual" [1KHW002089].

2.3   Pre-Installation Checklist

Step 1   Read the FOXMAN-UN R18 Release Note.

In particular check the section "HW and OS Requirements - Linux Platform". Make sure you have the appropriate HW and OS available and tested before starting with the installation.

Step 2	Determine the component for NEM Software that you want to install on each workstation: A. Core + UI (also determine required Add-ons) B. Core only (also determine required Add-ons) C. UI only You may also consider the use of server redundancy by applying the Main/Standby feature, which requires a further FOXMAN-UN server installation. For details refer to [1KHW029097] User manual "FOXMAN-UN Main/Standby Solution" and [1KHW029089] Application note "FOXMAN-UN Main/Standby Solution".
Step 3	Check the LINUX version of your machine via the command: `cat /etc/redhat-release` FOXMAN-UN was tested and is supported only under the Red Hat Enterprise Linux versions as detailed in the FOXMAN-UN R18 Release Note, section "Linux Operating System".

Step 4	**On the HW or VM determined for installation of FOXMAN-UN**, run the script "systemid" provided with the FOXMAN-UN installation package to determine the workstation machine ID which is required for ordering the license key.
	
	Note:
	
	The installation package needs to be extracted to access the script. Depending on the folder you use for extraction, you might need to be root or have sudo permissions for extracting and/or executing "systemid". The "systemid" script is stored in the extracted folder named "NEM", e.g.,
	
	`<FOXMAN-UN-18.0.0-0.el9>/NEM/systemid`
	
	Note:
	
	If you are using or planning to use a second Ethernet interface, "systemid" must be run on the HW or VM determined for installation of FOXMAN-UN specifying the primary interface, e.g.,
	
	`<FOXMAN-UN-18.0.0-0.el9>/NEM/systemid -i ens3`
	
	For RHEL 9 the interface is named "ens3" or similar per default.
	
	If you do not know the name of the Ethernet interface execute one of the commands "`nmcli`" or "`ip address`" to see the available interfaces.
	
	Write down or save the workstation machine ID. Fill in a license key form for each workstation and obtain the license key(s) from Hitachi Energy. This form is supplied by Hitachi Energy sales upon ordering.
	
	Note:
	
	In the installed FOXMAN-UN the script will be available as
	
	`/opt/nem/bin/private/systemid`
	
	As a Linux user you must be member of the "nem" group to execute the script.

Step 5	Make sure that disk partitions of sufficient size for the installation of the FOXMAN-UN system have been created (see section 4.1 Pre-installation Worksheet (on page 8) and FOXMAN-UN R18 release note). The default, mandatory FOXMAN-UN installation home directory is: `/opt/nem.` This directory will be created automatically during the installation process.
Step 6	Prepare a suitable Linux account for the FOXMAN-UN NEM security administrator. Observe the common rules on creation and safekeeping of the password. The NEM security administrator username must be entered during the installation process. This user will be granted two roles during the installation, the NEM Linux administrator and the RBAC default administrator.

3 Installation Process Overview

Step 1   Determine the server hardware requirements: CPU/RAM/Disk Space. See 4.1 "Pre-installation Worksheet" for the main server and, in case of redundancy, also for the standby server. Also refer to the Release Note of the FOXMAN-UN version to be installed [1KHW002499 - R18], section "Server Hardware Platform and Span of Control".

Step 2   Order the FOXMAN-UN License Key(s). See 8.1 "License Key Ordering".

Step 3   Install the RedHat Enterprise Linux 9.6, 64 bit, depending on your requirements,

    a   either with the "Server with GUI" option

    b   or with the "Server only" option (i.e., without GUI).

Note:

If you need ALS to be installed with FOXMAN-UN, or if you will install FOXMAN-UN with the components "Core + UI" or "UI only", the "Server with GUI" RHEL 9.6 OS installation option is mandatory.

If installing with GUI, choose the default settings for "Desktop". See 4.2 "Installing RHEL 9 OS".

Select the default OS language to be LANG=en_US.UTF-8.

When installing server and/or client on an OS other than en (English), add the following line to the server file "/etc/locale.conf" at the end of the installation:

`LC_NUMERIC=en_US.UTF-8`

Step 4   If you need server redundancy (warm standby), install the RedHat Enterprise Linux 9.6, 64 bit, on a second server.

Step 5   Install the additional RHEL 9 RPM packages: these are some mandatory RHEL 9 RPM files required by FOXMAN-UN operation and maintenance. See 5 "Installing RPM Packages".

Step 6   Perform the system configuration. See 6 "System Configurations".

Step 7   Install the FOXMAN-UN R18 software (including Service Packs if available). See 7.1 "FOXMAN-UN Installation Procedure" on the main server machine and, in case of redundancy, also on the standby server.

During installation, enter the username of the NEM security administrator which should be a local Linux user.

Step 8   Install the FOXMAN-UN License Key(s). See 7.1 "FOXMAN-UN Installation Procedure" step 9. and 8 "FOXMAN-UN License Key Ordering, Installation, and Reporting".

Step 9   Install the FOXMAN-UN R18 Add-ons as available and required. See 7.2 "FOXMAN-UN Add-on Installation".

Step 10   Install additional software packages that are not included in this installation package. See 7.3 "FOXMAN-UN User Authentication".

Step 11   Commission the FOXMAN-UN server / workstation.

4   RHEL 9 Installation

Note: This section does not cover the RHEL OS installation in detail.

4.1   Pre-installation Worksheet

Write down or keep ready your system's information as outlined in the table below. The information will assist you in completing the installation. The sample values given in the table below will not be appropriate for your setup.

Item	Setting (sample)
Hostname (lowercase)	my-nem-server
root password	my_root_password
IP address/subnet ('eth0' or similar)	172.21.22.18 / 255.255.255.0
Gateway	172.21.22.1
Primary DNS	172.23.18.10
Secondary DNS	172.31.34.10
Disk partitioning	see FOXMAN-UN R18 release note

Note: If you are using DHCP, enter the hostname and IP address of your nem-server in the DHCP settings of your DHCP server before installing RHEL 9 on your machine. In this case you do not require the IP address for the RHEL 9 installation.

Note: For required disk space, CPU size, and memory (RAM) size, see details in the FOXMAN-UN R18 release note, section "Hardware and OS Requirements".

Note: If you are using DNS, enter the hostname and IP address of your NEM server in the DNS settings of your DNS server before installing RHEL 9 on your machine.

4.2   Installing RHEL 9 OS

The installation of the RHEL 9.6 OS should follow the installation guidance provided by the installer. However, the following details shall be considered:

*   For FOXMAN-UN R18 installation our requirement for the **OS is RHEL 9.6 full ISO**
    −   either with the "Server with GUI" option,
    −   or with the "Server only" option,

    depending on your requirements.

> [i] **Please note:**
> If you need ALS to be installed with FOXMAN-UN, or if you will install FOXMAN-UN with the components "Core + UI" or "UI only", the "Server with GUI" RHEL 9.6 OS installation option is mandatory.

*   Configure the partitioning of the local disk if required (mandatory if hardening is required); recommended minimum space is defined in the FOXMAN-UN R18 Release Note [1KHW002499], section "**Server Hardware Platform and Span of Control**". Required minimum partitioning for hardening is defined in the application note "FOXMAN-UN R18 RHEL9 Hardened Installation" [1KHW029185].
*   After the standard Operating System (RHEL 9.6) installation, we recommend to connect to the Internet, register the installation with a valid subscription and execute
    ```
    # subscription-manager release --set=9.6
    # dnf update
    ```
*   Because the Zip utility is not available in RHEL 9.6 by default, install it with this command:
    ```
    $ sudo dnf install zip
    ```

4.3 CIS Profile

Applying an adapted CIS profile is recommended. For details on an adapted CIS profile please refer to the specific application note related to that subject. The "FOXMAN-UN R18 RHEL9 Hardened Installation" [1KHW029185] application note will be made available for download on the Hitachi Energy Publisher for that purpose.

4.4 Installations requiring UCST / FOX51x support

The UCST requires a CORBA over TCP/IP communication between the client and the core. To enable this communication the symbolic links in the /opt/nem/etc/systemd folder must be changed to point to the tcp/ip configuration.

You must have root permissions for executing all of the following commands.

- Default setup (CORBA over ssl)
```
nem-systemd.env -> /opt/nem/etc/systemd/nem-systemd.env.ssl
nem-systemd.env.ssl
nem-systemd.env.tcp

nem-systemd-names.env -> /opt/nem/etc/systemd/nem-systemd-names.env.ssl
nem-systemd-names.env.ssl
nem-systemd-names.env.tcp

nem-systemd-event.env -> /opt/nem/etc/systemd/nem-systemd-event.env.ssl
nem-systemd-event.env.ssl
nem-systemd-event.env.tcp
```

- Support UCST/FOX51x setup (CORBA over TCP/IP)
```
nem-systemd.env -> /opt/nem/etc/systemd/nem-systemd.env.tcp
nem-systemd.env.ssl
nem-systemd.env.tcp

nem-systemd-names.env -> /opt/nem/etc/systemd/nem-systemd-names.env.tcp
nem-systemd-names.env.ssl
nem-systemd-names.env.tcp

nem-systemd-event.env -> /opt/nem/etc/systemd/nem-systemd-event.env.tcp
nem-systemd-event.env.ssl
nem-systemd-event.env.tcp
```

To set up CORBA over TCP execute the installation script as "root" user with -t option, e.g.,

```
# /tmp/LINUX/NEM/install.sh -t
```

> **i** **Please note:**
> If CORBA over TCP/IP communications is enabled the secure network setup as described in the application note [1KHW029191] Application note "Client-Server setup in a secure network" is required.

To change the CORBA setup after FOXMAN-UN installation, execute the /opt/nem/bin/private/ reconfigure_nem script with option -c.

To return to the default settings:

```
# /opt/nem/bin/private/reconfigure_nem -c SSL
```

To setup CORBA over TCP:

```
# /opt/nem/bin/private/reconfigure_nem -c TCP
```

5 Installing RPM Packages

This section provides step-by-step procedures on how to install additional packages and pre-pare for the FOXMAN-UN installation.

It describes YUM (Yellow dog Updater Modified) processes, which will install the mandatory as well as their dependent packages.

> **Please note:**
> Some RPM packages, including their dependent packages, are available in the RedHat Enterprise Linux 9.6 Server 64 bit Edition Installation DVD.

> **Please note:**
> After the standard Operating System (RHEL 9.6) installation, the FOXMAN-UN will require additional packages to be installed:
>
> • Packages which are part of the standard RHEL 9.6 distribution repository;
> • Packages which are part of the FOXMAN-UN installation DVD / archive, stored under "3rd party RPMS Core" and "3rd party RPMS UI".
>
> These packages will be installed during the FOXMAN-UN installation procedure, which will be started from the filesystem extracted from the FOXMAN-UN installer package.
>
> → It is therefore required to mount the RHEL 9.6 DVD as a local repository – as described in section "5.1 "Mounting DVD as Local Repository"" – to succeed with the FOXMAN-UN installation.

5.1 Mounting DVD as Local Repository

Steps	Procedures
1.	Insert the RHEL 9.6 installation DVD to your computer's DVD drive.
2.	Switch user to the "root" account: `$ su - root`

3.	Create a mount point for the repository:
	`# mkdir –p <mount point>`
	`e.g.`
	`mkdir –p /mnt/rhel9`

4.	Determine the device name of the DVD drive: `# cat /proc/sys/dev/cdrom/info` **Note**: the first CD or DVD drive on the system is typically named sr0

5.	Mount the DVD on the mount point that you have just created:
	`# mount –r –t iso9660 /dev/sr0 <mount point>`
	`e.g.`
	`# mount –r –t iso9660 /dev/sr0 /mnt/rhel9`
	
	Where:
	`iso9660: for the ISO image`
	`sr0: the device name`
	`/mnt/rhel9: mount point`

5.2   Installing RPM Packages using YUM

YUM is capable of tracking the dependencies of a package and installing them prior to installing the package that the user wanted to install. This simplifies the whole process as you only need to know the name of the package that you want to install.

This section describes how to set up YUM repository using DVD.

Using locally mounted RHEL 9.6 Installation DVD

Steps	Procedures
1.	Mount the RHEL 9.6 DVD as per 5.1 "Mounting DVD as Local Repository" instructions. Take note of the DVD mount point, e.g., `/mnt/rhel9`
2.	Change to the yum.repos.d directory: `# cd /etc/yum.repos.d` **Note:** The etc/yum.repos.d is the default directory for the repos as defined in /etc/yum.conf.
3.	Create a new repo file. The name of the file is not important, as long as it ends in .repo, e.g., use dvd.repo: `# vi dvd.repo` Add the lines as shown in the sample below (`/mnt/rhel9` is the mount point) for the two repositories required:

```
[InstallMedia-BaseOS]
name=RHEL9-BaseOS
baseurl=file:///mnt/rhel9/BaseOS/
enabled=1
gpgcheck=1
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-redhat-release
metadata_expire=-1

[InstallMedia-AppStream]
name=RHEL9-AppStream
baseurl=file:///mnt/rhel9/AppStream/
enabled=1
gpgcheck=1
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-redhat-release
metadata_expire=-1
```

Save and exit the file.

Note:

`[InstallMedia-BaseOS], [InstallMedia-AppStream]`

are the names of the repositories.

`baseurl`

tells the yum where to download the packages from (software repo). It is the path to the mountpoint that you have created previously suffixed with /Server.

```
enabled=1
```
the repository is enabled.
```
gpgcheck=1
```
the GPG signatures should be used to check the downloaded packages.
```
gpgkey
```
location of the GPG key.

To obtain the path or location:

find /etc -name '*RPM-GPG-KEY*'

4.   Import the key:

rpm --import /etc/pki/rpm-gpg/*

5.   Check the repo installation

yum repolist

This will list the repos with repo id and the related repo name. The list should not be empty and should at least include the AppStream and BaseOS repos.

You should now be ready to prepare FOXMAN-UN installation. Continue with section 6 "System Configurations".

i	**Please note:** If FOXMAN-UN installation in 7.1 "FOXMAN-UN Installation Procedure" fails it might be helpful to temporarily move the automatically installed repo files to another directory, leaving dvd.repo only in yum.repos.d before installing FOX-MAN-UN.

6   System Configurations

Steps	Procedures

1.   Check the active adapters in your system:

```
# nmcli
```

2.   Configure the networking via NetworkManager:

Red Hat Enterprise Linux provides administrators different options to configure Ethernet connections. Refer to "Red Hat Enterprise Linux 9 Configuring and managing" networking document to choose and use the proper one.

I.e., you provide a static IP address for the FOXMAN-UN server.

Sample configurations:

```
Address: 172.21.22.18
Netmask: 255.255.255.0
Gateway: 172.21.22.1
DNS servers: 172.23.18.10
```

Select Apply > Close

3.   Modify the file /etc/hosts

```
# vi /etc/hosts
```

Or edit the file /etc/hosts in an editor like gedit.

Sample entry:

```
172.21.22.18 my-nem-server
127.0.0.1 localhost.localdomain localhost
```

Disable this line:

```
#::1  localhost6.localdomain6 localhost6
```

Where:

172.21.22.18 is the IPv4 address of the FOXMAN-UN server in this sample;

my-nem-server is the hostname of the FOXMAN-UN server in this sample.

Save and exit the file.

4.   It is strongly recommended to keep the firewall enabled. If however required, you may disable the firewall by running the following commands as "root":

```
# systemctl stop firewalld
# systemctl disable firewalld
```

To enable and start it again:

```
# systemctl enable firewalld
# systemctl start firewalld
```

If you run your machine with firewall, please follow the instructions given in the application note "FOXMAN-UN in Firewalled Environment [1KHW029012]" included in the FOXMAN-UN documentation.

5.   Verify that SELinux is enabled:

```
# vi /etc/selinux/config
```

Set the parameters to (recommended):

```
SELINUX=enforcing
SELINUXTYPE=targeted
```

Save the file and exit from the editor.

6. Check the network connection by executing:

```
$ ping <gateway ip>
$ ping <dns server ip>
```

You can stop the ping command by entering <CTRL-C>.

Sample commands:

```
$ ping 172.21.22.1
$ ping 172.23.18.10
```

The default minimum MTU size (minimum discovered path MTU) for Linux is 552. In case you need to modify the minimum MTU size in accordance with settings done for nodes to be managed (e.g., on the management VLAN interface or management PPP interface of a node of type FOX61x), the following changes are required:

Steps	Procedures
1.	Determine the minimum MTU size to be used in your management network. Note that 128 is the minimum that can be supported.
2.	Create the following file as user "root": `/etc/sysctl.d/nem_min_pmtu`

3.	Add the following line to the file /etc/sysctl.d/nem_min_pmtu
	`net.ipv4.route.min_pmtu = <min_mtu>`
	Where <min_mtu> is the minimum MTU size in integer format.
	Example for MTU size = 128:
	`net.ipv4.route.min_pmtu = 128`
	Save and exit the file.

4.	Reload the kernel settings by entering the following command as "root": `sysctl -p /etc/sysctl.d/nem_min_pmtu`

You should now be ready to execute FOXMAN-UN installation. Continue with section 7 "FOXMAN-UN Installation".

7   FOXMAN-UN Installation

7.1   FOXMAN-UN Installation Procedure

> **i**
>
> **Please note:**
> If any error occurs during installation, an error message will be issued in the shell where the installation script is executed.
> → Carefully observe any possible error messages to the stdout during installation.

Steps	Procedures (with sample screen contents)
1.	1 Copy the ZIP file (1MRC000087R1800_FOXMAN_R18_NEM.zip) to a folder in the file system with at least 10 GB free space, e.g. /opt/work/installer
	2 Unpack the archive, tar.gz or tar (FOXMAN-18.0.0-0.el9.tar.gz) to an appopriate folder.
	3 From the extracted file system, execute the installation script as "root" user, e.g., `# sudo /opt/work/installer/FOXMAN-18.0.0-0/NEM/install.sh`
2.	LICENSE AGREEMENT is displayed. Press the SPACE key several times until you are prompted with the following question: "Do you agree to the above license terms?" Enter 'y' to accept the License Agreement.
3.	The default NEM custom parameters are shown below (all IP addresses and server names shown here are examples):

```
#############################################
FOXMAN-UN Installation Utility
FOXMAN 18.0.0-0
#############################################

Host: nemsrv (10.21.17.153)

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]

    FOXMAN-UN Security Administrator: <username>


Enter the number 1-3 to select a component to install
Enter 's' to modify supported ESW
Enter 'a' to configure FOXMAN-UN Security Administrator

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

Enter :
```

4.   Enter 'a' to define the NEM security administrator (this step is mandatory):

```
# a
```

5.   Enter 's' if you need to modify the supported FOX61x ESW:

(optional)
```
# s
```

Modification of the default is required if you operate legacy ESW on at least one of your managed NEs.

6.   Enter 'h' if you want to modify the server name.

(optional)
```
# h
```

7.   Enter 'i' to install the selected components:

```
# i
```

The FOXMAN-UN application will now be installed. Carefully observe any possible error messages to the stdout during installation.

Once the installation is successfully concluded, it is confirmed by the output

```
FOXMAN-UN Installation done.
```

8.   At the end of the installation procedure, the current user will be automatically added to the NEM administrators and offered to log out and log back in for the change to take effect. In case such user chooses not to do so right away, they must still log out and log back in before doing further actions (such as, e.g., attempting to execute nemstart, i.e., to start the FOXMAN-UN services).

Do not execute nemstart before having concluded steps 9, 10, and 11 as far as applicable.

9.   Install a valid, regular FOXMAN-UN license key. This step must be done **before** installing add-ons since add-ons depend on a valid license key.

If you already have a valid FOXMAN-UN license file available in a file system accessible by the FOXMAN-UN server, execute the following bash command:

```
LICENSE_SOURCE_PATH=<path_and_filename_of_license_file>
```

Example:
```
LICENSE_SOURCE_PATH=/opt/work/HitachiEnergyLicense.xml
```

Then paste the following command as is to the same terminal (this assumes that nemsec is the username of the FOXMAN-UN security administrator. If you have chosen a different username in step 4 above, use that username instead of nemsec):

```
LICENSE_DESTINATION_PATH=/opt/nem/etc/license.xml
sudo cp -v $LICENSE_SOURCE_PATH $LICENSE_DESTINATION_PATH
sudo chmod 640 -v $LICENSE_DESTINATION_PATH
sudo chown -v nemadm:nem $LICENSE_DESTINATION_PATH
su - nemsec lslicense
```

For additional details see 8 "FOXMAN-UN License Key Ordering, Installation, and Reporting".

10.   If you need to install any of the add-ons provided in the package, proceed with 7.2 "FOXMAN-UN Add-on Installation".

11.   Restore the NEM database backup from the previous installation if applicable.

7.2   FOXMAN-UN Add-on Installation

> ⓘ   **Please note:**
>
> If any error occurs during add-on installation, an error message will be issued in the shell where the installation script is executed.
>
> → Carefully observe any possible error messages to the stdout during add-on installation.

After the FOXMAN-UN R18 Package Installation, it is possible to install additional components (add-ons) as required and available, As root, execute:

• ALS:

```
#<mount point>/NEM_ADDON/install_als_server.sh
```

• DIRAC:

```
#<mount point>/NEM_ADDON/install_dirac.sh
```

• Language Pack (if available):

```
#<mount point>/NEM_ADDON/install_lang_pack.sh
```

For complete installation and configuration guidance for Add-On components, please refer to their corresponding customer documentations. Usually these are included in the FOXMAN-UN documentation package. If not, they are available for download on Hitachi Energy Publisher (https://publisher.hitachienergy.com).

• ALS Server: ALS for FOXMAN-UN - Installation Manual [1KHW002399].

7.3   FOXMAN-UN User Authentication

FOXMAN-UN R18 is a 64 bit application and uses the PAM file /etc/pam.d/nem-auth for the configuration of user authentication. By default, user authentication is performed locally.

```
#%PAM-1.1
# NEM authenticaton

auth        include        system-auth
auth        required       pam_nologin.so
account     required       pam_unix.so
password    include        system-auth
session     include        system-auth
session     required       pam_limits.so
```

Alternative authentications to local authentication are supported and can be implemented by installing and configuring the additionally required PAM modules. The modules you will require depend on the user authentication protocol being used in your organization or in your network.

Red Hat is offering several options via SSSD (System Security Services Daemon) and its PAM module (pam_sss.so):

• Redhat IDM / Free IPA

• RHDS / 389-ds

• OpenLDAP or any other compliant LDAP server

• Microsoft Active Directory

Please refer to the document Red Hat Enterprise Linux 9 - "Configuring authentication and authorization in RHEL" for its configuration.

For Microsoft Active Directory via SSSD please also refer to [1KHW029190] Application note "Integration with Active Directory (AD)".

A furher authentication protocol supported is RADIUS; please refer to [1KHW029093] Application note "FreeRADIUS Integration" for its configuration.

If you are using the Monitoring Dashboard, we strongly recommend the change of the default password for the influxDB user as proposed in the application note "FOXMAN-UN Metrics Database" [1KHW029196] which is part of the user documentation.

Once you have successfully installed RHEL 9 and FOXMAN-UN and verified that FOXMAN-UN is running correctly (which may be possible in a later stage only; also see section 8 "FOXMAN-UN License Key Ordering, Installation, and Reporting"), the local repo is no longer required.

To unmount the local repo, execute:

Unmount locally mounted RHEL 9 Installation DVD:

Steps	Procedures
9.	After installing or upgrading software from the RHEL 9 DVD and other sources, and after installing FOXMAN-UN and all related packages, remove the repo file that you created: `# rm /opt/yum.repos.d/dvd.repo`
10.	Unmount and remove the RHEL 9 DVD from your drive. `# umount <mount point>` Example: umount /dev/sr0

7.4   IP Address or Hostname Change

If you have installed FOXMAN-UN already but need to change the IP address and/or the hostname of your core machine, proceed as described below.

For an IP address or hostname change,

Proceed as follows:

1. Perform a FOXMAN-UN database backup, e.g., by using the manual backup provided in the NEM Remote Admin Tool (RAT).
   • When using the manual backup from the NEM RAT the backup is stored in /opt/nem/var/backups/manual
   • The FOXMAN-UN license is stored in /opt/nem/etc
2. Copy the database backup, the FOXMAN-UN license and any other licenses you may have stored in a folder under /opt/nem to a safe place, preferably outside /opt/nem.
   • If you have an active Main/Standby redundancy in operation, a switch-over to the standby server may be considered now. For details see the documentation of the Main/Standby feature.
3. Change the IP address and/or hostname of the machine in accordance with the RHEL manual, as required.
4. Execute the script /opt/nem/bin/private/reconfigure_nem
   • This will show the following output and prompt:

```
##############################
##                          ##
##  NEM Reconfigure script   ##
##                          ##
##############################

  Logs file: /opt/nem/var/log/reconfigure_nem.log
  Debug logs: disabled
  ------------------------------
  Hostname: nemsrv.mycompany.net
  IP address: UNKNOWN (possible: 192.168.41.131/)
```

```
  Active ESW Support: LEGACY
  CORBA Interface: over TCP
  NEM Security Administrator: nemsec

Possible actions:
1) Reload NEM Config    3) Change CORBA Interface to SSL  5) NEM Security Administrator
2) Change ESW Support   4) Enable debug logs              6) Quit

Select: _
```

5. Select the action 1.

6. Restart FOXMAN-UN by executing /opt/nem/bin/nembasestop, followed by /opt/nem/bin/nemstart (the script will ask you whether you want to restart).

7. If required, reconfigure and re-activate the Main/Standby function via the NEM RAT. For details see the documentation of the Main/Standby feature.

End of instruction

7.5   User Creation and Role Assignment

7.5.1   User Creation

After successful installation of FOXMAN-UN R18 with a valid license applied, and after installing a FOXMAN-UN R18 Client for Windows® or for Linux, the first action proposed to an administrator is to set up Linux users that shall be allowed to log in to FOXMAN-UN R18 via the client application. If the planned users already exist in Linux environment with appropriate group assignment, they can be taken over for working with FOXMAN-UN R18 in a next step. Each of the users shall be planned with their role(s) as per roles listed in the document "FOXMAN-UN Role-based Access Control - Application Note" [1MRC000110].

Once the users are defined, start the FOXMAN-UN R18 services by executing the command "nemstart" (by an administrator) on the server. When the services are up and running (verified by the command "lsnem" executed by an administrator), the client login (launch "NEM Login" application on Windows®; execute command "nemlogin" on Linux) is executed.

In the NEM Login dialog, click the gear icon to open the Host Manager and add the FOXMAN-UN R18 server connection by entering hostname and/or IP address. When done, close the Host Manager and log in to the FOXMAN-UN R18 server as NEM Security Administrator using the username and password of the NEM Security Administrator defined when installing FOXMAN-UN R18.

7.5.2   Role Assignment

When connected, the NEM Desktop opens. From the NEM Desktop menu select either of the two following options to assign roles to users:

- **Application** > **NEM Configurator…**

  Change to the "Role Based Access Control" tab. Click on the "Users" node of the tree structure. In the right-hand side window click the "+ Add" button. Select a user and assign the role(s) and possible exceptions. Apply the assignment.

- **Application** > **Homepage…**

  From the application groups in the left panel select "Security", then start the "User and Role Management" application. In the "User" tab click on "+ Create" in the ribbon. Select a user and assign the role(s) and possible exceptions. In the summary, apply the assignment to create the user.

Repeat the procedure for every required new user.

Restart the FOXMAN-UN R18 services to make sure all permissions are applied correctly.

8 FOXMAN-UN License Key Ordering, Installation, and Reporting

Upon installation, the FOXMAN-UN activates a special key or "NOKEY", which enables the functions of FOXMAN-UN Basic Package for a grace period of 10 days. During this time, the appropriate FOXMAN-UN License key has to be obtained.

8.1 License Key Ordering

Fill in a FOXMAN-UN License Request form and obtain the FOXMAN-UN license key(s) from Hitachi Energy. This form is supplied by Hitachi Energy sales upon ordering or via downloading the instructions from the Hitachi Energy Publisher; search for document ID **1MRC000126**.

8.2 License Key Installation via Command Line

Steps	Procedures
1.	Rename the license file received from Hitachi Energy to license.xml.
2.	Copy the license.xml file to `/opt/nem/etc` directory.

3.	Restart the FOXMAN-UN if major changes in FOXMAN-UN licensed options apply, and therefore some newly required processes may not be automatically started. Enter the following commands in a terminal:
	```$ nemstop```
	```$ nemstart```
	and wait until the NEM start has been concluded.

8.3 License Key Installation via Remote Admin Tool (RAT)

Steps	Procedures

1.	Import the new license file received from Hitachi Energy:
	Open the NEM RAT from the GUI or start it via shell command, either
	```remoteadmintool -s <servername> -i <IPAddress> -u <username> -p <password>```
	or
	```remoteadmintool -s <servername> -i <IPAddress>```
	and enter username and password in the pop-up window.
	Once the NEM RAT dialog is opened, click on "License Information".

2.	To import the license file, click the "Upload NEM License File…" button, select the file and click "Open".

3.	Restart the FOXMAN-UN if major changes in FOXMAN-UN options apply, and therefore some newly required processes may not be automatically started. Enter the following commands in a terminal:
	```$ nemstop```
	```$ nemstart```
	and wait until the NEM start has been concluded.

8.4 License Reporting

In a terminal enter the following command:

```
$ lslicense
```

or

from the NEM RAT, click on the button "License Information".

9   Appendix

9.1   Commonly Used FOXMAN-UN Admin Commands

These are the commands that are of most use to a FOXMAN-UN administrator in gathering information about the system in order to troubleshoot and maintain it.

The following users are initially available for admin tasks:

\# : "root" user, created upon RHEL 9 installation

\$: NEM security administrator, defined during FOXMAN-UN installation

Note:

Some commands can only be performed as "root" user.

To open a Terminal Window on Gnome Desktop	`Applications > Utilities > Terminal`
To switch user: e.g., an administrator user to "root" user: "root" to an administrator user:	`$ su – root` `# su – nemsecadm`
To change the password of a user, including "root"	`passwd <username>`
To check the redhat-release	`cat /etc/redhat-release`

To obtain system ID	Run the \<systemid\> script available from the FOXMAN-UN installation DVD.
	`<dvd_mount_point>/systemid`
	If FOXMAN-UN is already installed:
	`/opt/nem/bin/private/systemid`
	If the Ethernet interface is not recognized make sure an entry
	`lic_if      enp0s25`
	or similar exists in the /opt/nem/etc/nem.conf file

To shut down and restart the server	`shutdown -r now`
To remove FOXMAN-UN software	`/opt/nem/share/uninstall/rmnem`
Note: You need to close the NEM Client before uninstalling FOXMAN-UN.	
Basic Networking:	
To show the IP address(es) and status of the Ethernet interfaces	`nmcli`
To check network connectivity	`ping <IPaddress or DNSname>`
To activate the configured network interfaces	`systemctl restart NetworkManager.service`
Remote connection via ssh	`ssh -X root@<host>` `ssh -X nemsecadm@<host>`

Disk Space Management:

To show system's disk space usage in "human-readable" form	`df -h`
To view the system's partitions and disk space usage in graphical format	`gnome-system-monitor` `Click the Filesystem menu`
To show the total disk usage of a directory	`du -hs`
To show the disk usage of each subdirectory	`du -h *`

FOXMAN-UN Basic Operation:

To stop the FOXMAN-UN components	`nemstop`
To restart the FOXMAN-UN components	`nemstart`
Check if the FOXMAN-UN components are active	`lsnem`
View FOXMAN-UN system information	`nemsysinfo`

File Management:

To search for a file	e.g to find pg_hba files: `find / -name *pg_hba*`

To view/edit file content	`vi </path/<filename>>`
	`e.g.:`
	`vi /opt/nem/etc/nem.conf`
	To enter edit mode, press "`i`"
	Alternatively, use gedit, e.g.
	`gedit /opt/nem/etc/nem.conf`

To leave vi edit mode	press "Esc" key
To save changes and exit vi mode	`:wq!`
To just save changes in vi mode	`:w!`
To exit vi mode without saving the changes:	`:q!`
To securely copy one or more files to or from a remote system	`sftp user@remote-host` (also allows usage of "heredocs" which are useful for redirecting multiple commands)
To create other FOXMAN-UN user account	`/opt/nem/bin/nemuser -a -u` `<login name>`
Create access right for the user (only for users with sufficient permissions)	`NEM Desktop > NEM Configurator >` `Role Based Access Control`

9.2   Document History

Table 1:   Document history

Document ID	Release	Revision	Date	Changes since previous version
1KHW002426	R18	A	Sept 2025	Updated for system release R18.
1KHW002426	R17A	A	Sept 2024	Updated for system release R17A.
1KHW002426	R16B	B	Oct 2023	Added env file to be considered in 4.4 "Installations requiring UCST / FOX51x support".
1KHW002426	R16B	A	Aug 2023	Updated for system release R16B.
1KHW002426	R16A	B	Dec 2022	Added 4.4 "Installations requiring UCST / FOX51x support".
1KHW002426	R16A	A	Jul 2022	Updated for system release R16A.
1KHW002426	R15B	B	Apr 2022	Corrected mount point folder names in section 5.1.
1KHW002426	R15B	A	Feb 2022	Updated for system release R15B.
1KHW002426	R15A	A	Jun 2021	Updated for system release R15A.
1KHW002426	R14B	A	Jan 2021	Updated for system release R14B.
1KHW002426	R14A	B	Aug 2020	Corrected Linux version to 7.7.
1KHW002426	R14A	A	Jul 2020	Updated for system release R14A.
1KHW002426	R11B	A	Sep 2019	Updated for system release R11B.
1KHW002426	R11A SP01	E	Mar 2019	Added information about changing min MTU size.
1KHW002426	R11A SP01	D	Feb 2019	Added information about installation on SELinux.
1KHW002426	R11A SP01	C	Dec 2018	Reworked for R11A SP01. Document type changed to User Manual.
1KHW002426	R11A	B	May 2018	Reworked for system release R11A.
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