

**iMaster NCE Web LCT
V100R024C00**

User Guide

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About This Document

Intended Audience

This document describes the overview of Web LCT, and how to install and use Web LCT. The service port description, terms, and specifications of Web LCT are also provided.

This document is intended for:

- Network planning engineers
- Installation engineers
- Commissioning engineers
- Application developers
- Data configuration engineers

Symbol Conventions

The symbols that may be found in this document are defined in the following table.

Symbol	Description
 DANGER	Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
 WARNING	Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
 CAUTION	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
 NOTICE	Indicates a potentially hazardous situation (for device or environment safety) which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.

Symbol	Description
 NOTE	Supplements the important information in the main text. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Command Format Conventions

The command conventions that may be found in this document are defined as follows.

Format	Description
Boldface	The keywords of a command line are in boldface .
<i>Italics</i>	Command parameters which must be replaced by specific values in an actual command, are in <i>italic</i> .
[]	The part enclosed in square brackets ([]) is optional during command configuration.
{ x y ... }	Two or more items are enclosed in braces ({ }) and separated by vertical bars (), from which you select one item.
[x y ...]	Two or more items are enclosed in square brackets ([]) and separated by vertical bars (), from which you select one item or no item.
{ x y ... } *	Optional items are grouped in braces and separated by vertical bars. A minimum of one or a maximum of all can be selected.
[x y ...] *	Two or more items are enclosed in square brackets ([]) and separated by vertical bars (), from which you select several items or no item.

GUI Conventions

The GUI conventions that may be found in this document are defined as follows.

Format	Description
Boldface	Buttons, menus, parameters, tabs, pages, and dialog titles are in boldface . For example, click OK .

Format	Description
>	Multi-level menus are in boldface and separated by greater-than signs (>). For example, choose File > Create > Folder .

Change History

Updates between document issues are cumulative. Therefore, the latest document issue contains all updates made in previous issues.

Issue	Date	Change Description
01	2024-06-30	This issue is the first official release.

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1 Installation Guide

This chapter describes how to install the Web LCT on the Windows operating systems.

[1.1 Preparing to Install](#)

This section describes the hardware and software required by the Web LCT and how to prepare them before installing the Web LCT.

[1.2 Installing Web LCT](#)

After all preparations are complete, install the Web LCT.

[1.3 \(Optional\) Configuring Script Parameters in the Web LCT Read and Write Permission Environment](#)

To keep the Web LCT secure, you can set the Web LCT installation directory to be read-only. To write data to subdirectories in the installation directory, users need to specify another directory

[1.4 Loading the SM Certificate](#)

For devices that support the SM certificate, import identity and trust certificates to the Web LCT.

[1.5 Uninstalling Web LCT](#)

Uninstall the Web LCT if you no longer need it.

1.1 Preparing to Install

This section describes the hardware and software required by the Web LCT and how to prepare them before installing the Web LCT.

1.1.1 Hardware and Software Requirements

The Web LCT runs properly only when hardware and software configurations meet requirements.

Hardware Requirements

Table 1-1 Hardware requirements of the Web LCT

Item	Recommended Requirement	Minimum Requirement
CPU	CPU-i5-520M, 2.4 GHz	Intel E2140 1.6GHz
Memory	4 GB	4 GB
Hard disk	160 GB	160 GB
Interface	10 or 100 Mbit/s Ethernet	10 or 100 Mbit/s Ethernet

Software Requirements

Table 1-2 Software requirements of the Web LCT

Item	Requirement
OS	- Windows 10 Professional (64-bit) - Windows 11 Professional (64-bit)
Browser	- Google Chrome 100 or later (32-bit or 64-bit) - Firefox 99.0 or later (32-bit or 64-bit) - Firefox 91.8 ESR or later (32-bit or 64-bit) - Microsoft Edge 100 or later (64-bit)

NOTE

The Web LCT can be installed only on the simplified Chinese and English editions of Windows OS.

In Windows, it is advisable to install the antivirus software and update it in time.

The Web LCT uses port 13443 by default. Ensure that these ports are not occupied by other programs or blocked by firewalls.

1.1.2 Preparing for Software Installation

Before installing the Web LCT, prepare the required software first.

Table 1-3 Software to be installed

Software Package	Software Requirements
Web LCT installation package	iMasterNCEWebLCT_ <i>version</i> _windows-x86-64.zip NOTE <i>version</i> in the installation software package indicates the version of Web LCT to be installed. Before downloading the Web LCT software package, determine the version of the software package.
Third-party JRE	bellsoft-jre11 <i>xxx+x</i> -windows-amd64-full.zip NOTE <i>jre11xxx+x</i> indicates the latest JRE 11 version.

To obtain the Web LCT software package, do as follows:

- For carriers:
 - Log in to <https://support.huawei.com/carrier>.
 - Search for "iMaster NCE Web LCT" on the **Software** tab page and go to [iMaster NCE Web LCT](#).
 - Click the desired version to download the Web LCT software package and signature file.

 NOTE

The name of the Web LCT software package is **iMasterNCEWebLCT_ *version* _windows-x86-64.zip**, and the name of the signature file is **iMasterNCEWebLCT_ *version* _windows-x86-64.zip.asc**. Click **pgp** in the **Manual Verification Signature File** column to download the corresponding signature file.

- After the software package is downloaded, verify the correctness of the downloaded software package. For details, see [1.1.3 Verifying Downloaded Software Packages by Using PGPVerify](#).
- For enterprises:
 - Log in to <https://support.huawei.com/enterprise>.
 - Search for "iMaster NCE Web LCT" on the **Technical Support** tab page and click the **Software Download** tab.
 - Click the desired version to download the Web LCT software package and signature file.

 NOTE

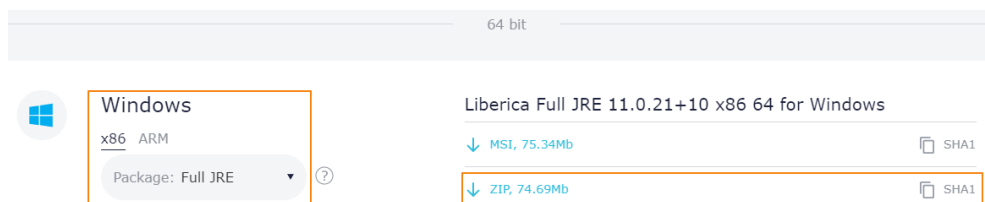
The name of the Web LCT software package is **iMasterNCEWebLCT_ *version* _windows-x86-64.zip**, and the name of the signature file is **iMasterNCEWebLCT_ *version* _windows-x86-64.zip.asc**. Click **pgp** in the **Manual Verification Signature File** column to download the corresponding signature file.

- After the software package is downloaded, verify the correctness of the downloaded software package. For details, see [1.1.3 Verifying Downloaded Software Packages by Using PGPVerify](#).

To obtain the Liberica Full JRE installation package, do as follows:

1. Access <https://www.bell-sw.com/pages/downloads/>.
2. Download the latest Liberica Full JRE installation package and obtain the corresponding SHA1 value. Click the **JDK 11 LTS** tab, find the Liberica Full JRE installation package shown in the following figure, and download it.

This section uses JRE 11 as an example. The downloaded software package is **Liberica Full JRE 11.0.21+10 x86 64 for Windows**.



NOTE

To ensure the integrity of the downloaded Liberica Full JRE installation package, verify the package by referring to "Verifying downloaded files" in *Installation guide* on the official website.

1.1.3 Verifying Downloaded Software Packages by Using PGPVerify

To ensure that the downloaded software packages are secure and workable, use PGPVerify to verify them.

Context

- Each software package corresponds to a signature file. They are placed in the same directory and released together.
- Signature files are in the .asc format and share names with software packages. If a package is **V100R021C10.zip**, its signature file will be **V100R021C10.zip.asc**.
- Obtain the PGPVerify tool that is used to verify the integrity of downloaded software packages and its public key file KEYS.
 - a. Download the PGPVerify tool and its public key file **KEYS**.
 - For carriers: visit <https://support.huawei.com/carrier/digitalSignatureAction> to download the **OpenPGP Signature Verification Guide** package and decompress it. Obtain the PGPVerify tool and its public key file **KEYS**.
 - For enterprises: visit [https://support.huawei.com/enterprise/en/tool/software-digital-signature-validation-tool-\(pgp-verify\)-http://support.huawei.com/enterprise/en/tool/software-digital-signature-validation-tool--pgp-verify--TL1000000054](https://support.huawei.com/enterprise/en/tool/software-digital-signature-validation-tool-(pgp-verify)-http://support.huawei.com/enterprise/en/tool/software-digital-signature-validation-tool--pgp-verify--TL1000000054), choose the latest version, and download the **VerificationTools.rar** package and its public key file **KEYS**.
 - b. For carriers, decompress the **VerificationTools.zip** package. For enterprises, decompress the **VerificationTools.rar** package. Obtain different versions of PGPVerify software for different OSs.
 - Windows: PGPVerify.exe (in the **Windows\x86\PGPVerify TOOL** directory)

- Linux: PGPVerify-x86_64.tar.gz (in the **linux\X86\bit64\PGPVerify TOOL** directory)
- c. On Linux OS, use SFTP as the **root** user to upload the obtained PGPVerify software and public key file **KEYS** to the server.
- d. Windows OS supports GUI-based verification and CLI-based verification.
- PGPVerify is a digital signature verification tool released by Huawei. Users can choose third-party verification tools as needed.

Tool	OS	Tool Description
PGPVerify	Windows, Solaris, Linux	An easy-to-use PGP verification tool released by Huawei.
GNU Privacy Guard for Windows (Gpg4Win)	Windows	An official Windows edition of GnuPG. Address: https://www.gpg4win.org/ Recommended version: 2.2.1
The GNU Privacy Guard (GnuPG)	Linux	A free and open-source GNU tool that implements the OpenPGP standards defined by RFC4880. This tool is pre-installed on most Linux OSs. Address: https://www.gnupg.org Recommended version: 2.0.9

Procedure

- GUI-based verification on Windows OS:
 - a. Double-click **PGPVerify.exe** to start PGPVerify tool.
 - b. Click **Select Public Key**, select the obtained public key file **KEYS**, and load it.
 - c. Click **Multiple Verify** and select the **D:\oss** directory to verify all files in it.

NOTE

- **D:\oss** indicates the directory that stores the signature file. Change it based on site requirements. The signature file and software package must be stored in the same directory.
- To verify a single file, click **Single Verify** and select the file to be verified.

The verification result may be one of the following:

- The green item indicates passed verification, that is, [PASS].
- The yellow item indicates unsupported verification, that is, [WARN]. For example, the signature file or software version does not exist.
- The red item indicates failed verification, that is, [FAIL].

If no "WARN" or "FAIL" result appears, the signature file is valid. All items are displayed in green.

NOTICE

If a version has multiple signature files to be verified, the version is secure only when the verification results of all files are "PASS". If any verification result is "WARN" or "FAIL", re-download the software package.

- CLI-based verification on Windows:

Run the following command to verify the signature file:

```
> "C:\PGPVerify.exe" -k "C:\KEYS" -d "D:\oss"
```

 NOTE

- Assume that the signature file and software package are stored in the **D:\oss** and that the PGPVerify tool and the **KEYS** file are stored in **C:** directory.
- To verify a single file, run the **C:\PGPVerify.exe" -k "C:\KEYS" -f "D:\oss\V100R019C00.zip.asc** command.

Information similar to the following is displayed:

```
[INFO]:Filter file in directory, please wait...
[WARN]:Can't find signature file, signed file position: D:\oss\V100R019C00.zip.
[WARN]:Can't find signed file, signature file position: D:\oss\V100R019C00.zip.asc.
[FAIL]:Invalid Signature. File path: D:\oss\V100R019C00.zip.
[PASS]:Good Signature. File path: D:\oss\V100R019C00.zip, Public key fingerprint: B1000AC3
8C41525A 19BDC087 99AD81DF 27A74824
[INFO]: Verify Complete.
```

 NOTE

In the preceding characters, the bold Rivest-Shamir-Adleman (RSA) key ID is consistent with the public key ID. For a certain file, if no "WARN" or "FAIL" result appears, the signature file is valid.

NOTICE

If a version has multiple signature files to be verified, the version is secure only when the verification results of all files are "PASS". If any verification result is "WARN" or "FAIL", re-download the software package.

----End

1.2 Installing Web LCT

After all preparations are complete, install the Web LCT.

1.2.1 Performing Pre-installation Checks

Before installing the Web LCT, check the environment to ensure that the Web LCT can be successfully installed and will run properly in this environment.

Procedure

- Step 1** Log in to the OS as an administrator.
- Step 2** Check that the Windows OS and related patches have been installed. For details, see [1.1.1 Hardware and Software Requirements](#).
- Step 3** Check that disk C and the disk to which the Web LCT will be installed both have more than 10 GB free space.
- Step 4** Check that the **current language for non-Unicode programs** is **English (United States)**.
- Step 5** Ensure that the software decompression path contains only letters, digits, and underscores (_). Other characters such as Chinese characters and spaces are not allowed.

----End

1.2.2 Installing the Web LCT Software

The Web LCT can be installed using a DVD-ROM or a software package.

Prerequisites

- Windows OS and related patches have been installed. For details, see [1.1.1 Hardware and Software Requirements](#).
- An administrator has been created on the OS.
- The installation software is ready.

Procedure

- Step 1** Log in to Windows OS as the administrator.
- Step 2** The Web LCT is an installation-free software. Decompress the Web LCT software package.
- Step 3** Right-click the third-party JRE software package and choose **Extract Here** from the shortcut menu. Change the name of the decompression folder to **jre**.
- Step 4** Access the directory where the file for starting the Web LCT resides, as shown in [Figure 1-1](#). Place the **jre** folder in this directory.

Figure 1-1 Web LCT installation directory

This PC > Data (D:) > WebLCT

Name	Date modified	Type	Size
bin	5/24/2022 7:35 PM	File folder	
conf	5/24/2022 7:26 PM	File folder	
envs	5/22/2022 6:33 PM	File folder	
etc	5/24/2022 7:06 PM	File folder	
frame_app	5/22/2022 6:33 PM	File folder	
jre	6/4/2021 2:56 PM	File folder	
lib	5/22/2022 6:33 PM	File folder	
logs	5/24/2022 7:06 PM	File folder	
rtsp	5/22/2022 6:33 PM	File folder	
temp	6/7/2022 10:15 AM	File folder	
tomcatwork	5/24/2022 7:05 PM	File folder	
var	5/22/2022 6:33 PM	File folder	
web_app	5/22/2022 6:33 PM	File folder	
webapps	5/22/2022 6:33 PM	File folder	
weblct	5/22/2022 6:33 PM	File folder	
startweblct.bat	5/22/2022 6:33 PM	Windows Batch File	6 KB
stopweblct.bat	5/22/2022 6:33 PM	Windows Batch File	1 KB
Uninstall.ico	5/22/2022 6:33 PM	Icon	9 KB
updatealgorithmsuite.bat	5/22/2022 6:33 PM	Windows Batch File	2 KB
Web_LCT_START.ico	5/22/2022 6:33 PM	Icon	6 KB
Web_LCT_STOP.ico	5/22/2022 6:33 PM	Icon	6 KB

Figure 1-2 jre directory

This PC > Data (D:) > WebLCT > jre

Name	Date modified	Type	Size
bin	5/27/2022 3:04 AM	File folder	
lib	5/27/2022 3:01 AM	File folder	
ASSEMBLY_EXCEPTION	5/27/2022 2:56 AM	File	2 KB
LICENSE	5/27/2022 2:56 AM	File	19 KB
readme.txt	5/28/2022 3:55 AM	Text Document	1 KB
release	5/27/2022 3:02 AM	File	1 KB
THIRD_PARTY_README	5/27/2022 2:56 AM	File	154 KB

-----End

1.3 (Optional) Configuring Script Parameters in the Web LCT Read and Write Permission Environment

To keep the Web LCT secure, you can set the Web LCT installation directory to be read-only. To write data to subdirectories in the installation directory, users need to specify another directory

 NOTE

Skip this topic if you do not need to deploy a read and write permission environment.

1.3.1 Configuring Scripts

To deploy a read and write permission environment, you need to configure the Web LCT startup and shutdown scripts.

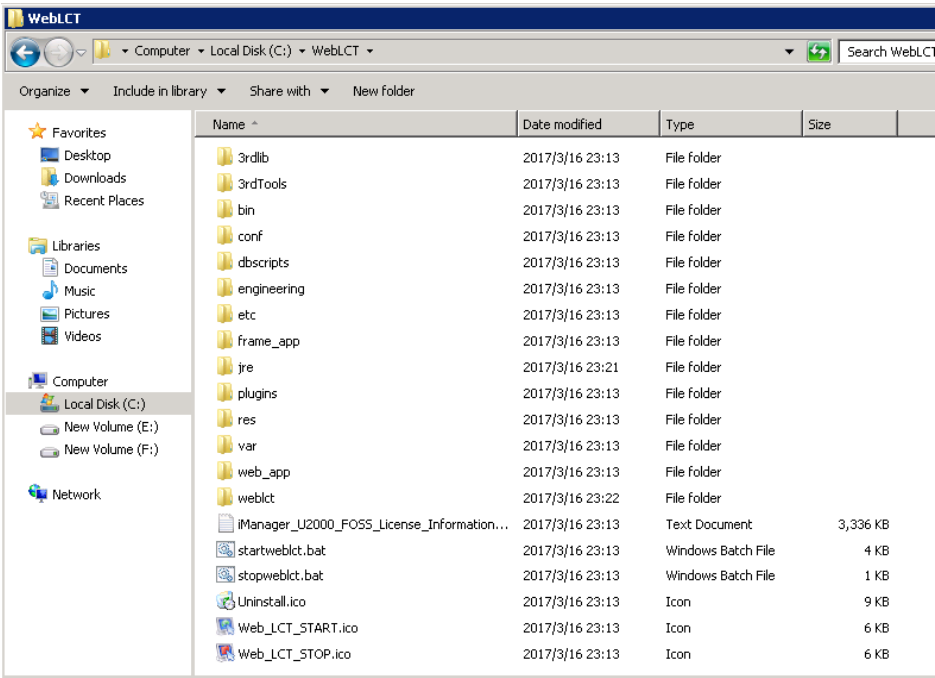
1.3.1.1 Configuring the Startup Script

Running the Web LCT startup script triggers read and write operations on some Web LCT directories. To ensure that the script can run successfully, set writable directories for it.

Procedure

- Step 1** After the Web LCT installation is complete, go to the directory containing the file that starts the Web LCT, as shown in [Figure 1-3](#).

Figure 1-3 Web LCT installation directory



- Step 2** Create a writeable directory for the Web LCT runtime in the same level as the Web LCT installation directory, for example, **data_weblct**.

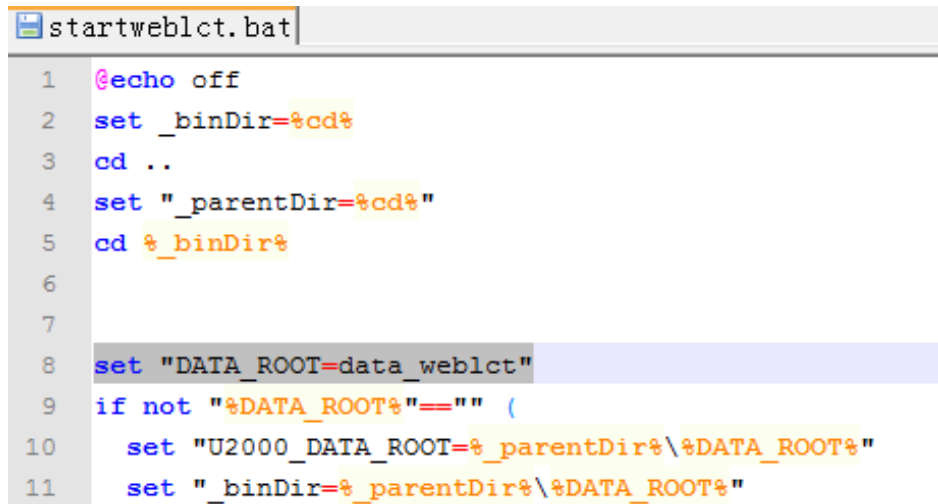
Name	Date modified	Type
 data_weblct	2024/6/19 15:37	File folder
 WebLCT	2024/6/19 15:37	File folder

Step 3 Configure the Web LCT startup script.

1. Right-click **startweblct.bat** and choose **Edit** from the shortcut menu.
2. Add set "DATA_ROOT=data_weblct" to the script, as shown in [Figure 1-4](#).

 NOTE

data_weblct is the folder you need the write permission for Web LCT. Be sure to enter the double quotation marks. Do not enter an absolute path.

Figure 1-4 Editing the script

```
startweblct.bat
1 @echo off
2 set _binDir=%cd%
3 cd ..
4 set "_parentDir=%cd%"
5 cd %_binDir%
6
7
8 set "DATA_ROOT=data_weblct"
9 if not "%DATA_ROOT%"==" " (
10     set "U2000_DATA_ROOT=%_parentDir%\%DATA_ROOT%"
11     set "_binDir=%_parentDir%\%DATA_ROOT%"
```

3. Save and close the script.

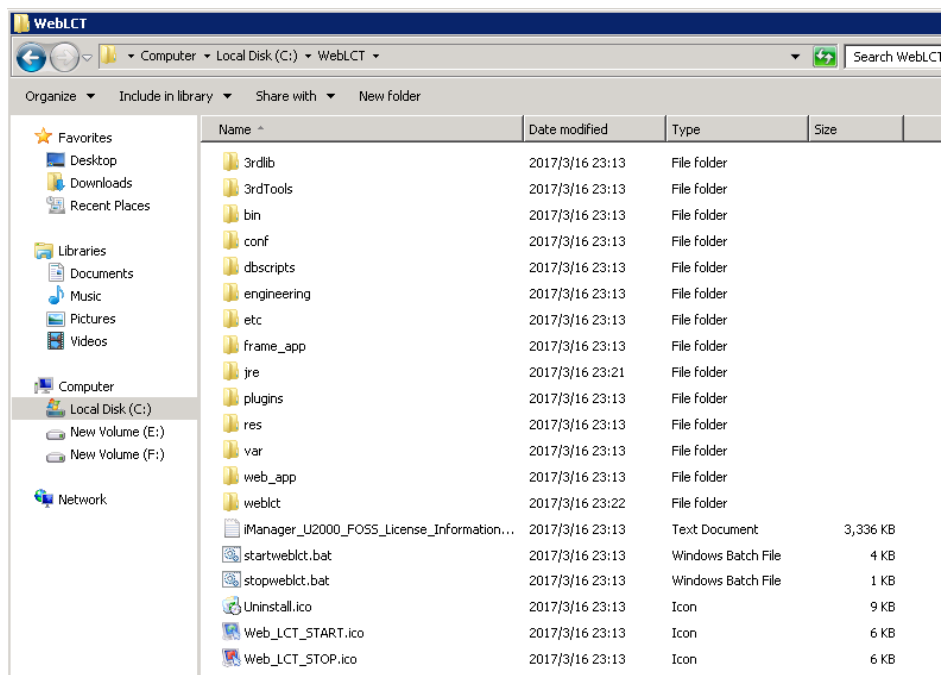
-----End

1.3.1.2 Configuring the Shutdown Script

Running the Web LCT shutdown script triggers read and write operations on some Web LCT directories. To ensure that the script can run successfully, set writable directories for it.

Procedure

- Step 1** After the Web LCT installation is complete, go to the directory containing the file that shuts down the Web LCT, as shown in [Figure 1-5](#).

Figure 1-5 Web LCT installation directory**Step 2** Configure the Web LCT shutdown script.

1. Right-click **stopweblct.bat** and choose **Edit** from the shortcut menu.
2. Add set "DATA_ROOT=data_weblct" to the script, as shown in [Figure 1-6](#).

NOTE

data_weblct is the folder you need the write permission for Web LCT. Be sure to enter the double quotation marks. Do not enter an absolute path.

Figure 1-6 Editing the script

```
stopweblct.bat
1 @echo off
2 set _binDir=%cd%
3 cd ..
4 set "_parentDir=%cd%"
5 cd %_binDir%
6
7 set "DATA_ROOT=data_weblct"
8 if not "%DATA_ROOT%"==" " (
9     set "_binDir=%_parentDir%\%DATA_ROOT%"
10 )
11 if exist "%_binDir%\bin\temp.dat" del "%_binDir%\bin\temp.dat"
```

3. Save and close the script.

----End

1.3.2 Setting Read-Only and Writable Directories

The read and write permission environment requires read-only and writable directories.

1.3.2.1 Setting a Read-only Directory

Set a read-only directory for storing read-only files that are required for running the Web LCT.

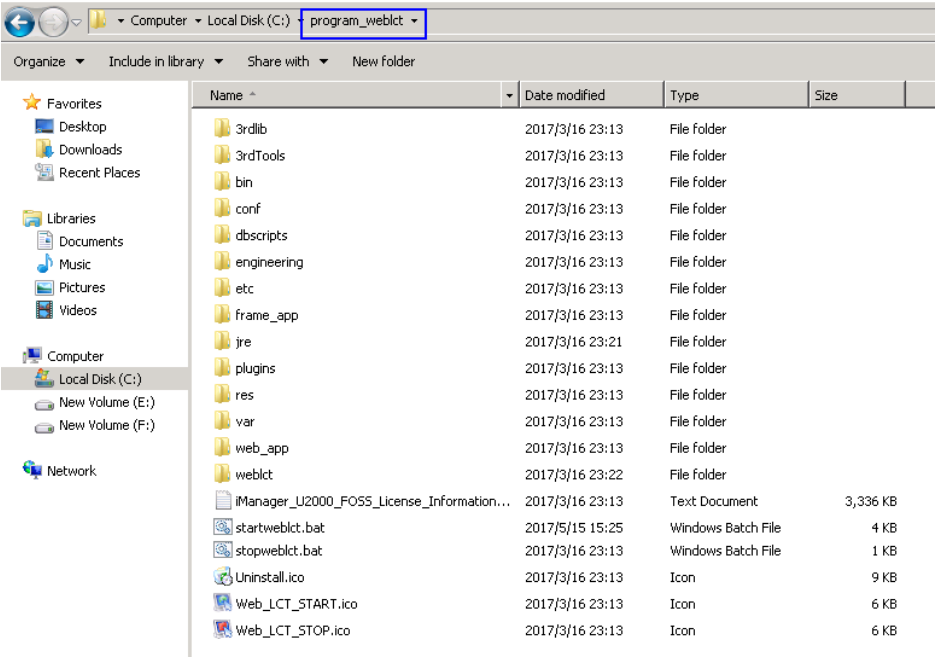
Procedure

- Step 1** Rename the Web LCT installation directory **program_weblct**, as shown in [Figure 1-7](#).

 **NOTE**

program_weblct is read-only. It stores read-only files that are required for running the Web LCT.

Figure 1-7 Renaming the installation directory



----End

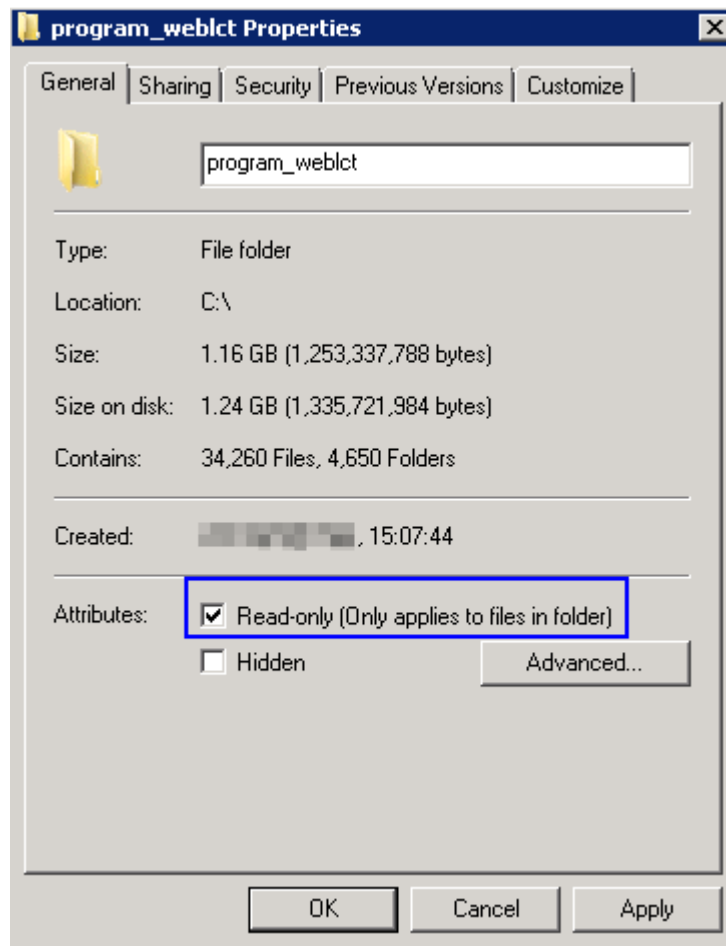
1.3.2.2 Setting the Installation Directory as Read-Only

The Web LCT directory is writable by default. Manually set it as read-only.

Procedure

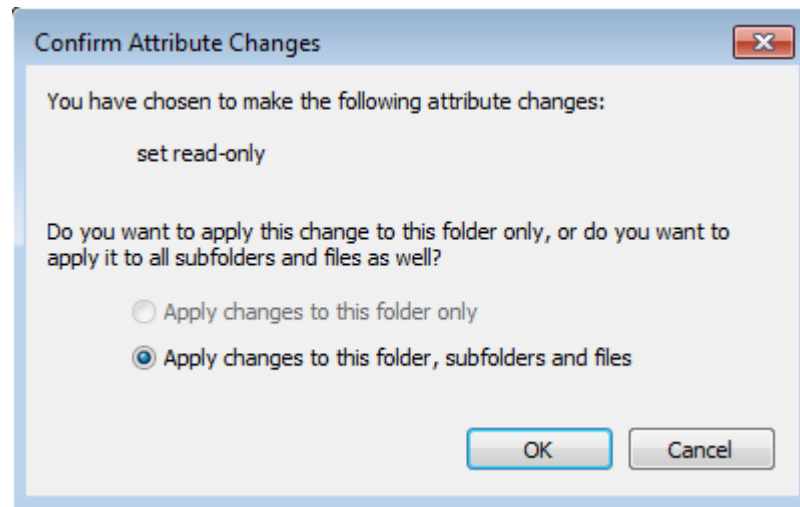
- Step 1** Right-click **program_weblct** and choose **Properties** from the shortcut menu.
- Step 2** In the dialog box that is displayed, select the **Read-only (Only applies to files in folder)** check box, as shown in [Figure 1-8](#).

Figure 1-8 Properties



- Step 3** Click **Apply**.
- Step 4** In the dialog box that is displayed, click the **Apply changes to this folder, subfolders and files** option button, as shown in [Figure 1-9](#).

Figure 1-9 Confirming attribute changes



Step 5 Click **OK**.

----End

1.3.3 Generating a Writable Directory of the Web LCT

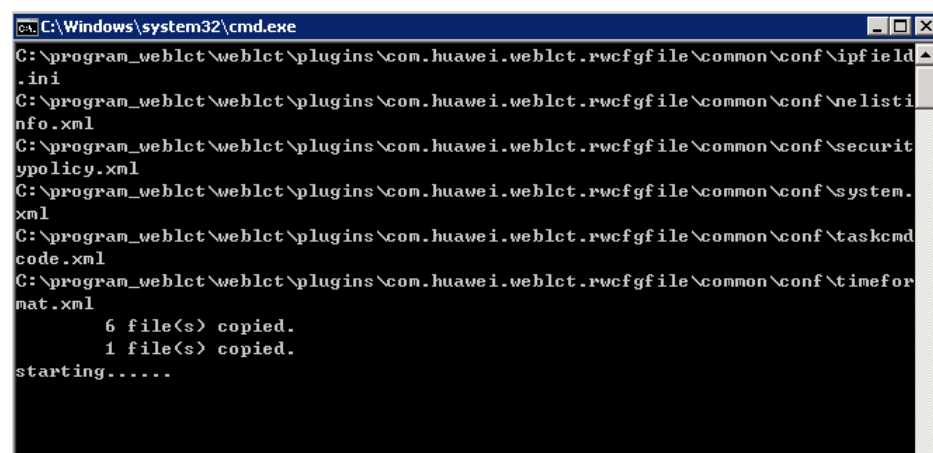
After you run the Web LCT startup script, files are automatically copied to writable directories.

Procedure

Step 1 Go to **C:\program_weblct** (which is read-only).

Step 2 Double-click the **startweblct.bat** script. The CLI pops up, indicating that some files are copied to a writable directory.

Figure 1-10 CLI



- Step 3** Check the folders parallel to **program_weblct**. You can find that the writable folder **data_weblct** has been created.

----End

1.4 Loading the SM Certificate

For devices that support the SM certificate, import identity and trust certificates to the Web LCT.

Prerequisites

You have obtained the identity certificate, **enc.p12** (encryption certificate file) and **sig.p12** (signature certificate file), and the trust certificate **trust.cer** provided by the user.

The names of the three certificate files are fixed. If the names of corresponding files obtained from the user are different, change them accordingly.

NOTE

Currently, only WDM devices support the loading of the SM certificate.

Procedure

- Step 1** Copy the three certificate files to *Web LCT installation directory*\WebLCT\conf\StateSecretCertificate.
- Step 2** Open *Web LCT installation directory*\WebLCT and double-click **updateStateSecretCertificate.bat** to update certificates.
- Step 3** Enter the password for the signature certificate file and press **Enter**.
- Step 4** Enter the password for the encryption certificate file and press **Enter**.

If the following information is displayed, certificates are successfully imported.

```
please input sig password:1234
please input enc password:1234
Picked up JAVA_TOOL_OPTIONS: -Duser.language=en
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/D:/Environment/iMasterNCEWebLCT_V100R023C10B035_11.27/WebLCT/lib/log4j-slf4j-impl-2.1
8.0.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/D:/Environment/iMasterNCEWebLCT_V100R023C10B035_11.27/WebLCT/rtsp/tomcat/lib/log4j-sl
f4j-impl-2.18.0.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: See http://www.slf4j.org/codes.html#multiple_bindings for an explanation.
SLF4J: Actual binding is of type [org.apache.logging.slf4j.Log4jLoggerFactory]
2023-11-29 10:11:01,343 main WARN Posix file attribute permissions defined but it is not supported by this files system.
2023-11-29 10:11:01,349 main WARN Posix file attribute permissions defined but it is not supported by this files system.
sigPassword = 1234
encPassword = 1234
userDir = D:\Environment\iMasterNCEWebLCT_V100R023C10B035_11.27\WebLCT
appRootPath = D:\Environment\iMasterNCEWebLCT_V100R023C10B035_11.27\WebLCT
rootKeyHome = null
cipherRoot = D:\Environment\iMasterNCEWebLCT_V100R023C10B035_11.27\WebLCT/etc/cipher
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by org.openeuler.BGMJCEProvider (file:/D:/Environment/iMasterNCEWebLCT_V100R023C10B03
5_11.27/WebLCT/lib/jca-1.0.8.jar) to field sun.security.x509.AlgorithmId.nameTable
WARNING: Please consider reporting this to the maintainers of org.openeuler.BGMJCEProvider
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
write json to D:\Environment\iMasterNCEWebLCT_V100R023C10B035_11.27\WebLCT\conf\StateSecretCertificate\GsmSSLCertificate
Config.json
encrypted = 0000000100000000291E9BED4C6A53AAB225F2146A4621EFC02B034603118EC281049A236BA279A51
encrypted = 00000001000000002C8FC57060CEF27CB56B159C1143B93CB63260119D6B438F1EE274251E67561D7
encrypted = 000000010000000023DCD194451D1549CEEE208F5A90C93391B94F5FBA0463473C62E0251F8611E0C
```

----End

1.5 Uninstalling Web LCT

Uninstall the Web LCT if you no longer need it.

Prerequisites

The Web LCT must have been shut down.

Procedure

- Step 1** Double-click **decompression directory\WebLCT\stopweblct.bat**, stop the Web LCT service.
- Step 2** Delete the decompression directory of the Web LCT.
----End

2 Product Description

The Web LCT is an NE-layer management system for the transport network. It is able to manage the following NEs: OSN 9560, NG WDM , and RTN.

2.1 Network Position

The Web LCT is an NE-layer management system for transport networks. Based on the browser/server architecture, the Web LCT allows you to perform all the operations related to NE-level configuration and maintenance.

2.2 Manageable Equipment

2.3 WDM/OTN/MSTP/RTN Features and Functions

This section describes the NE management features and functions provided by the Web LCT.

2.4 WDM/OTN NE Management(VRP)

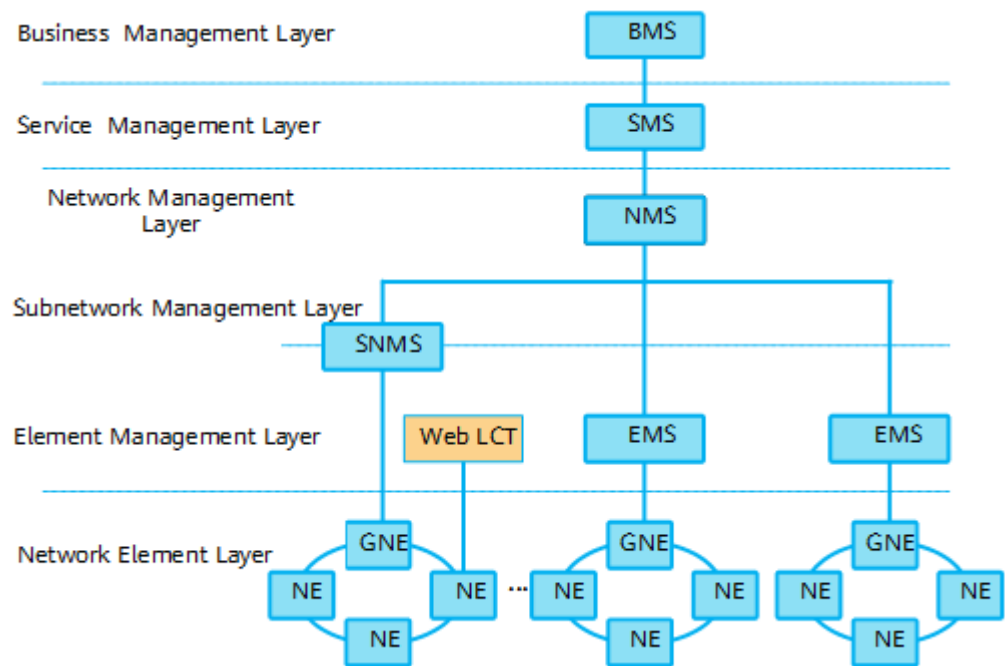
This section describes the NE management functions for the WDM/OTN NEs (VRP) provided by the Web LCT.

2.1 Network Position

The Web LCT is an NE-layer management system for transport networks. Based on the browser/server architecture, the Web LCT allows you to perform all the operations related to NE-level configuration and maintenance.

In the TMN, the Web LCT is located at the NE layer. That is, the Web LCT is an element management system (EMS) and provides all management functions at the NE layer. See [Figure 2-1](#).

Figure 2-1 Position in TMN hierarchy



- BMS: Business Management System
- SMS: Service Management System
- NMS: Network Management System
- SNMS: Subnetwork Management System
- EMS: Element Management System
- GNE: Gateway Network Element
- NE: Network Element

The Web LCT manages a maximum of 32 NEs. The Web LCT accesses local NEs through local area networks (LANs) and accesses remote NEs through data communications channels (DCCs).

Data Management

The Web LCT does not have its own database. All operations take effect directly on NEs. Therefore, the Web LCT does not allow users to preconfigure NEs, upload or download NE data, and acknowledge and synchronize alarms.

2.2 Manageable Equipment

The Web LCT can manage Huawei OptiX series optical transport devices, including the OSN 9560, NG WDM devices, RTN devices, and marine series NEs.

2.2.1 MSTP Series

The following table lists the MSTP series NE supported.

Table 2-1 OSN series

NE	New NE Version	Compatible NE Version
OptiX OSN 9560	N/A	5.51.05.20 (V100R002C00), 5.51.06.10 (V100R005C00), 5.51.07.10 (V100R006C00), 5.51.07.30-5.51.07.59 (V100R006C01), 5.51.08.10 (V100R007C00)

 NOTE

Rules for defining commercial versions of NE software: a.bb.cc.dd. "a" indicates the NE platform version. Currently, 4, 5 and 8 are supported. "bb" indicates the product name. "cc" indicates the R version of the product. To be specific, 01 represents R001, 02 represents R002, and so on. "dd" indicates the C version of the product. Mapping principle:

1. If the mapping table provides only the information that a.bb.cc.20 is supported by version A of the Web LCT, a.bb.cc.2x is supported by version A of the Web LCT.
2. If the mapping table provides only the information that a.bb.cc is supported by version A of the Web LCT, a.bb.cc.xx is supported by version A of the Web LCT.

2.2.2 WDM Series

The following table lists the WDM series NE supported.

Table 2-2 NG WDM series

NE	New NE Version	Compatible NE Version
OptiX OSN 1600 II	5.67.24.10 (V100R024C00)	5.67.20.61 (V100R020C10), 5.67.21.20 (V100R021C10), 5.67.21.30 (V100R021C10), 5.67.22.10 (V100R022C00), 5.67.22.20 (V100R022C10), 5.67.22.23 (V100R022C10), 5.67.23.10 (V100R023C00), 5.67.23.20 (V100R023C10)
OptiX OSN 1600 V	5.67.24.10 (V100R024C00)	5.67.20.63 (V100R020C10), 5.67.21.20 (V100R021C10), 5.67.21.30 (V100R021C10), 5.67.22.10 (V100R022C00), 5.67.22.20 (V100R022C10), 5.67.22.23 (V100R022C10), 5.67.23.10 (V100R023C00), 5.67.23.20 (V100R023C10)
OptiX OSN 1800 I C	5.67.24.10 (V100R024C00)	5.67.22.20 (V100R022C10), 5.67.22.23 (V100R022C10), 5.67.23.10 (V100R023C00), 5.67.23.20 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 1800 I E	5.67.24.10 (V100R024C00)	5.67.08.30 (V100R008C10), 5.67.09.11 (V100R009C00), 5.67.19.13 (V100R009C00), 5.67.19.83 (V100R019C10), 5.67.20.61 (V100R020C10), 5.67.21.11 (V100R021C00), 5.67.21.20 (V100R021C10), 5.67.21.30 (V100R021C10), 5.67.22.10 (V100R022C00), 5.67.22.20 (V100R022C10), 5.67.22.23 (V100R022C10), 5.67.23.10 (V100R023C00), 5.67.23.20 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 1800 I/II	N/A	5.141.05.11 (F3SCC) (V100R005C20), 5.141.06.11 (F3SCC) (V100R006C00), 5.141.06.21 (F3SCC) (V100R006C10), 5.141.06.31 (F3SCC) (V100R006C20), 5.141.07.11 (F3SCC) (V100R007C00), 5.141.07.31 (F3SCC) (V100R007C10), 5.141.08.11 (V100R008C00 F3SCC), 5.141.08.30 (V100R008C10 F3SCC), 5.141.09.11 (V100R009C00 F3SCC), 5.141.19.13 (V100R009C00), 5.141.19.83 (V100R019C10), 5.141.19.95 (F3SCC V100R019C11SPC300), 5.141.20.61 (V100R020C10), 5.141.21.11 (V100R021C00 F3SCC), 5.153.07.11 (F1SCC) (V100R007C00), 5.153.07.31 (F1SCC) (V100R007C10), 5.153.08.11 (V100R008C00 F1SCC), 5.153.08.12 (V100R008C10 F1SCC), 5.153.09.11 (V100R009C00 F1SCC), 5.153.19.13 (V100R009C00), 5.67.01.10 (V100R001), 5.67.01.20,

NE	New NE Version	Compatible NE Version
		5.67.02.10 (V100R002C00), 5.67.03.10 (V100R003C00), 5.67.03.20 (V100R003C01), 5.67.03.20~5.67.03.90 (F1SCC) (V100R005C20), 5.67.03.20~5.67.03.90 (F1SCC) (V100R006C00), 5.67.03.20~5.67.03.90 (V100R005C00), 5.67.03.30 (V100R003C02), 5.67.03.40 (V100R003C03), 5.67.03.50 (V100R003C05), 5.67.03.86~5.67.03.87 (F1SCC), 5.67.03.88~5.67.03.89 (F1SCC), 5.67.19.83 (V100R019C10), 5.67.20.61 (V100R020C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 1800 II E	5.67.24.10 (V100R024C00)	5.67.07.30 (V100R007C10), 5.67.08.11 (V100R008C00), 5.67.08.30 (V100R008C10), 5.67.09.11 (V100R009C00), 5.67.19.13 (V100R009C00), 5.67.19.83 (V100R019C10), 5.67.20.61 (V100R020C10), 5.67.21.11 (V100R021C00), 5.67.21.20 (V100R021C10), 5.67.21.30 (V100R021C10), 5.67.22.10 (V100R022C00), 5.67.22.20 (V100R022C10), 5.67.22.23 (V100R022C10), 5.67.23.10 (V100R023C00), 5.67.23.20 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 1800 II Pro	5.67.24.10 (V100R024C00)	5.67.19.85 (V100R19C10 TMK2UXCL), 5.67.20.61 (V100R20C10 TMK2UXCL), 5.67.21.11 (V100R021C00), 5.67.21.20 (V100R021C10), 5.67.21.30 (V100R021C10), 5.67.22.10 (V100R022C00), 5.67.22.20 (V100R022C10), 5.67.22.23 (V100R022C10), 5.67.23.10 (V100R023C00), 5.67.23.20 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 1800 II TP	5.67.24.10 (V100R024C00)	5.67.19.13 (V100R009C00), 5.67.19.83 (V100R019C10), 5.67.19.95 (B1SCC V100R019C11SPC300), 5.67.20.61 (V100R020C10), 5.67.21.11 (V100R021C00), 5.67.21.20 (V100R021C10), 5.67.21.30 (V100R021C10), 5.67.22.10 (V100R022C00), 5.67.22.20 (V100R022C10), 5.67.22.23 (V100R022C10), 5.67.23.10 (V100R023C00), 5.67.23.20 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 1800 II(Packet)	N/A	5.67.03.91 (V100R003C05), 5.67.05.11 (V100R005C00), 5.67.05.20 (V100R005C10), 5.67.05.30 (V100R005C20), 5.67.06.11 (V100R006C00), 5.67.06.21 (V100R006C10), 5.67.06.31 (V100R006C20), 5.67.07.11 (V100R007C00), 5.67.07.31 (V100R007C10), 5.67.08.11 (V100R008C00), 5.67.08.30 (V100R008C10), 5.67.09.11 (V100R009C00), 5.67.19.13 (V100R009C00), 5.67.19.83 (V100R019C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 1800 V	5.67.24.10 (V100R024C00)	5.67.03.60 (V100R003C05), 5.67.05.11 (V100R005C00), 5.67.05.20 (V100R005C10), 5.67.05.30 (V100R005C20), 5.67.06.11 (V100R006C00), 5.67.06.21 (V100R006C10), 5.67.06.31 (V100R006C20), 5.67.07.11 (V100R007C00), 5.67.07.31 (V100R007C10), 5.67.08.11 (V100R008C00), 5.67.08.30 (V100R008C10), 5.67.09.11 (V100R009C00), 5.67.19.13 (V100R009C00), 5.67.19.83 (V100R019C10), 5.67.19.95 (F5XCH Z8SCC V100R019C11SPC300), 5.67.20.61 (V100R020C10), 5.67.21.11 (V100R021C00), 5.67.21.20 (V100R021C10), 5.67.21.30 (V100R021C10), 5.67.22.10 (V100R022C00), 5.67.22.20 (V100R022C10), 5.67.22.23 (V100R022C10),

NE	New NE Version	Compatible NE Version
		5.67.23.10 (V100R023C00), 5.67.23.20 (V100R023C10)
OptiX OSN 1800 V Pro	5.67.24.10 (V100R024C00)	5.67.20.61 (V100R20C10 TMK5SCC), 5.67.21.11 (V100R021C00), 5.67.21.20 (V100R021C10), 5.67.21.30 (V100R021C10), 5.67.22.10 (V100R022C00), 5.67.22.20 (V100R022C10), 5.67.22.23 (V100R022C10), 5.67.23.10 (V100R023C00), 5.67.23.20 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 1832	N/A	5.51.08.10 (V100R007C00), 5.51.08.30 (V100R007C02), 5.51.09.10 (V100R008C00), 5.51.09.30 (V100R008C10), 5.51.10.10 (V100R009C00), 5.51.10.30 (V100R009C10), 5.51.11.10 (V100R010C00), 5.51.11.30 (V100R010C10), 5.51.12.10 (V100R011C00), 5.51.12.30 (V100R011C10), 5.51.13.10 (V100R012C00), 5.51.13.30 (V100R012C10), 5.51.15.10 (V100R013C00), 5.51.15.32 (V100R013C10), 5.51.19.83 (V100R019C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 1832 X16	5.67.24.10 (V100R024C00)	5.67.03.60 (V100R003C05), 5.67.05.11 (V100R005C00), 5.67.05.20 (V100R005C10), 5.67.05.30 (V100R005C20), 5.67.06.11 (V100R006C00), 5.67.06.21 (V100R006C10), 5.67.06.31 (V100R006C20), 5.67.07.11 (V100R007C00), 5.67.07.31 (V100R007C10), 5.67.08.11 (V100R008C00), 5.67.08.30 (V100R008C10), 5.67.09.11 (V100R009C00), 5.67.19.13 (V100R009C00), 5.67.19.83 (V100R019C10), 5.67.20.61 (V100R020C10), 5.67.21.11 (V100R021C00), 5.67.21.20 (V100R021C10), 5.67.21.30 (V100R021C10), 5.67.22.10 (V100R022C00), 5.67.22.20 (V100R022C10), 5.67.22.23 (V100R022C10), 5.67.23.10 (V100R023C00),

NE	New NE Version	Compatible NE Version
		5.67.23.20 (V100R023C10)
OptiX OSN 1832 X16 Pro	5.67.24.10 (V100R024C00)	5.67.20.61 (V100R20C10 TMK5SCC), 5.67.21.11 (V100R021C00), 5.67.21.20 (V100R021C10), 5.67.21.30 (V100R021C10), 5.67.22.10 (V100R022C00), 5.67.22.20 (V100R022C10), 5.67.22.23 (V100R022C10), 5.67.23.10 (V100R023C00), 5.67.23.20 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 1832 X4 E	5.67.24.10 (V100R024C00)	5.67.08.30 (V100R008C10), 5.67.09.11 (V100R009C00), 5.67.19.13 (V100R009C00), 5.67.19.83 (V100R019C10), 5.67.20.61 (V100R020C10), 5.67.21.11 (V100R021C00), 5.67.21.20 (V100R021C10), 5.67.21.30 (V100R021C10), 5.67.22.10 (V100R022C00), 5.67.22.20 (V100R022C10), 5.67.22.23 (V100R022C10), 5.67.23.10 (V100R023C00), 5.67.23.20 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 1832 X8	N/A	5.67.03.91 (V100R003C05), 5.67.05.11 (V100R005C00), 5.67.05.20 (V100R005C10), 5.67.05.30 (V100R005C20), 5.67.06.11 (V100R006C00), 5.67.06.21 (V100R006C10), 5.67.06.31 (V100R006C20), 5.67.07.11 (V100R007C00), 5.67.07.31 (V100R007C10), 5.67.08.11 (V100R008C00), 5.67.08.30 (V100R008C10), 5.67.09.11 (V100R009C00), 5.67.19.13 (V100R009C00), 5.67.19.83 (V100R019C10), 5.67.20.61 (V100R020C10), 5.67.21.11 (V100R021C00), 5.67.22.10 (V100R022C00), 5.67.22.20 (V100R022C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 1832 X8 E	5.67.24.10 (V100R024C00)	5.67.07.30 (V100R007C10), 5.67.08.11 (V100R008C00), 5.67.08.30 (V100R008C10), 5.67.09.11 (V100R009C00), 5.67.19.13 (V100R009C00), 5.67.19.83 (V100R019C10), 5.67.20.61 (V100R020C10), 5.67.21.20 (V100R021C10), 5.67.21.30 (V100R021C10), 5.67.22.10 (V100R022C00), 5.67.22.20 (V100R022C10), 5.67.22.23 (V100R022C10), 5.67.23.10 (V100R023C00), 5.67.23.20 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 1832 X8 Pro	5.67.24.10 (V100R024C00)	5.67.20.61 (V100R20C10 TMK2UXCL), 5.67.21.11 (V100R021C00), 5.67.21.20 (V100R021C10), 5.67.21.30 (V100R021C10), 5.67.22.10 (V100R022C00), 5.67.22.20 (V100R022C10), 5.67.22.23 (V100R022C10), 5.67.23.10 (V100R023C00), 5.67.23.20 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 3800	N/A	5.51.06.10 (V100R005C00), 5.51.07.10 (V100R006C00), 5.51.07.30 (V100R006C01), 5.51.07.60 (V100R006C03), 5.51.08.10 (V100R007C00), 5.51.08.30 (V100R007C02), 5.51.09.10 (V100R008C00), 5.51.09.30 (V100R008C10), 5.51.10.10 (V100R009C00), 5.51.10.30 (V100R009C10), 5.51.11.10 (V100R010C00), 5.51.11.30 (V100R010C10), 5.51.12.10 (V100R011C00), 5.51.12.30 (V100R011C10), 5.51.13.10 (V100R012C00), 5.51.13.30 (V100R012C10), 5.51.15.10 (V100R013C00), 5.51.15.32 (V100R013C10), 5.52.01.10, 5.52.02.10, 5.52.03.20, 5.52.04.10, 5.52.04.20 (V100R004C02),

NE	New NE Version	Compatible NE Version
		5.52.04.30 (V100R004C03), 5.52.05.20 (V100R004C04)

NE	New NE Version	Compatible NE Version
OptiX OSN 6800	N/A	5.51.01.10, 5.51.02.10, 5.51.03.20, 5.51.04.10, 5.51.04.20 (V100R004C02), 5.51.04.30 (V100R004C03), 5.51.05.20 (V100R004C04), 5.51.06.10 (V100R005C00), 5.51.07.10 (V100R006C00), 5.51.07.30 (V100R006C01), 5.51.07.60 (V100R006C03), 5.51.08.10 (V100R007C00), 5.51.08.30 (V100R007C02), 5.51.09.10 (V100R008C00), 5.51.09.30 (V100R008C10), 5.51.10.10 (V100R009C00), 5.51.10.30 (V100R009C10), 5.51.11.10 (V100R010C00), 5.51.11.30 (V100R010C10), 5.51.12.10 (V100R011C00), 5.51.12.30 (V100R011C10), 5.51.13.10 (V100R012C00), 5.51.13.30 (V100R012C10),

NE	New NE Version	Compatible NE Version
		5.51.15.10 (V100R013C00), 5.51.15.32 (V100R013C10), 5.51.15.82 (V100R013C10)
OptiX OSN 880	5.67.24.10 (V100R024C00)	5.67.19.13 (V100R009C00), 5.67.19.83 (V100R019C10), 5.67.20.61 (V100R020C10), 5.67.21.20 (V100R021C10), 5.67.21.30 (V100R021C10), 5.67.22.10 (V100R022C00), 5.67.22.20 (V100R022C10), 5.67.22.23 (V100R022C10), 5.67.23.10 (V100R023C00), 5.67.23.20 (V100R023C10)
OptiX OSN 880-C04X1D	5.67.24.10 (V100R024C00)	5.67.20.61 (V100R020C10), 5.67.21.20 (V100R021C10), 5.67.21.30 (V100R021C10), 5.67.22.10 (V100R022C00), 5.67.22.20 (V100R022C10), 5.67.22.23 (V100R022C10), 5.67.23.10 (V100R023C00), 5.67.23.20 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 880-C08X2D	5.67.24.10 (V100R024C00)	5.67.20.61 (V100R020C10), 5.67.21.20 (V100R021C10), 5.67.21.30 (V100R021C10), 5.67.22.10 (V100R022C00), 5.67.22.20 (V100R022C10), 5.67.22.23 (V100R022C10), 5.67.23.10 (V100R023C00), 5.67.23.20 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 8800	N/A	5.51.08.10 (V100R007C00), 5.51.08.30 (V100R007C02), 5.51.09.10 (V100R008C00), 5.51.09.30 (V100R008C10), 5.51.10.10 (V100R009C00), 5.51.10.30 (V100R009C10), 5.51.11.10 (V100R010C00), 5.51.11.30 (V100R010C10), 5.51.12.10 (V100R011C00), 5.51.12.30 (V100R011C10), 5.51.13.10 (V100R012C00), 5.51.13.30 (V100R012C10), 5.51.15.10 (V100R013C00), 5.51.15.32 (V100R013C10), 5.51.15.82 (V100R013C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 8800 T16	N/A	5.51.07.10 (V100R006C00), 5.51.07.30 (V100R006C01), 5.51.07.60 (V100R006C03), 5.51.08.10 (V100R007C00), 5.51.08.30 (V100R007C02), 5.51.09.10 (V100R008C00), 5.51.09.30 (V100R008C10), 5.51.10.10 (V100R009C00), 5.51.10.30 (V100R009C10), 5.51.11.10 (V100R010C00), 5.51.11.30 (V100R010C10), 5.51.12.10 (V100R011C00), 5.51.12.30 (V100R011C10), 5.51.13.10 (V100R012C00), 5.51.13.30 (V100R012C10), 5.51.15.10 (V100R013C00), 5.51.15.32 (V100R013C10), 5.51.15.82 (V100R013C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 8800 T32	N/A	5.51.04.20 (V100R001C01), 5.51.04.30 (V100R001C02), 5.51.05.20 (V100R002C00), 5.51.05.21 (V100R002C02), 5.51.06.10 (V100R005C00), 5.51.07.10 (V100R006C00), 5.51.07.30 (V100R006C01), 5.51.07.60 (V100R006C03), 5.51.08.10 (V100R007C00), 5.51.08.30 (V100R007C02), 5.51.09.10 (V100R008C00), 5.51.09.30 (V100R008C10), 5.51.10.10 (V100R009C00), 5.51.10.30 (V100R009C10), 5.51.11.10 (V100R010C00), 5.51.11.30 (V100R010C10), 5.51.12.10 (V100R011C00), 5.51.12.30 (V100R011C10), 5.51.13.10 (V100R012C00), 5.51.13.30 (V100R012C10), 5.51.15.10 (V100R013C00), 5.51.15.32 (V100R013C10),

NE	New NE Version	Compatible NE Version
		5.51.15.82 (V100R013C10)
OptiX OSN 8800 T64	N/A	5.51.05.21 (V100R002C02), 5.51.06.10 (V100R005C00), 5.51.07.10 (V100R006C00), 5.51.07.30 (V100R006C01), 5.51.07.60 (V100R006C03), 5.51.08.10 (V100R007C00), 5.51.08.30 (V100R007C02), 5.51.09.10 (V100R008C00), 5.51.09.30 (V100R008C10), 5.51.10.10 (V100R009C00), 5.51.10.30 (V100R009C10), 5.51.11.10 (V100R010C00), 5.51.11.30 (V100R010C10), 5.51.12.10 (V100R011C00), 5.51.12.30 (V100R011C10), 5.51.13.10 (V100R012C00), 5.51.13.30 (V100R012C10), 5.51.15.10 (V100R013C00), 5.51.15.32 (V100R013C10), 5.51.15.82 (V100R013C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 9600	N/A	5.174.06.60 (V100R007C00 51SCU), 5.174.06.82 (V100R007C00 51SCU), 5.174.19.60 (V100R019C10 51SCU), 5.51.08.15 (V100R001C00), 5.51.09.17 (V100R001C01), 5.51.09.33 (V100R001C20), 5.51.10.13 (V100R001C30), 5.51.11.13 (V100R002C10), 5.51.11.31 (V100R003C00), 5.51.12.11 (V100R003C10), 5.51.12.17 (V100R005C00), 5.51.13.10 (V100R005C10), 5.51.13.30 (V100R006C00), 5.51.15.10 (V100R006C10), 5.51.15.82 (V100R007C00 52SCC), 5.51.19.60 (V100R019C10 52SCC)
OptiX OSN 9600 K36	5.103.24.12 (V100R024C00)	5.103.23.22 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 9600 M05	5.172.24.12 (V100R024C00)	5.172.19.60 (V100R019C10), 5.172.20.20 (V100R020C10), 5.172.21.10 (V100R021C00), 5.172.21.20 (V100R021C10), 5.172.22.10 (V100R022C00), 5.172.22.22 (V100R022C10), 5.172.23.12 (V100R023C00), 5.172.23.22 (V100R023C10)
OptiX OSN 9600 M12	5.172.24.12 (V100R024C00)	5.172.06.82 (V100R007C00), 5.172.19.60 (V100R019C10), 5.172.20.20 (V100R020C10), 5.172.21.10 (V100R021C00), 5.172.21.20 (V100R021C10), 5.172.22.10 (V100R022C00), 5.172.22.22 (V100R022C10), 5.172.23.12 (V100R023C00), 5.172.23.22 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 9600 M24	5.172.24.12 (V100R024C00)	5.172.06.10 (V100R006C00), 5.172.06.30 (V100R006C10), 5.172.06.60 (V100R007C00 UTS), 5.172.19.60 (V100R019C10), 5.172.20.20 (V100R020C10), 5.172.21.10 (V100R021C00), 5.172.21.20 (V100R021C10), 5.172.22.10 (V100R022C00), 5.172.22.22 (V100R022C10), 5.172.23.12 (V100R023C00), 5.172.23.22 (V100R023C10)
OptiX OSN 9600 P32	5.200.24.12 (V100R024C00)	5.200.06.68 (V100R007C00), 5.200.19.60 (V100R019C10), 5.200.20.20 (V100R020C10), 5.200.21.10 (V100R021C00), 5.200.21.20 (V100R021C10), 5.200.22.10 (V100R022C00), 5.200.22.22 (V100R022C10), 5.200.23.12 (V100R023C00), 5.200.23.22 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 9600 P32C	5.200.24.12 (V100R024C00)	5.200.20.20 (V100R020C10), 5.200.21.10 (V100R021C00), 5.200.21.20 (V100R021C10), 5.200.22.10 (V100R022C00), 5.200.22.22 (V100R022C10), 5.200.23.12 (V100R023C00), 5.200.23.22 (V100R023C10)
OptiX OSN 9600 U16	N/A	5.111.01.80 (V100R001C30), 5.111.02.30 (V100R002C10), 5.111.03.10 (V100R003C00), 5.111.03.30 (V100R003C10), 5.111.03.50 (V100R003C10), 5.111.05.10 (V100R005C00), 5.111.05.30 (V100R005C10), 5.111.06.10 (V100R006C00 VRP), 5.111.06.30 (V100R006C10 VRP), 5.111.06.60 (V100R007C00 VRP), 5.111.19.60 (V100R019C10 VRP), 5.111.19.88 (V100R019C10SPC900), 5.111.19.88 (V100R019C10SPCa00)

NE	New NE Version	Compatible NE Version
OptiX OSN 9600 U32	5.171.24.12 (V100R024C00)	5.111.01.10 (V100R001C00), 5.111.01.30 (V100R001C01), 5.111.01.60 (V100R001C20), 5.111.01.80 (V100R001C30), 5.111.02.30 (V100R002C10), 5.111.03.10 (V100R003C00), 5.111.03.30 (V100R003C10), 5.111.03.50 (V100R003C10), 5.111.05.10 (V100R005C00), 5.111.05.30 (V100R005C10), 5.111.06.10 (V100R006C00 VRP), 5.111.06.30 (V100R006C10 VRP), 5.111.06.60 (V100R007C00 VRP), 5.111.19.60 (V100R019C10 VRP), 5.111.19.78 (V100R019C10 SPC800 VRP), 5.111.19.88 (V100R019C10SPC900), 5.111.19.88 (V100R019C10SPCa00), 5.171.06.10 (V100R006C00 UTS), 5.171.06.30 (V100R006C10 UTS), 5.171.06.60 (V100R007C00 UTS), 5.171.19.60 (V100R019C10 UTS),

NE	New NE Version	Compatible NE Version
		5.171.20.20 (V100R020C10 UTS), 5.171.21.10 (V100R021C00), 5.171.21.20 (V100R021C10), 5.171.22.10 (V100R022C00), 5.171.22.22 (V100R022C10), 5.171.23.12 (V100R023C00), 5.171.23.22 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 9600 U64	5.171.24.12 (V100R024C00)	5.111.01.10 (V100R001C00), 5.111.01.30 (V100R001C01), 5.111.01.60 (V100R001C20), 5.111.01.80 (V100R001C30), 5.111.02.30 (V100R002C10), 5.111.03.10 (V100R003C00), 5.111.03.30 (V100R003C10), 5.111.03.50 (V100R003C10), 5.111.05.10 (V100R005C00), 5.111.05.30 (V100R005C10), 5.111.06.10 (V100R006C00 VRP), 5.111.06.30 (V100R006C10 VRP), 5.111.06.60 (V100R007C00 VRP), 5.111.19.60 (V100R019C10 VRP), 5.111.19.78 (V100R019C10 SPC800 VRP), 5.111.19.88 (V100R019C10SPC900), 5.111.19.88 (V100R019C10SPCa00), 5.171.06.10 (V100R006C00 UTS), 5.171.06.30 (V100R006C10 UTS), 5.171.06.60 (V100R007C00 UTS), 5.171.19.60 (V100R019C10 UTS),

NE	New NE Version	Compatible NE Version
		5.171.20.20 (V100R020C10 UTS), 5.171.21.10 (V100R021C00), 5.171.21.20 (V100R021C10), 5.171.22.10 (V100R022C00), 5.171.22.22 (V100R022C10), 5.171.23.12 (V100R023C00), 5.171.23.22 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 9800	N/A	5.174.06.82 (V100R007C00 51SCU), 5.174.19.60 (V100R019C10 51SCU), 5.174.19.75 (V100R019C11SPC300), 5.51.08.15 (V100R001C00), 5.51.09.17 (V100R001C01), 5.51.09.33 (V100R001C20), 5.51.10.13 (V100R001C30), 5.51.11.13 (V100R002C10), 5.51.11.31 (V100R003C00), 5.51.12.11 (V100R003C10), 5.51.12.17 (V100R005C00), 5.51.13.10 (V100R005C10), 5.51.13.30 (V100R006C00), 5.51.15.10 (V100R006C10), 5.51.15.82 (V100R007C00 52SCC), 5.51.19.60 (V100R019C10 52SCC)
OptiX OSN 9800 K36	5.103.24.12 (V100R024C00)	5.103.23.22 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 9800 M05	5.172.24.12 (V100R024C00)	5.172.19.60 (V100R019C10), 5.172.20.20 (V100R020C10), 5.172.21.10 (V100R021C00), 5.172.21.20 (V100R021C10), 5.172.22.10 (V100R022C00), 5.172.22.22 (V100R022C10), 5.172.23.12 (V100R023C00), 5.172.23.22 (V100R023C10)
OptiX OSN 9800 M12	5.172.24.12 (V100R024C00)	5.172.06.82 (V100R007C00), 5.172.19.60 (V100R019C10), 5.172.19.75 (V100R019C11SPC300), 5.172.20.20 (V100R020C10), 5.172.21.10 (V100R021C00), 5.172.21.20 (V100R021C10), 5.172.22.10 (V100R022C00), 5.172.22.22 (V100R022C10), 5.172.23.12 (V100R023C00), 5.172.23.22 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 9800 M24	5.172.24.12 (V100R024C00)	5.172.06.10 (V100R006C00), 5.172.06.30 (V100R006C10), 5.172.06.60 (V100R007C00 UTS), 5.172.19.60 (V100R019C10), 5.172.19.75 (V100R019C11SPC300), 5.172.20.20 (V100R020C10), 5.172.21.10 (V100R021C00), 5.172.21.20 (V100R021C10), 5.172.22.10 (V100R022C00), 5.172.22.22 (V100R022C10), 5.172.23.12 (V100R023C00), 5.172.23.22 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 9800 P32	5.200.24.12 (V100R024C00)	5.200.06.30 (V100R006C10), 5.200.06.60 (V100R007C00), 5.200.19.60 (V100R019C10), 5.200.20.20 (V100R020C10), 5.200.21.10 (V100R021C00), 5.200.21.20 (V100R021C10), 5.200.22.10 (V100R022C00), 5.200.22.22 (V100R022C10), 5.200.23.12 (V100R023C00), 5.200.23.22 (V100R023C10)
OptiX OSN 9800 P32C	5.200.24.12 (V100R024C00)	5.200.20.20 (V100R020C10), 5.200.21.10 (V100R021C00), 5.200.21.20 (V100R021C10), 5.200.22.10 (V100R022C00), 5.200.22.22 (V100R022C10), 5.200.23.12 (V100R023C00), 5.200.23.22 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 9800 U16	N/A	5.111.01.80 (V100R001C30), 5.111.02.30 (V100R002C10), 5.111.03.10 (V100R003C00), 5.111.03.30 (V100R003C10), 5.111.03.50 (V100R003C10), 5.111.05.10 (V100R005C00), 5.111.05.30 (V100R005C10), 5.111.06.10 (V100R006C00 VRP), 5.111.06.30 (V100R006C10 VRP), 5.111.06.60 (V100R007C00 VRP), 5.111.19.60 (V100R019C10 VRP), 5.111.19.88 (V100R19C10SPC900), 5.111.19.88 (V100R19C10SPCa00), 5.171.19.75 (V100R019C11SPC300)

NE	New NE Version	Compatible NE Version
OptiX OSN 9800 U32	5.171.24.12 (V100R024C00)	5.111.01.10 (V100R001C00), 5.111.01.30 (V100R001C01), 5.111.01.60 (V100R001C20), 5.111.01.80 (V100R001C30), 5.111.02.30 (V100R002C10), 5.111.03.10 (V100R003C00), 5.111.03.30 (V100R003C10), 5.111.03.50 (V100R003C10), 5.111.05.10 (V100R005C00), 5.111.05.30 (V100R005C10), 5.111.06.10 (V100R006C00 VRP), 5.111.06.30 (V100R006C10 VRP), 5.111.06.60 (V100R007C00 VRP), 5.111.19.60 (V100R019C10 VRP), 5.111.19.78 (V100R019C10 SPC800 VRP), 5.111.19.88 (V100R019C10SPC900), 5.111.19.88 (V100R019C10SPCa00), 5.171.06.10 (V100R006C00 UTS), 5.171.06.30 (V100R006C10 UTS), 5.171.06.60 (V100R007C00 UTS), 5.171.19.60 (V100R019C10 UTS),

NE	New NE Version	Compatible NE Version
		5.171.19.75 (V100R019C11SPC300), 5.171.20.20 (V100R020C10 UTS), 5.171.21.10 (V100R021C00), 5.171.21.20 (V100R021C10), 5.171.22.10 (V100R022C00), 5.171.22.22 (V100R022C10), 5.171.23.22 (V100R023C00), 5.171.23.22 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX OSN 9800 U64	5.171.24.12 (V100R024C00)	5.111.01.10 (V100R001C00), 5.111.01.30 (V100R001C01), 5.111.01.60 (V100R001C20), 5.111.01.80 (V100R001C30), 5.111.02.30 (V100R002C10), 5.111.03.10 (V100R003C00), 5.111.03.30 (V100R003C10), 5.111.03.50 (V100R003C10), 5.111.05.10 (V100R005C00), 5.111.05.30 (V100R005C10), 5.111.06.10 (V100R006C00 VRP), 5.111.06.30 (V100R006C10 VRP), 5.111.06.60 (V100R007C00 VRP), 5.111.19.60 (V100R019C10 VRP), 5.111.19.78 (V100R019C10 SPC800 VRP), 5.111.19.88 (V100R019C10SPC900), 5.111.19.88 (V100R019C10SPCa00), 5.111.19.88 (V100R019C10SPCa00), 5.171.06.10 (V100R006C00 UTS), 5.171.06.30 (V100R006C10 UTS), 5.171.06.60 (V100R007C00 UTS),

NE	New NE Version	Compatible NE Version
		5.171.19.60 (V100R019C10 UTS), 5.171.19.75 (V100R019C11SPC300), 5.171.20.20 (V100R020C10 UTS), 5.171.21.10 (V100R021C00), 5.171.21.20 (V100R021C10), 5.171.22.10 (V100R022C00), 5.171.22.22 (V100R022C10), 5.171.23.12 (V100R023C00), 5.171.23.22 (V100R023C10)
OptiXsense EF3000-A50	5.67.24.10 (V100R024C00)	5.67.21.13 (V100R021C00), 5.67.22.12 (V100R022C00), 5.67.22.23 (V100R022C10), 5.67.23.10 (V100R023C00), 5.67.23.26 (V100R023C10)
OptiXsense EF3000-F50	5.67.24.10 (V100R024C00)	5.67.22.12 (V100R022C00), 5.67.22.23 (V100R022C10), 5.67.23.10 (V100R023C00), 5.67.23.26 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiXstar A810 A	5.67.24.10 (V100R024C00)	5.67.20.61 (V100R020C10), 5.67.21.20 (V100R021C10), 5.67.21.30 (V100R021C10), 5.67.22.10 (V100R022C00), 5.67.22.20 (V100R022C10), 5.67.22.23 (V100R022C10), 5.67.23.10 (V100R023C00), 5.67.23.20 (V100R023C10)
OptiXstar C610 M	N/A	5.67.20.61 (V100R020C10)
OptiXstar C810 A	5.67.24.10 (V100R024C00)	5.67.20.61 (V100R020C10), 5.67.21.20 (V100R021C10), 5.67.21.30 (V100R021C10), 5.67.22.10 (V100R022C00), 5.67.22.20 (V100R022C10), 5.67.22.23 (V100R022C10), 5.67.23.10 (V100R023C00), 5.67.23.20 (V100R023C10)
OptiXstar C810 E	5.67.24.10 (V100R024C00)	5.67.23.10 (V100R023C00)

NE	New NE Version	Compatible NE Version
OptiXstar C820 A	5.67.24.10 (V100R024C00)	5.67.20.61 (V100R020C10), 5.67.21.20 (V100R021C10), 5.67.21.30 (V100R021C10), 5.67.22.10 (V100R022C00), 5.67.22.20 (V100R022C10), 5.67.22.23 (V100R022C10), 5.67.23.10 (V100R023C00), 5.67.23.20 (V100R023C10)
OptiXstar E810	5.67.24.10 (V100R024C00)	5.67.23.10 (V100R023C00), 5.67.23.20 (V100R023C10)
OptiXtrans DC908	5.223.24.10 (V100R024C00)	5.223.19.69 (V100R019C10), 5.223.20.20 (V100R020C10), 5.223.21.10 (V1R021C00), 5.223.21.20 (V100R021C10), 5.223.22.20 (V100R022C10), 5.223.22.20 (V100R022C10), 5.223.22.22 (V100R022C10), 5.223.22.26 (V100R022C10), 5.223.23.10 (V100R023C00), 5.223.23.20 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiXtrans DC908 Pro	5.223.24.10 (V100R024C00)	5.223.22.26 (V100R022C10), 5.223.23.10 (V100R023C00), 5.223.23.20 (V100R023C10)
OptiXtrans E6608	5.67.24.10 (V100R024C00)	5.67.19.85 (V100R019C10), 5.67.20.61 (V100R20C10), 5.67.21.11 (V100R021C00), 5.67.21.20 (V100R021C10), 5.67.21.30 (V100R021C10), 5.67.22.10 (V100R022C00), 5.67.22.20 (V100R022C10), 5.67.22.23 (V100R022C10), 5.67.23.10 (V100R023C00), 5.67.23.20 (V100R023C10)
OptiXtrans E6608T	5.67.24.10 (V100R024C00)	5.67.20.61 (V100R20C10), 5.67.21.11 (V100R021C00), 5.67.21.20 (V100R021C10), 5.67.21.30 (V100R021C10), 5.67.22.10 (V100R022C00), 5.67.22.20 (V100R022C10), 5.67.23.10 (V100R023C00), 5.67.23.20 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiXtrans E6616	5.67.24.10 (V100R024C00)	5.67.19.85 (V100R019C10), 5.67.20.61 (V100R20C10), 5.67.21.11 (V100R021C00), 5.67.21.20 (V100R021C10), 5.67.21.30 (V100R021C10), 5.67.22.10 (V100R022C00), 5.67.22.20 (V100R022C10), 5.67.22.23 (V100R022C10), 5.67.23.10 (V100R023C00), 5.67.23.20 (V100R023C10)
OptiXtrans E6616X	5.67.24.10 (V100R024C00)	5.67.22.20 (V100R022C10), 5.67.23.10 (V100R023C00), 5.67.23.20 (V100R023C10)
OptiXtrans E9605	5.172.24.12 (V100R024C00)	5.172.19.66 (V100R019C10), 5.172.20.20 (V100R020C10), 5.172.21.10 (V100R021C00), 5.172.21.20 (V100R021C10), 5.172.22.10 (V100R022C00), 5.172.22.22 (V100R022C10), 5.172.23.12 (V100R023C00), 5.172.23.22 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiXtrans E9612	5.172.24.12 (V100R024C00)	5.172.20.20 (V100R020C10), 5.172.21.10 (V100R021C00), 5.172.21.20 (V100R021C10), 5.172.22.10 (V100R022C00), 5.172.22.22 (V100R022C10), 5.172.23.12 (V100R023C00), 5.172.23.22 (V100R023C10)
OptiXtrans E9624	5.172.24.12 (V100R024C00)	5.172.20.20 (V100R020C10), 5.172.21.10 (V100R021C00), 5.172.21.20 (V100R021C10), 5.172.22.10 (V100R022C00), 5.172.22.22 (V100R022C10), 5.172.23.12 (V100R023C00), 5.172.23.22 (V100R023C10)
OptiXtrans E9624X	5.172.24.12 (V100R024C00)	5.172.21.12 (V100R021C00), 5.172.21.20 (V100R021C10), 5.172.22.10 (V100R022C00), 5.172.22.22 (V100R022C10), 5.172.23.12 (V100R023C00), 5.172.23.22 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiXtrans M12DA	5.172.24.12 (V100R024C00)	5.172.23.12 (V100R023C00), 5.172.23.12 (V100R023C00), 5.172.23.26 (V100R023C10)

 NOTE

- Rules for defining commercial versions of NE software: a.bb.cc.dd. "a" indicates the NE platform version. Currently, 4, 5 and 8 are supported. "bb" indicates the product name. "cc" indicates the R version of the product. To be specific, 01 represents R001, 02 represents R002, and so on. "dd" indicates the C version of the product. Mapping principle:
1. If the mapping table provides only the information that a.bb.cc.20 is supported by version A of the Web LCT, a.bb.cc.2x is supported by version A of the Web LCT.
 2. If the mapping table provides only the information that a.bb.cc is supported by version A of the Web LCT, a.bb.cc.xx is supported by version A of the Web LCT.

2.2.3 RTN Series

The following table lists the RTN series NE supported.

Table 2-3 RTN series

NE	New NE Version	Compatible NE Version
OptiX RTN 310	5.92.24.10 (V100R024C00)	5.92.01.10 (V100R001C00), 5.92.01.20 (V100R001C01), 5.92.03.10 (V100R003C00), 5.92.05.10 (V100R005C00), 5.92.06.10 (V100R006C00), 5.92.07.10 (V100R007C00), 5.92.07.20 (V100R007C10), 5.92.08.10 (V100R008C00), 5.92.08.20 (V100R008C10), 5.92.09.10 (V100R009C00), 5.92.09.20 (V100R009C10), 5.92.19.10 (V100R019C00), 5.92.19.27 (V100R019C10), 5.92.20.20 (V100R020C10), 5.92.20.30 (V100R020C10), 5.92.21.10 (V100R021C00), 5.92.21.20 (V100R021C10), 5.92.22.10 (V100R022C00), 5.92.22.20 (V100R022C10), 5.92.23.10 (V100R023C00), 5.92.23.20 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX RTN 320	5.204.24.10(DMD4L) (V100R024C00), 5.151.24.10(DMD4D) (V100R024C00), 5.151.24.10 (V100R024C00)	5.151.05.10 (V100R005C00), 5.151.06.10 (V100R006C00), 5.151.07.10 (V100R007C00), 5.151.07.20 (V100R007C10), 5.151.08.10 (V100R008C00), 5.151.08.20 (V100R008C10), 5.151.09.10 (V100R009C00), 5.151.09.20 (V100R009C10), 5.151.19.10 (V100R019C00), 5.151.19.27 (V100R019C10), 5.151.20.20 (V100R020C10), 5.151.20.30 (V100R020C10), 5.151.21.10 (V100R021C00), 5.151.21.20 (V100R021C10), 5.151.22.10 (V100R022C00), 5.151.22.20 (V100R022C10), 5.151.23.10 (V100R023C00), 5.151.23.20 (V100R023C10), 5.204.09.20(DMD4D) (V100R009C10), 5.204.19.10(DMD4D) (V100R019C00), 5.204.19.27(DMD4D) (V100R019C10), 5.204.20.20(DMD4D) (V100R020C10),

NE	New NE Version	Compatible NE Version
		5.204.20.30(DMD4D) (V100R020C10), 5.204.21.10(DMD4D) (V100R021C00), 5.204.21.20(DMD4D) (V100R021C10), 5.204.22.10(DMD4D) (V100R022C00), 5.204.22.20(DMD4D) (V100R022C10), 5.204.23.10(DMD4D) (V100R023C00), 5.204.23.20(DMD4D) (V100R023C10), 5.204.23.20(DMD4L) (V100R023C10)
OptiX RTN 360	N/A	5.138.01.10 (V100R001C00), 5.138.03.10 (V100R003C00), 5.138.05.10 (V100R005C00), 5.138.06.10 (V100R006C00), 5.138.07.10 (V100R007C00), 5.138.07.20 (V100R007C10), 5.138.08.10 (V100R008C00), 5.138.08.20 (V100R008C10), 5.138.09.10 (V100R009C00), 5.138.09.20 (V100R009C10), 5.138.19.10 (V100R019C00), 5.138.19.27 (V100R019C10)

NE	New NE Version	Compatible NE Version
OptiX RTN 380	5.115.24.10 (V100R024C00)	5.115.01.10 (V100R001C00), 5.115.01.20 (V100R001C10), 5.115.02.10 (V100R002C00), 5.115.03.10 (V100R003C00), 5.115.05.10 (V100R005C00), 5.115.06.10 (V100R006C00), 5.115.07.10 (V100R007C00), 5.115.07.20 (V100R007C10), 5.115.08.10 (V100R008C00), 5.115.08.20 (V100R008C10), 5.115.09.10 (V100R009C00), 5.115.09.20 (V100R009C10), 5.115.19.10 (V100R019C00), 5.115.19.27 (V100R019C10), 5.115.20.20 (V100R020C10), 5.115.20.30 (V100R020C10), 5.115.21.10 (V100R021C00), 5.115.21.20 (V100R021C10), 5.115.22.10 (V100R022C00), 5.115.22.20 (V100R022C10), 5.115.23.10 (V100R023C00), 5.115.23.20 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX RTN 380A	5.203.24.10 (V100R024C00)	5.203.09.10 (V100R009C00), 5.203.09.20 (V100R009C10), 5.203.19.10 (V100R019C00), 5.203.19.27 (V100R019C10), 5.203.20.20 (V100R020C10), 5.203.20.30 (V100R020C10), 5.203.21.10 (V100R021C00), 5.203.21.20 (V100R021C10), 5.203.22.10 (V100R022C00), 5.203.22.20 (V100R022C10), 5.203.23.10 (V100R023C00), 5.203.23.20 (V100R023C10)
OptiX RTN 380AN	5.203.24.10(MXUG4N) (V100R024C00)	5.203.22.20(MXUG4N) (V100R022C10), 5.203.23.10(MXUG4N) (V100R023C00), 5.203.23.20(MXUG4N) (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX RTN 380AX	5.212.24.10(MXXI4H) (V100R024C00), 5.212.24.10(MXXI4B) (V100R024C00), 5.206.24.10 (V100R024C00)	5.206.09.20 (V100R009C10), 5.206.19.10 (V100R019C00), 5.206.19.27 (V100R019C10), 5.206.20.20 (V100R020C10), 5.206.20.30 (V100R020C10), 5.206.21.10 (V100R021C00), 5.206.21.20 (V100R021C10), 5.206.22.10 (V100R022C00), 5.206.22.20 (V100R022C10), 5.206.23.10 (V100R023C00), 5.206.23.20 (V100R023C10), 5.212.19.10(MXXI4B) (V100R019C00), 5.212.19.27(MXXI4B) (V100R019C10), 5.212.20.12(MXXI4H) (V100R020C00), 5.212.20.20(MXXI4B) (V100R020C10), 5.212.20.20(MXXI4H) (V100R020C10), 5.212.20.30(MXXI4H) (V100R020C10), 5.212.20.30(MXXI4H) (V100R020C10), 5.212.21.10(MXXI4B) (V100R021C00), 5.212.21.10(MXXI4H) (V100R021C00), 5.212.21.20(MXXI4B) (V100R021C10), 5.212.21.20(MXXI4H) (V100R021C10),

NE	New NE Version	Compatible NE Version
		5.212.22.10(MXXI4B) (V100R022C00), 5.212.22.10(MXXI4H) (V100R022C00), 5.212.22.20(MXXI4B) (V100R022C10), 5.212.22.20(MXXI4H) (V100R022C10), 5.212.23.10(MXXI4B) (V100R023C00), 5.212.23.10(MXXI4H) (V100R023C00), 5.212.23.20(MXXI4B) (V100R023C10), 5.212.23.20(MXXI4H) (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX RTN 380H	5.190.24.10(MXXI5) (V100R024C00), 5.160.24.10 (V100R024C00)	5.160.06.10 (V100R006C00), 5.160.07.10 (V100R007C00), 5.160.07.20 (V100R007C10), 5.160.08.10 (V100R008C00), 5.160.08.20 (V100R008C10), 5.160.09.10 (V100R009C00), 5.160.09.20 (V100R009C10), 5.160.19.10 (V100R019C00), 5.160.19.27 (V100R019C10), 5.160.20.20 (V100R020C10), 5.160.20.30 (V100R020C10), 5.160.21.10 (V100R021C00), 5.160.21.20 (V100R021C10), 5.160.22.10 (V100R022C00), 5.160.22.20 (V100R022C10), 5.160.23.10 (V100R023C00), 5.160.23.20 (V100R023C10), 5.190.08.10(MXXI5) (V100R008C00), 5.190.08.20(MXXI5) (V100R008C10), 5.190.09.10(MXXI5) (V100R009C00), 5.190.09.20(MXXI5) (V100R009C10), 5.190.19.10(MXXI5) (V100R019C00),

NE	New NE Version	Compatible NE Version
		5.190.19.27(MXXI5) (V100R019C10), 5.190.20.20(MXXI5) (V100R020C10), 5.190.20.30(MXXI5) (V100R020C10), 5.190.21.10(MXXI5) (V100R021C00), 5.190.21.20(MXXI5) (V100R021C10), 5.190.22.10(MXXI5) (V100R022C00), 5.190.22.20(MXXI5) (V100R022C10), 5.190.23.10(MXXI5) (V100R023C00), 5.190.23.20(MXXI5) (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX RTN 380e	5.180.24.10 (V100R024C00)	5.180.07.20 (V100R007C10), 5.180.08.10 (V100R008C00), 5.180.08.20 (V100R008C10), 5.180.09.10 (V100R009C00), 5.180.09.20 (V100R009C10), 5.180.19.10 (V100R019C00), 5.180.20.20 (V100R020C10), 5.180.20.30 (V100R020C10), 5.180.21.10 (V100R021C00), 5.180.21.20 (V100R021C10), 5.180.22.10 (V100R022C00), 5.180.22.20 (V100R022C10), 5.180.23.10 (V100R023C00), 5.180.23.20 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX RTN 510	5.194.24.10 (V100R024C00)	5.194.01.20 (V100R001C10), 5.194.02.10 (V100R002C00), 5.194.02.20 (V100R002C10), 5.194.19.10 (V100R019C00), 5.194.19.27 (V100R019C10), 5.194.20.20 (V100R020C10), 5.194.20.30 (V100R020C10), 5.194.21.10 (V100R021C00), 5.194.21.20 (V100R021C10), 5.194.22.10 (V100R022C00), 5.194.22.20 (V100R022C10), 5.194.23.10 (V100R023C00), 5.194.23.20 (V100R023C10)
OptiX RTN 605	N/A	5.60.01.10 (V100R001), 5.60.03.10 (V100R003), 5.60.03.30 (V100R003C02), 5.60.05.10 (V100R005)
OptiX RTN 610	N/A	5.54.01.10 (V100R001C00), 5.54.01.20 (V100R001C01), 5.54.02.10 (V100R002C00), 5.54.03.10 (V100R003)

NE	New NE Version	Compatible NE Version
OptiX RTN 620	N/A	5.54.01.10 (V100R001C00), 5.54.01.20 (V100R001C01), 5.54.02.10 (V100R002C00), 5.54.03.10 (V100R003), 5.54.05.10 (V100R005C00), 5.54.05.20 (V100R005C01), 5.54.05.30 (V100R005C02)

NE	New NE Version	Compatible NE Version
OptiX RTN 905	5.95.24.10 (V100R024C00)	5.95.05.10 (V100R005C00), 5.95.05.20 (V100R005C01), 5.95.06.10 (V100R006C00), 5.95.06.20 (V100R006C10), 5.95.07.10 (V100R007C00), 5.95.07.20 (V100R007C10), 5.95.08.10 (V100R008C00), 5.95.08.20 (V100R008C10), 5.95.09.10 (V100R009C00), 5.95.09.20 (V100R009C10), 5.95.10.10 (V100R010C00), 5.95.10.20 (V100R010C10), 5.95.11.10 (V100R011C00), 5.95.11.20 (V100R011C10), 5.95.19.10 (V100R019C00), 5.95.19.27 (V100R019C10), 5.95.20.20 (V100R020C10), 5.95.20.30 (V100R020C10), 5.95.21.10 (V100R021C00), 5.95.21.20 (V100R021C10), 5.95.22.10 (V100R022C00), 5.95.22.20 (V100R022C10),

NE	New NE Version	Compatible NE Version
		5.95.23.10 (V100R023C00), 5.95.23.20 (V100R023C10)
OptiX RTN 905e	5.183.24.10 (V100R024C00)	5.183.09.20 (V100R009C10), 5.183.10.10 (V100R010C00), 5.183.10.20 (V100R010C10), 5.183.11.10 (V100R011C00), 5.183.11.20 (V100R011C10), 5.183.19.10 (V100R019C00), 5.183.20.20 (V100R020C10), 5.183.20.30 (V100R020C10), 5.183.21.10 (V100R021C00), 5.183.21.20 (V100R021C10), 5.183.22.10 (V100R022C00), 5.183.22.20 (V100R022C10), 5.183.23.10 (V100R023C00), 5.183.23.20 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX RTN 910	5.76.24.10 (V100R024C00)	5.76.01.10 (V100R001C00), 5.76.01.20 (V100R001C01), 5.76.01.30 (V100R001C02), 5.76.01.40 (V100R001C03), 5.76.02.10 (V100R002C00), 5.76.02.20 (V100R002C01), 5.76.02.30 (V100R002C02), 5.76.03.10 (V100R003C00), 5.76.03.20 (V100R003C01), 5.76.03.30 (V100R003C02), 5.76.03.40 (V100R003C03), 5.76.05.10 (V100R005C00), 5.76.05.20 (V100R005C01), 5.76.06.10 (V100R006C00)

NE	New NE Version	Compatible NE Version
OptiX RTN 910A	5.207.24.10(CSHRF) (V100R024C00), 5.152.24.10 (V100R024C00)	5.152.08.10 (V100R008C00), 5.152.08.20 (V100R008C10), 5.152.09.10 (V100R009C00), 5.152.09.20 (V100R009C10), 5.152.10.10 (V100R010C00), 5.152.10.20 (V100R010C10), 5.152.11.10 (V100R011C00), 5.152.11.20 (V100R011C10), 5.152.19.10 (V100R019C00), 5.152.19.27 (V100R019C10), 5.152.20.20 (V100R020C10), 5.152.20.30 (V100R020C10), 5.152.21.10 (V100R021C00), 5.152.21.20 (V100R021C10), 5.152.22.10 (V100R022C00), 5.152.22.20 (V100R022C10), 5.152.23.10 (V100R023C00), 5.152.23.20 (V100R023C10), 5.207.19.10 (CSHRF) (V100R019C00), 5.207.19.27(CSHRF) (V100R019C10), 5.207.20.20(CSHRF) (V100R020C10), 5.207.20.30(CSHRF) (V100R020C10),

NE	New NE Version	Compatible NE Version
		5.207.21.10(CSHRF) (V100R021C00), 5.207.21.20(CSHRF) (V100R021C10), 5.207.22.10(CSHRF) (V100R022C00), 5.207.22.20(CSHRF) (V100R022C10), 5.207.23.10(CSHRF) (V100R023C00), 5.207.23.20(CSHRF) (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX RTN 950	5.76.24.10 (V100R024C00), 5.196.24.10(CSHUF) (V100R024C00)	5.196.11.10(CSHUF) (V100R011C00), 5.196.11.20(CSHUF) (V100R011C10), 5.196.19.10(CSHUF) (V100R019C00), 5.196.19.27(CSHUF) (V100R019C10), 5.196.20.20(CSHUF) (V100R020C10), 5.196.20.30(CSHUF) (V100R020C10), 5.196.21.10(CSHUF) (V100R021C00), 5.196.21.20(CSHLF) (V100R021C10), 5.196.21.20(CSHUF) (V100R021C10), 5.196.22.10(CSHUF) (V100R022C00), 5.196.22.20(CSHUF) (V100R022C10), 5.196.23.10(CSHUF) (V100R023C00), 5.196.23.20(CSHUF) (V100R023C10), 5.76.01.10 (V100R001C00), 5.76.01.20 (V100R001C01), 5.76.01.30 (V100R001C02), 5.76.01.40 (V100R001C03), 5.76.02.10 (V100R002C00), 5.76.02.20 (V100R002C01), 5.76.02.30 (V100R002C02), 5.76.03.10 (V100R003C00), 5.76.03.20 (V100R003C01),

NE	New NE Version	Compatible NE Version
		5.76.03.30 (V100R003C02), 5.76.03.40 (V100R003C03), 5.76.05.10 (V100R005C00), 5.76.05.20 (V100R005C01), 5.76.06.10 (V100R006C00), 5.76.06.20 (V100R006C10), 5.76.07.10 (V100R007C00), 5.76.07.20 (V100R007C10), 5.76.08.10 (V100R008C00), 5.76.08.20 (V100R008C10), 5.76.09.10 (V100R009C00), 5.76.09.20 (V100R009C10), 5.76.10.10 (V100R010C00), 5.76.10.20 (V100R010C10), 5.76.11.10 (V100R011C00), 5.76.11.20 (V100R011C10), 5.76.19.10 (V100R019C00), 5.76.19.27 (V100R019C10), 5.76.20.20 (V100R020C10), 5.76.20.30 (V100R020C10), 5.76.21.10 (V100R021C00), 5.76.21.20 (V100R021C10),

NE	New NE Version	Compatible NE Version
		5.76.22.10 (V100R022C00), 5.76.22.20 (V100R022C10), 5.76.23.10 (V100R023C00), 5.76.23.20 (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX RTN 950A	5.255.24.10(CSHOG) (V100R024C00), 5.195.24.10(CSHOF) (V100R024C00), 5.114.24.10 (V100R024C00)	5.114.05.20 (V100R005C01), 5.114.06.10 (V100R006C00), 5.114.06.20 (V100R006C10), 5.114.07.10 (V100R007C00), 5.114.07.20 (V100R007C10), 5.114.08.10 (V100R008C00), 5.114.08.20 (V100R008C10), 5.114.09.10 (V100R009C00), 5.114.09.20 (V100R009C10), 5.114.10.10 (V100R010C00), 5.114.10.20 (V100R010C10), 5.114.11.10 (V100R011C00), 5.114.11.20 (V100R011C10), 5.114.19.10 (V100R019C00), 5.114.19.27 (V100R019C10), 5.114.20.20 (V100R020C10), 5.114.20.30 (V100R020C10), 5.114.21.10 (V100R021C00), 5.114.21.20 (V100R021C10), 5.114.22.10 (V100R022C00), 5.114.22.20 (V100R022C10), 5.114.23.10 (V100R023C00),

NE	New NE Version	Compatible NE Version
		5.114.23.20 (V100R023C10), 5.195.11.20(CSHOF) (V100R011C10), 5.195.19.10(CSHOF) (V100R019C00), 5.195.19.27(CSHOF) (V100R019C10), 5.195.20.20(CSHOF) (V100R020C10), 5.195.20.30(CSHOF) (V100R020C10), 5.195.21.10(CSHOF) (V100R021C00), 5.195.21.20(CSHOF) (V100R021C10), 5.195.22.10(CSHOF) (V100R022C00), 5.195.22.20(CSHOF) (V100R022C10), 5.195.23.10(CSHOF) (V100R023C00), 5.195.23.20(CSHOF) (V100R023C10), 5.255.20.20(CSHOG) (V100R020C10), 5.255.20.30(CSHOG) (V100R020C10), 5.255.21.10(CSHOG) (V100R021C00), 5.255.21.20(CSHOG) (V100R021C10), 5.255.22.10(CSHOG) (V100R022C00), 5.255.22.20(CSHOG) (V100R022C10), 5.255.23.10(CSHOG) (V100R023C00), 5.255.23.20(CSHOG) (V100R023C10)

NE	New NE Version	Compatible NE Version
OptiX RTN 980	5.178.24.10(CSHNU) (V100R024C00)	5.178.09.20(CSHNU) (V100R009C10), 5.178.10.10(CSHNU) (V100R010C00), 5.178.10.20(CSHNU) (V100R010C10), 5.178.11.10(CSHNU) (V100R011C00), 5.178.11.20(CSHNU) (V100R011C10), 5.178.19.10(CSHNU) (V100R019C00), 5.178.19.27(CSHNU) (V100R019C10), 5.178.20.20(CSHNU) (V100R020C10), 5.178.20.30(CSHNU) (V100R020C10), 5.178.21.10(CSHNU) (V100R021C00), 5.178.21.20(CSHNU) (V100R021C10), 5.178.22.10(CSHNU) (V100R022C00), 5.178.22.20(CSHNU) (V100R022C10), 5.178.23.10(CSHNU) (V100R023C00), 5.178.23.20(CSHNU) (V100R023C10), 5.83.03.10 (V100R003C00), 5.83.03.30 (V100R003C02), 5.83.03.40 (V100R003C03), 5.83.05.10 (V100R005C00), 5.83.05.20 (V100R005C01), 5.83.06.10 (V100R006C00), 5.83.06.20 (V100R006C10),

NE	New NE Version	Compatible NE Version
		5.83.07.10 (V100R007C00), 5.83.07.20 (V100R007C10), 5.83.08.10 (V100R008C00), 5.83.08.20 (V100R008C10), 5.83.09.10 (V100R009C00), 5.83.09.20 (V100R009C10), 5.83.10.10 (V100R010C00), 5.83.10.20 (V100R010C10), 5.83.11.10 (V100R011C00), 5.83.11.20 (V100R011C10), 5.83.19.10 (V100R019C00)

NE	New NE Version	Compatible NE Version
OptiX RTN 980L	5.179.24.10(CSHLU) (V100R024C00)	5.140.07.10 (V100R007C00), 5.140.07.20 (V100R007C10), 5.140.08.10 (V100R008C00), 5.140.08.20 (V100R008C10), 5.140.09.10 (V100R009C00), 5.140.09.20 (V100R009C10), 5.140.10.10 (V100R010C00), 5.140.10.20 (V100R010C10), 5.140.11.10 (V100R011C00), 5.140.11.20 (V100R011C10), 5.140.19.10 (V100R019C00), 5.140.19.27 (V100R019C10), 5.179.09.20(CSHLU) (V100R009C10), 5.179.10.10(CSHLU) (V100R010C00), 5.179.10.20(CSHLU) (V100R010C10), 5.179.11.10(CSHLU) (V100R011C00), 5.179.11.20(CSHLU) (V100R011C10), 5.179.19.10(CSHLU) (V100R019C00), 5.179.19.27(CSHLU) (V100R019C10), 5.179.20.20(CSHLU) (V100R020C10), 5.179.20.30(CSHLU) (V100R020C10), 5.179.21.10(CSHLU) (V100R021C00),

NE	New NE Version	Compatible NE Version
		5.179.21.20(CSHLU) (V100R021C10), 5.179.22.10(CSHLU) (V100R022C00), 5.179.22.20(CSHLU) (V100R022C10), 5.179.23.10(CSHLU) (V100R023C00), 5.179.23.20(CSHLU) (V100R023C10)
Optix RTN 380AXH	5.212.24.10 (V100R024C00)	5.212.21.22 (V100R021C10), 5.212.22.10 (V100R022C00), 5.212.22.20 (V100R022C10), 5.212.23.10 (V100R023C00), 5.212.23.20 (V100R023C10)
RTN 6900	5.199.24.10 (V100R024C00)	5.199.23.20 (V100R023C10)

 NOTE

Rules for defining commercial versions of NE software: a.bb.cc.dd. "a" indicates the NE platform version. Currently, 4, 5 and 8 are supported. "bb" indicates the product name. "cc" indicates the R version of the product. To be specific, 01 represents R001, 02 represents R002, and so on. "dd" indicates the C version of the product. Mapping principle:

1. If the mapping table provides only the information that a.bb.cc.20 is supported by version A of the Web LCT, a.bb.cc.2x is supported by version A of the Web LCT.
2. If the mapping table provides only the information that a.bb.cc is supported by version A of the Web LCT, a.bb.cc.xx is supported by version A of the Web LCT.

2.2.4 Submarine Series

The following table lists the submarine series NE supported.

Table 2-4 Marine series

NE	New NE Version	Compatible NE Version
OptiX BWS 1600S T16	N/A	5.51.08.10 (V100R006C00), 5.51.09.31 (V100R007C00), 5.51.11.10 (V100R008C00), 5.51.11.20 (V100R008C10)
SLM 1630	N/A	5.61.01.10, 5.61.01.20 (V100R001C02), 5.61.02.10 (V100R002C00), 5.61.02.20 (V100R002C00), 5.61.03.10 (V100R003C00)
SLM 1630 P16	N/A	5.181.03.01 (V100R003C00), 5.181.03.20 (V100R003C10), 5.181.03.50 (V100R003C20)

 NOTE

- Rules for defining commercial versions of NE software: a.bb.cc.dd. "a" indicates the NE platform version. Currently, 4, 5 and 8 are supported. "bb" indicates the product name. "cc" indicates the R version of the product. To be specific, 01 represents R001, 02 represents R002, and so on. "dd" indicates the C version of the product. Mapping principle:
1. If the mapping table provides only the information that a.bb.cc.20 is supported by version A of the Web LCT, a.bb.cc.2x is supported by version A of the Web LCT.
 2. If the mapping table provides only the information that a.bb.cc is supported by version A of the Web LCT, a.bb.cc.xx is supported by version A of the Web LCT.

2.3 WDM/OTN/MSTP/RTN Features and Functions

This section describes the NE management features and functions provided by the Web LCT.

 NOTE

- If the NCE/NCE Lite has logged in to the NE that you are going to manage through the Web LCT, enable **LCT Access Control** and select **Ethernet Access Control** on the NCE/NCE Lite.

2.3.1 Alarm Management

The alarm management feature enables the Web LCT to monitor equipment faults and exceptions in real time and provide alarm details and analytic measures. The feature helps users locate and recover faults fast.

Configuring Alarm Policies

By using alarm monitoring policies, users can:

- Set alarm attributes for NEs, including:
 - Register mode
 - Alarm Reversion
 - Correlation Analysis
 - Delay Reporting
 - Delay in Alarm Generation
 - Delay in Alarm Clearance
 - Alarm Indicator
 - Alarm Threshold for Fade Margin Shortage
 - Alarm Sound
- Set alarm suppression.
- Set alarm severity and automatic reporting.
- Set alarm reversion.
- Set alarm insertion.
- Set alarm indication signal (AIS) insertion.
- Set UNEQ insertion.
- Set the bit error alarm threshold.
- Set the latency difference alarm threshold.
- Enable monitoring of lower order path alarms.
- Save alarm data by printing a report or exporting data.
- Suppress inter-board alarms for RTN NEs.

Browsing Alarms

On the Web LCT, users can:

- Browse current alarms.
- Browse historical alarms.
- Browse the alarms that have not been reported from WDN NEs (NA).
- Browse abnormal events.

- Browse microwave link alarms of RTN NEs.
- Browse statistics on current alarms and abnormal events on the toolbar.
- Turn off the alarm indicator on cabinets.

Alarm Deletion

On the Web LCT, users can delete current alarms of NEs.

2.3.2 Performance Management

The performance management feature enables the Web LCT to collect performance data of NEs, functions, services, and other objects periodically or as triggered. The performance data records the operating status, health status, and quality of the live network.

Configuring Performance Monitoring Policies

By using performance monitoring policies, users can:

- Set start time and stop time for NE performance monitoring.
- Set start time and stop time for Ethernet performance monitoring.
- Set the monitoring status of Ethernet performance events.
- Set performance monitoring status and performance thresholds for boards.

Monitoring Performance

Specifically, users can perform the following operations on the Web LCT:

- Browse the current performance data, historical performance data, unavailable time events (UATs), and threshold crossing records.
- Monitor Ethernet remote monitor (RMON) performance.
- Query the advanced statistical items selected to monitor the packet loss condition of ports.
- Browse the microwave link performance of RTN NEs.
- Monitor Ethernet port traffic.
- Monitor service flow traffic.

Resetting Performance Registers

On the Web LCT, users can reset performance registers for boards.

2.3.3 Security Management

The security management feature involves Web LCT security management, NE security management, and system log management. It safeguards the Web LCT and transport network data.

Web LCT Security Management

The Web LCT provides only one default user, **admin**. To ensure system security, its password needs to be changed periodically.

NE Security Management

- NE user management: Create, modify, and delete NE users.
- NE user group management: Query the NE users included in each NE user group.
- LCT access control: Determine whether the LCT can log in to and manage NEs.
- Online user management: Query online users and force online users out.
- NE security parameter: Query and set NE security parameters, including the warning displayed upon logins to NEs.
- NE security logs: Query NE security logs.

System Log Management

The Web LCT records system logs. Users can filter these logs by operation time, object, or result. The query results can be printed or saved to a file.

2.3.4 Communications Management

The communications management feature enables the Web LCT to provide communications channels for operation, administration and maintenance (OAM) on transport networks.

Specifically, users can perform the following operations on the Web LCT:

- Set the following NE communications parameters:
 - IP address
 - Extended ID
 - Gateway IP address
 - Subnet mask
 - Network service access point (NSAP) address
- Set extended embedded control channel (ECC) parameters for Ethernet ports.
- Set access control, including:
 - Enabling the Web LCT or CLI to access NEs through an Ethernet or serial port.
 - Setting the access rate for the serial port.
- Query the types and communication status of DCC channels.
- Change DCC rates by selecting a D byte for DCC channels.

D Byte	DCC Rate
1 byte (D1-D1)	64 kbit/s
3 bytes (D1-D3)	192 kbit/s
9 bytes (D4-D12)	576 kbit/s
12 bytes (D1-D12)	768 kbit/s

 NOTE

For plesiochronous digital hierarchy (PDH) microwave NEs, select 1 byte (D1-D1) or 3 bytes (D1-D3).

- Set DCC transparent transmission. When Huawei OptiX series equipment is interconnected with other vendors' equipment, D1-D3 bytes can be set to transparently transmit the D bytes of other vendors' equipment and D4-D12 bytes can be set to process the D bytes of Huawei OptiX series equipment.
- Manage IP protocol stacks, including:
 - Querying the IP routing table.
 - Setting Open Shortest Path First (OSPF) parameters.
 - Enabling the Address Resolution Protocol (ARP) proxy for NEs.
- Manage open systems interconnection (OSI), including querying and setting the network-level parameters and routing table.
- Manage OSI tunnels. Users can configure OSI tunnels for NEs at the edge of a non-OSI network. Then the Web LCT is able to manage OSI NEs through the non-OSI network.
- Support DCC transparent transmission through external clock interfaces.

2.3.5 Time Localization

Time localization ensures that the time on the Web LCT is correct when the Web LCT is in a different time zone and DST than NEs.

Specifically, users can perform the following operations on the Web LCT.

- Customize the time format used on the Web LCT.
- Set and query NE time zones.
- Enable or disable DST for NEs.

2.3.6 Report Management

The Web LCT provides various reports. When viewing the reports, users can print the contained data or save the data to a file. If the reports are tabular, users can filter data by NE type and save data to an Excel file.

The Web LCT provides the following reports:

- Board information report
- Board details report
- Subrack information report

2.3.7 MSTP NE Management

NE management consists of the attributes, communications, services, protections, and clock configurations of each NE. The configuration data is stored in the database of the Web LCT and the database of the corresponding NE.

Basic NE Configurations

- Modify NE attributes, including:

- NE name
- NE ID
- Extended NE ID
- Remarks
- Preconfiguration attributes

 NOTE

- NE IDs that need to be set using a DIP switch can be modified on the Web LCT.
- When the preconfiguration function is enabled for an NE, all configurations are performed offline on the NE without affecting any services. These configurations will not be applied to the NE but only saved in the Web LCT database. This function is mainly used for training, or when the NE has not been physically installed.
- Synchronize NE time: Specify the interval or exact time to automatically align the time of all NEs with the system time of the Web LCT server, NTP server, or standard NTP server. You can also set the time and period for automatic NE time synchronization.
 - If you use the scheme of synchronizing with the Web LCT server, all NEs use the Web LCT server time as the standard time. The NE time can be synchronized with the Web LCT server time manually or automatically. The Web LCT server time refers to the system time of the workstation or computer where the Web LCT server is located. This scheme features easy operation, and is applicable in networks that require a low accuracy with regard to time.
 - If you use the scheme of synchronizing with the NTP server or synchronizing with the standard NTP server, the NE time and the Web LCT time are synchronized with the NTP server time or the standard NTP server time automatically. The NTP server can be the Web LCT server or a special time server. This scheme enables the Web LCT and NEs to have a time accuracy of one nanosecond in theory, and applies to a network with high requirement for time accuracy.
- Display boards in plug-and-play (PnP) mode: After being inserted into slots, boards along with their information are automatically displayed in the NE Panel.
- Automatically disable NE functions: NE functions that affect services, such as loopback and automatic laser shutdown (ALS), are disabled at the scheduled time.
- Set environmental monitoring-related parameters, including:
 - PMU interface
 - EMU interface
 - CAU interface
 - TCU interface
 - Temperature attributes
- Support the management of inband DCN.
- Graphically display performance events related to optical power.
- Create boards with adjustable bandwidths for preconfigured NEs.
- Support outdoor racks.

- Support auxiliary interfaces.

NE License Authorization

In the **NE License Authorization** window provided by the Web LCT, you can control the basic functions, enhanced functions, and service access licenses of the TP Assistant, which greatly increases device O&M efficiency.

OSPF Protocol Configuration

The open shortest path first (OSPF) protocol can be used as the network protocol for the Web LCT.

- Manage the OSPF routing and set relevant parameters.
- Enable or disable port-level OSPF and link state advertisement (LSA).
- Import static routes.

Orderwire Configuration

- Set and query the orderwire phone numbers, call waiting time, and orderwire phone port availability.
- Set and query network-wide conference call numbers.
- Set and query the length of subnet numbers and the related subnet of an optical interface.
- Set and query the SDH network node interface (NNI) orderwire phone numbers.
- Set and query the F1 data port.
- Set and query the broadcast data port.

Board Protection Configuration

- Configure board 1+1 protection.
- Configure 1:N tributary protection switching (TPS) protection for a tributary board.
- Configure board-level protection.
- Configure port protection.
- Configure 1+1 IF protection and 1+N IF protection.
- Query the data backup status between the active and standby SCC boards.

SDH Interface Configuration

- Query and configure SDH interface boards that are installed on NEs.
- Configure SDH interfaces.
- Configure circuit emulation service (CES) interfaces.
- Configure plesiochronous digital hierarchy (PDH) interfaces.
- Modify the optical/electrical attributes of the port on a board.
- Configure overhead interfaces, including:
 - Orderwire phone number

- Hotline number
 - Special line number
 - Conference call number
 - Subnet number length
 - F1 data port
 - Broadcast data port
 - Communication port
 - Data port
 - Out-ring route
- Configure the interface of an optical amplifier board.
- Manage the optical power of a board.
- Set tone and data access (TDA) interfaces, including:
 - TDA clock source
 - TDA power feeding
- Query and set overhead bytes, including:
 - Regenerator section overhead (J0)
 - Lower-order path overhead (V5, J2)
 - VC4 higher-order path overhead (J1, C2) and its pass-through or termination
 - VC3 higher-order path overhead (J1, C2)
- Support pseudo-random binary sequence (PRBS).
- Support pre-alerts for port optical power.
- Set and query TUG structures in transmit and receive directions.
- Support lower-order loopback.
- Query the port status of line boards and data boards.
- Manage power consumption.
- Set and query the optical power threshold of line boards.
- Support automatic laser shutdown.
- Configuring Service Mapping for an SDH Port: The port mapping function enables the Web LCT to mount traditional SDH and packet services on lower-order ODUk trails dynamically and map virtual ports to physical ports.

SDH Service and Protection Configuration

- Configure VC12, VC3, VC4 or 3*AU3 services.
- Manage Transmux services, including M13/E13 Transmux and M13/E13 Transmux Server services.
- Configure VC4-4C, VC4-8C, VC4-16C, or VC4-64C concatenated services; bind or unbind services, and select protection groups for them.
- Configure other services, such as enterprise system connection (ESCON) services, 64 Kbit/s services (including TDA board services, Nx64 Kbit/s services), and DSL services.
- Manage subnetwork connection multiple protection (SNCMP) services.

- Activate or deactivate services.
- Manage subnetwork connection protection (SNCP) services.
- Manage subnetwork connection tunnel protection (SNCTP) services.
- Convert SNCP services to normal services or normal services to SNCP services.
- Configure Ethernet ring protection switching (ERPS): Based on the conventional Ethernet mechanism, ERPS uses the Ethernet OAM function and the ring automatic protection switching (R-APS) protocol to achieve fast protection switching on Ethernet ring networks.
- Configure multiple multiplex section protection (MSP) rings by VC4 at a single optical port, which can increase the network resource usage.
- Configure REG. If REG is configured for a line board on the Web LCT, each pair of optical ports (receiving port and transmitting port) of the line board provides more functions than normal. With REG, SDH signals received by the receiving port are directly passed through the regeneration section layer, amplified, and then sent to the transmitting port. The whole process is completed on the board alone without any help from the SCC board or a cross-connect board.
- Query the capacity of higher order and lower-order cross-connections of an NE.

ATM Interface, Service, and Protection Configuration

- Manage ATM interface boards, including:
 - Querying ATM interface boards on NEs
 - Configuring ATM interface boards for NEs
- Query bandwidth of ATM boards.
- Set parameters of ATM interfaces.
- Configure ATM traffic.
- Configure ATM cross-connections, including:
 - Creating an SDH NNI on the ATM processing board
 - Configuring ATM cross-connections
 - Configuring ATM protection groups
 - Configuring ATM protection pairs
 - Configuring the same services for SDH boards as those on ATM boards
 - Activating or deactivating ATM cross-connections
- Configure ATM path binding.
- Perform ATM operation, administration, and maintenance (OAM), including:
 - Setting and querying the segment end attributes of a connection point.
 - Setting and querying the activation status of continuity check (CC) at a connection point.
 - Performing a remote loopback test.
 - Setting and querying the loopback location identifier (LLID) of an NE.
 - Uploading, downloading, or copying the NE OAM data or performing a consistency check on the data.
- Configure an inverse multiplexing over ATM (IMA) group.

Ethernet Interface and Service Configuration

- Query and configure Ethernet interface boards on NEs.
- Configure Ethernet transparent transmission boards that transmit high-rate services.
- Configure Ethernet internal interfaces, including:
 - Basic attributes
 - Tag attributes
 - Network attributes
 - Encapsulation and mapping
 - Link capacity adjustment scheme (LCAS)
 - Bound path
 - Advanced attributes
- Configure Ethernet external interfaces, including:
 - Basic attributes
 - Traffic control
 - Tag attributes
 - Network attributes
 - Advanced attributes
- Configure point-to-point link-state pass through (LPT) or point-to-multipoint LPT.
- Configure or create E-Line services (including Ethernet private line (EPL) services and Ethernet virtual private line (EVPL) services) and configure the bound paths.
- Configure Ethernet private LAN (EPLAN) services: You can create a virtual bridge (VB) and set the following parameters:
 - Service mounting
 - VLAN filtering table
 - VLAN unicast
 - MAC address disabling
 - Bound paths
 - Self-learning MAC address
 - MAC address table capacity of the VB port
 - MAC address table capacity of the VLAN
- Configure Ethernet Layer 2 switching, including:
 - Aging time
 - Spanning Tree Protocol
 - Multiple Spanning Tree Protocol
 - IGMP Snooping Configuration
- Configure QinQ services: QinQ is a VLAN stacking technology that marks users with stacked VLAN tags to expand VLAN resources. You can add, strip, or exchange VLAN tags depending on the scenario.
- Configure Ethernet link aggregation groups (LAGs) that can be divided into intra-board LAGs and inter-board LAGs, including:

- Creating and deleting a LAG.
 - Adding and deleting ports to a LAG.
 - Querying ports in a LAG and the aggregation status.
- Configure the quality of service (QoS), including:
 - Flow
 - Committed access rate (CAR)
 - Class of service (CoS)
 - Flow shaping
 - Port shaping
 - Port policy of the differentiated service (DiffServ) domain
 - CAR policy
 - Weighted random early detection (WRED) policy of ports
 - V-UNI ingress policy
 - V-UNI egress policy
 - PW policy
 - WRED congestion and discarding policy of services
 - QinQ policy
 - Weighted fair queuing (WFQ) scheduling policy
 - WRR scheduling policy
 - CoS mapping
- Check frame receiving and transmitting on Ethernet boards.
- Query information about the peer NE of a data service.
- Provide a QoS template to simplify the QoS configuration for Ethernet services on a per-NE basis.
- Automatically report RMON performance events on Ethernet boards.
- Dump historical RMON performance events on Ethernet boards.
- Perform protocol diagnoses.
- Enable alarms in the event of no traffic at Ethernet ports.
- Configure Ethernet port mirroring and flow mirroring. In this manner, the product does not resolve or process the captured data.
- Set and query the MAC address of a data board.
- Collect traffic statistics for a port.
- Monitor Ethernet port traffic and generate reports.
- Enable the board to respond to ping commands.
- Create flows in batches.
- Manage multi-protocol label switching Label Switching (MPLS) tunnels. The MSTP equipment sets up a label switched path (LSP) to a PE router, identifies LSP labels and service priorities, and encapsulates LSPs into virtual concatenation groups (VCGs) for transmission.
- Configure the control plane, including static routes and address resolution.
- Manage VPLS services.

Ethernet OAM

- Create and configure maintenance nodes.
- Perform a CC check.
- Perform a loopback (LB) check.
- Perform a link trace (LT) check.
- Perform performance detection.
- Enable OAM automatic discovery.
- Query the peer OAM parameters.
- Notify link events.
- Set link monitoring parameters for detecting frame error events, frame error periods, and frame error seconds.
- Implement remote loopback.
- Implement the reporting of Ethernet OAM loopback events.

Clock Configuration

- Configuration of physical clocks
 - Query the clock synchronization status.
 - Set clock source priority, including:
 - Priority table for system clock sources
 - Priority table for phase-locked sources of the first external clock output
 - Priority table for phase-locked sources of the second external clock output
 - Set clock source switching, including:
 - Clock source restoration parameters
 - Clock source switching conditions
 - Performing clock source switching
 - Configure clock subnets, including:
 - Clock subnet
 - Clock quality
 - Synchronization status message (SSM) output control
 - Enable status of clock IDs
 - Set phase-locked sources of external clock output, including:
 - Phase-locked sources of external clock output
 - Attributes of 2M phase-locked sources of external clocks
- Configuration of IEEE 1588 clocks

- Set the selection mode of frequency sources.
- Set the PTP clock source.
- Set the quality level of PTP clock sources.
- Set the priority table of PTP clock sources.
- Configure a PTP clock service.
- Configure the clock interface.
- Set the external clock interface output.
- Configuration of CES ACR clocks
The CES adaptive clock recover (ACR) function, based on CES services, uses the adaptive mode to recover the source clock at the sink. Specifically, the sink equipment can recover the TDM clock (in FIFO mode) according to changes in the buffer for CES services (the buffer changes when receiving packets from the network side). In this manner, clock synchronization can be maintained for services at the sink.
- Unified configuration of clock domains

Configuration of Hybrid MSTP Service Interfaces

You can configure the general, Layer 2, or Layer 3 attributes for an interface to specify the working mode and application scenario of the interface.

General attributes are physical attributes of the interface. Layer 2 attributes are data link layer attributes of the interface, such as ATM attribute, VLAN attribute, and QinQ attribute. Layer 3 attributes are network layer attributes of the interface, such as the IP attribute.

Table 2-5 lists the Hybrid MSTP service interface types that the Web LCT supports.

Table 2-5 Types of Hybrid MSTP service interfaces

Service Interface	Supported Port Mode/ Encapsulation Type	Port Type	Function
PDH interface	General attributes	Physical port	To set general attributes for a PDH interface. The PDH interface configured with general attributes can be used to carry TDM services.

Service Interface	Supported Port Mode/ Encapsulation Type	Port Type	Function
	Layer 3 attributes	Physical port	To make a PPP-enabled PDH interface act as a member in a Multilink PPP (MP) group after Layer 3 attributes have been set for the interface.
	Advanced attributes	Physical port	To set advanced attributes for a PDH interface.
Ethernet interface	General attributes	Physical port	To set general attributes for an Ethernet interface.
	Layer 2 attributes	Physical port	To set Layer 2 attributes for an Ethernet interface. The Ethernet interface configured with Layer 2 attributes can be used to carry user-side or network-side Ethernet services.
	Layer 3 attributes	Physical port	To set Layer 3 attributes for an Ethernet interface. The Ethernet interface configured with Layer 3 attributes can be used to carry tunnels.
	Advanced attributes	Physical port	To set advanced attributes for an Ethernet interface.

Service Interface	Supported Port Mode/ Encapsulation Type	Port Type	Function
	Flow Control	Physical port	Indicates the flow control method used by an Ethernet interface in Non-Autonegotiation Flow Control Mode or Autonegotiation Flow Control Mode . Autonegotiation enables information exchange between two connected NEs, fully exerting their capabilities.

Synchronization Protocol Configuration

In the application scenario of dual-homing, the status of the peer equipment needs to be obtained for the MC LAG. Meanwhile, the actions on both sides need to be negotiated based on different fault cases. With the method of adding information of the peer end, a channel is established for control status synchronization with the peer end. In this manner, the control packets can be transmitted and received through the channel and link fault detection can be performed.

LAG/MC LAG Configuration

A LAG aggregates multiple Ethernet physical links to form a logical link of faster rate for transmitting data. This function improves the link availability and increases link capacity.

The MC LAG supports the ability to share load between aggregation group equipment.

The Web LCT supports the ability to set the following LAG/MC LAG attributes:

- Load sharing type, including sharing and non-sharing
- LAG type, including manual and static
- Load sharing hash algorithm of the LAG
- Port priority and system priority of the LAG

LMSP Configuration

Linear MSP protection contains 1+1 linear MSP and 1:N linear MSP. They use the protection channel to protect services that are transmitted on the working channel. When the working channel fails, services are switched to the protection channel. The linear MSP applies to the POS interface and structured STM interface.

The Web LCT supports the following functions of LMSP configuration:

- Creates a linear MSP.
- Checks the linear MSP switching status.
- Performs linear MSP switching.

MSTP Configuration

The multiple spanning tree protocol (MSTP) can be used to clear loops on a network. Using an algorithm, the MSTP blocks redundant trails so that the loop network can be trimmed as a non-loop tree network. In this case, broadcast storms caused by the proliferation and endless cycling of packets on the loop network do not occur. Different from the STP and RSTP that use only one spanning tree to correspond to all VLANs, the MSTP introduces the mapping between VLANs and multiple spanning trees, and therefore can forward data according to VLAN packets and achieve load balance of VLAN data.

- Configure parameters of port groups and network bridges.
- Configure CIST and MSTI parameters.
- Query CIST status and MSTI status.

IGMP Snooping Configuration

The Internet group management protocol snooping (IGMP snooping) is a scheme of multicast constraints on Layer 2 equipment, and is used to manage and control multicast groups.

- Configure IGMP Snooping protocol parameters.
- Configure quick leaving ports.
- Manage routes.
- Configure route member ports.
- Query statistics of IGMP protocol packets.

LPT Configuration

LPT is used to return the remote-end link status to the near end. The near-end equipment performs operations depending on the remote-end link status. When the intermediate transmission network of the services becomes faulty, the LPT informs the access equipment at both ends of the transmission network to enable the backup network. This ensures the normal transmission of the important data.

The Hybrid MSTP NEs support configuring point-to-point LPT and point-to-multipoint LPT.

QoS Configuration

QoS indicates the performance of the data flow that travels through a network. The QoS is used to ensure end-to-end service quality. The QoS cannot increase the bandwidth, but it can minimize the delay and jitter in the network by appropriately allocating and monitoring network resources. In this way, the quality of important services is ensured.

The DiffServ (DS) domain consists of a group of network nodes that enable the DiffServ function, that is, DS nodes. In a DS domain, all DS nodes use the same service provision policy to realize the same per-hop behavior (PHB). The DS nodes are classified into edge DS nodes and internal DS nodes. The edge DS nodes usually perform complex flow classification on the traffic that enters the DS domain. Traffic of different types is marked with different PHB service types. For internal DS nodes, you need to perform only simple flow classification based on PHB service type.

The Web LCT supports the following QoS functions:

- Configures QoS profiles.
- Configures DiffServ domains.
- Configures ATM CoS mapping.
- Configures simple flow classification and complex flow classification.
- Configures CAR and Shaping.
- Configures the WFQ scheduling policy.
- Configures the port WRED policy.
- Configures the service WRED policy.
- Configures WRR scheduling policy.
- To simplify the operation and share some common QoS configuration parameters, the Web LCT supports creating QoS function point policies as follows: port policy, ATM policy, V-UNI ingress policy, V-UNI egress policy, PW policy and QinQ policy. By using these function point policies, you can bind the CAR configuration attribute, shaping configuration attribute, flow classification configuration attributes, WFQ Schedule policy, WRED policy and WRR scheduling policy.
- Configure CoS queue mapping.
- Supports the application of the QoS policy to multiple NEs by configuring QoS profile.

MPLS Tunnel Configuration

MPLS is a type of transmission technology used to transparently transmit data packets between users. The MPLS tunnel is the tunnel defined in the MPLS protocol. Independent from the service, the MPLS tunnel realizes end-to-end transmission and carries the PWs related to the service.

The Web LCT supports configuring the following functions of the MPLS tunnel on a per-NE basis:

- Configures general attributes of the MPLS.
- Configures static unicast MPLS tunnels.

- Creates forward and backward MPLS tunnels at the same time.
- Creates static and bidirectional MPLS tunnels.
- Manages PWs.
- Manages tunnel labels and PW labels.

Configuration of the MPLS Tunnel Protection Group

- Create and configure an MPLS tunnel 1+1 protection group and MPLS tunnel 1:1 protection group, including the switching mode, revertive mode, WTR time, and hold-off time.
- Perform MPLS tunnel protection switching.
- Query the switching status of MPLS tunnel protection.

MS-PW Configuration

By creating multi-segment pseudo wires (MS-PWs) to transmit services, you can transmit services over different networks while saving tunnel resources.

PW APS Configuration

As a network protection mechanism, PW automatic protection switching (APS) is intended to protect the services on the working PW with a protection PW. That is, when the working PW is faulty, the services on the working PW are switched to the protection PW. In this manner, the services on the working PW are protected.

You can perform the following PW APS operations on a per-NE basis:

- Create a protection group.
- Bind the master and slave protection pairs.

CES Configuration

CES configuration is mainly used for transparent transmission of TDM circuit switching data on the PSN network.

- Create PWs for a CES service.
- Create UNI-UNI and UNI-NNI CES services.
- Create CES services with the following two modes:
 - Structure-aware TDM circuit emulation service over packet switched network (CESoPSN)
 - Structure-agnostic TDM over packet (SAToP)
- Configure QoS for CES services.
- Configure transparent transmission for CES service alarms.
- Create CES services using either of the following transparent transmission modes: common or SOH.
- Change the tunnel where PWs are carried in in-service mode.

ATM Service Configuration

ATM emulation service is mainly used to transparently transmit ATM services in the PTN.

The Web LCT provides the following configuration functions for ATM service creation:

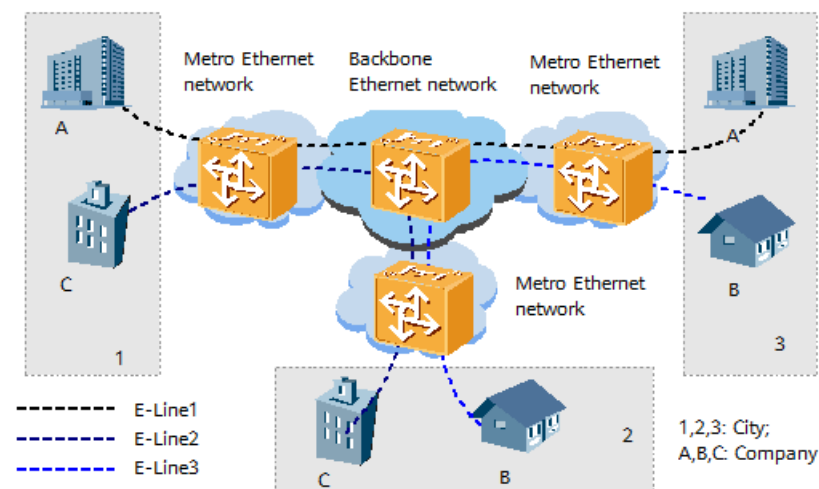
- Create an ATM service with multiple ATM connections.
- Creates UNI-UNI and UNIs-NNI ATM services.
- Create ATM services using one of the following connection types: PVP, PVC, or port transparent.
- Creates PWs for an ATM service.
- Configures IMA groups.
- Configures QoS for ATM services.
- Configures CoS mapping.
- Selects the tunnel that carries PWs without interrupting services.

E-Line Service Configuration

The E-line service is a point-to-point Ethernet service. The equipment transmits user packets from the user side to the network side based on Port or Port+VLAN. In this way, service data can be transparently transmitted in a point-to-point manner.

See [Figure 2-2](#). Company A has branches in City 1 and City 3. Company C has branches in City 1 and City 2. Branches of Company A or Company C that are in different cities have data communication requirements. The Hybrid MSTP equipment can provide E-line services for Company A and Company C, to meet their communication requirements. In addition, the service data can be completely isolated.

Figure 2-2 E-Line service



The Web LCT supports the following functions of configuring E-line services on a per-NE basis:

- Creates UNI-UNI E-Line services.
- Creates UNI-NNI E-Line services that are carried on ports.

- Creates UNI-NNI E-Line services that are carried on PWs.
- Creates UNI-NNI E-Line services that are carried on QinQ links.
- Configures QoS for the PWs of an E-Line service.
- Configures V-UNI groups.
- Selects the tunnel that carries PWs without interrupting services.

E-AGGR Service Configuration

E-AGGR services are multipoint-to-point Ethernet services. The equipment uses several ports to access services from the V-UNI side, and converges the services into one PW at the network side for transmission. In this way, service data from multiple points can be converged into one point.

See [Figure 2-3](#) and [Figure 2-4](#). One carrier wants to construct a 3G network. Services of each Node B are converged and transported to the RNC. The data between each Node B and RNC is regarded as one service. At the convergence point, the QoS parameters such as the overall bandwidth are specified.

Figure 2-3 E-AGGR service scenario 1

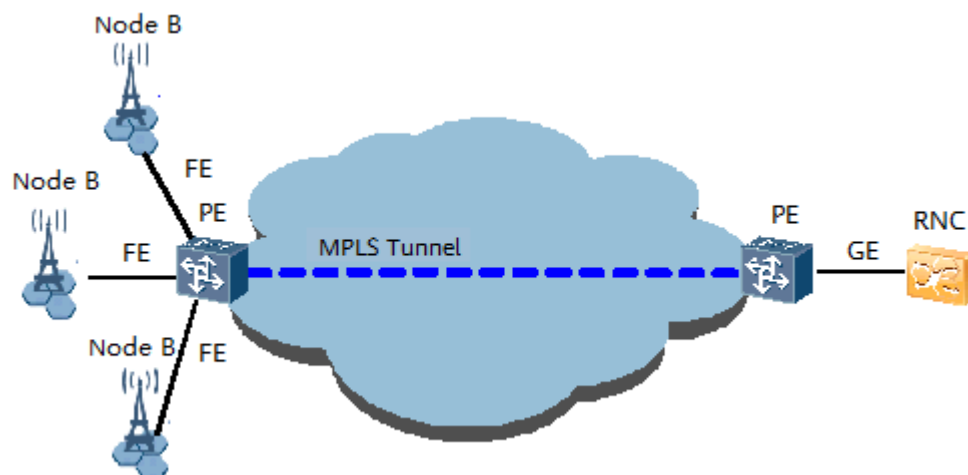
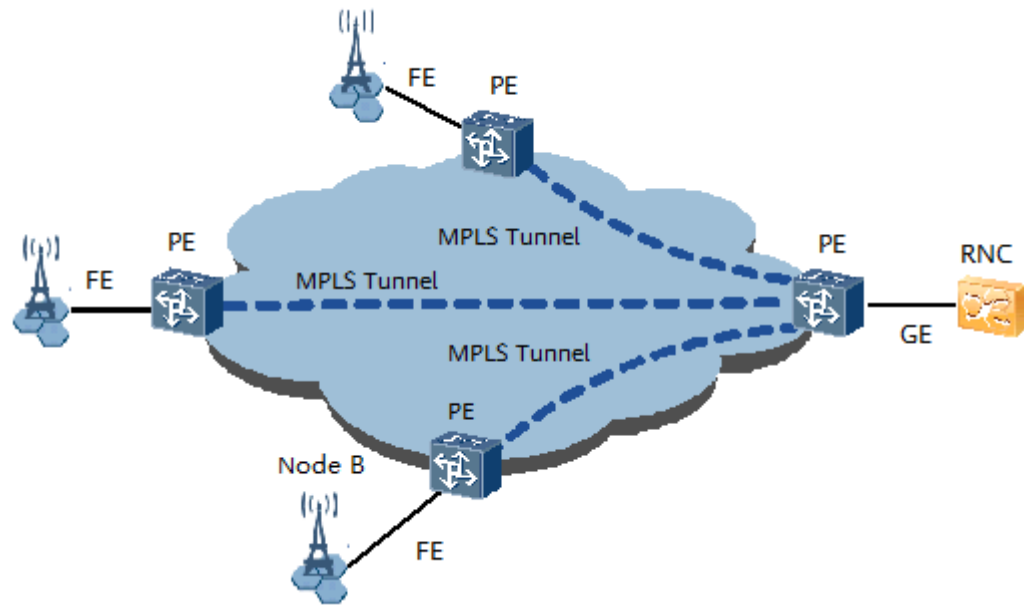


Figure 2-4 E-AGGR service scenario 2



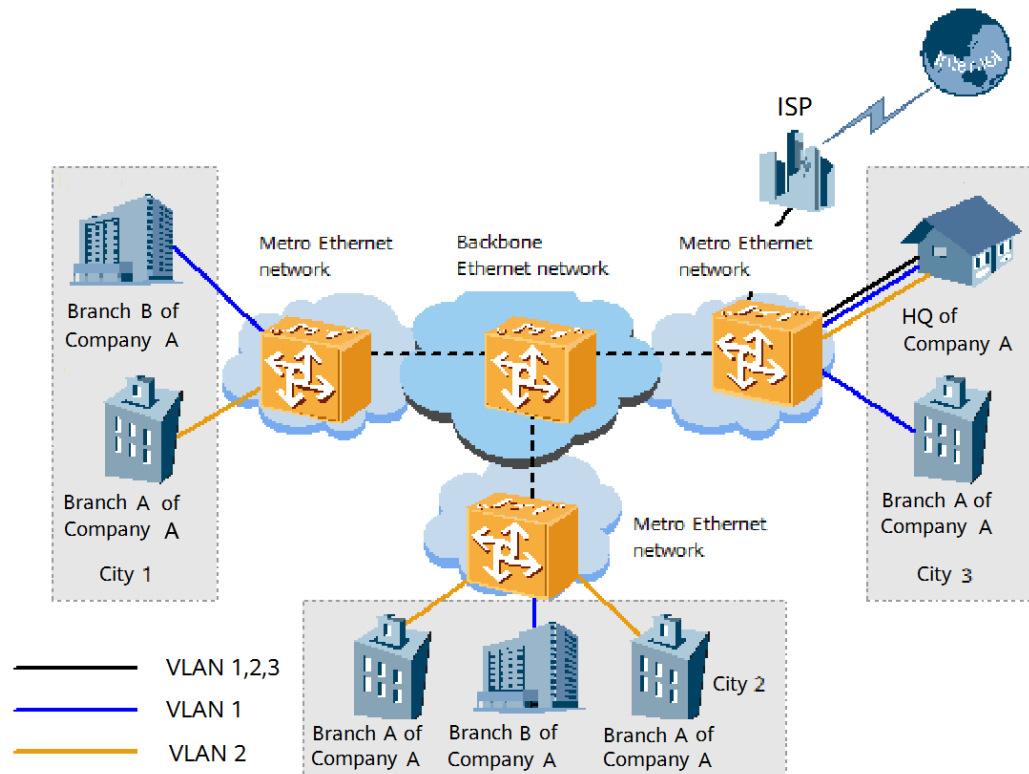
The Web LCT supports the following functions of configuring E-AGGR services on a per-NE basis:

- Configures the VLAN forwarding table items of an E-AGGR service.
- Configures QoS for the PWs for an E-AGGR service.
- Configures V-UNI groups.
- Selects the tunnel that carries PWs without interrupting services.

E-LAN Service Configuration

The E-LAN is a multipoint-to-multipoint Ethernet service. It connects to multiple V-UNI and NNI access points. It realizes packet forwarding and interconnection by using the MAC address self-learning scheme of layer 2.

See [Figure 2-5](#). The HQ of Company A is in City 3. Company A has Branch A in City 1, City 2, and City 3, and has Branch B in City 1 and City 2. Branch A and Branch B do not have business with each other. The data should be isolated between the two branches. The HQ has requirements of communicating with each branch and accessing the Internet.

Figure 2-5 E-LAN service

Different VLANs are used to identify service data of different branches by using the E-LAN service. In this way, data is shared within a branch and is isolated from other branches. The Internet data of the HQ is also isolated from the internal service data by using the VLAN.

The Web LCT supports the following functions of configuring E-LAN services on a per-NE basis:

- Creates E-LAN services that are carried on port.
- Creates E-LAN services that are carried on QinQ links.
- Creates E-LAN services that are carried on PW.
- Configures QoS for the PWs for an E-LAN service.
- Configures V-UNI and NNI interfaces for an E-LAN service.
- Configures the split horizon group of an E-LAN service.
- Configures V-UNI groups.
- Configures MAC address learning parameters.
- Configures the unknown frame processing mode.
- Configures the static MAC address.
- Configures the disabled MAC address.
- Configures the self-learning MAC address.

MPLS OAM Configuration

MPLS OAM refers to a group of OAM functions that can check the quality of LSPs in an MPLS network. The MPLS OAM scheme can effectively detect, report, and handle a defect inside the network at the MPLS layer in addition to triggering protection switching when a malfunction occurs.

The Web LCT provides the following functions of configuring MPLS OAM:

- Configures MPLS OAM parameters of a tunnel.
- Performs tunnel CV/FFD check.
- Performs tunnel ping check.
- Performs tunnel traceroute check.
- Performs PW ping check.
- Performs PW traceroute check.
- Enables or disables the FDI.

ATM OAM Configuration

ATM OAM refers to a group of end-to-end OAM functions that can check the quality of ATM links that pass through multiple NEs. The ATM OAM functions check an ATM link by inserting some OAM cells of the standard cell structure to the user cell flow.

The Web LCT provides the following functions of configuring ATM OAM:

- Sets segment end attributes.
- Performs a CC activation test.
- Performs remote loopback.
- Sets LLID.
- Configures ATM alarm transmission

MPLS-TP OAM Configuration

Complying with MPLS-TP standards, MPLS-TP OAM provides the following OAM functions for MPLS-TP networks:

- Checking, discovering, and locating a defect inside the network at the MPLS layer.
- Reporting and handling the defect.
- Triggering protection switching when a fault occurs.

This feature provides the following functions:

- Setting MEP parameters.
- Performing a CC check.
- Performing ping tests.
- Performing traceroute tests.
- Performing LB tests.
- Performing LT tests.

- Checking packet loss ratios and delay.
- Performing LCK and TST tests.
- Setting MIP parameters.

MPLS OAM Switching

This feature provides the following functions:

- Switching OAM recommendations.
- Switching to the OAM dual-stack mode.

Setting SNMP NMS Parameters

When the OSS obtains alarm and performance data from NE over SNMP, you need to configure IP address and permission control parameters of OSS on the Web LCT.

Query the Core Routing Table

To quickly check whether the communication between the created NE and the gateway NE is normal during deployment in the scenario where hybrid MSTP NEs use in-band DCN protocol for communication.

Setting PCM Interfaces

The SDH equipment on a transport network integrates some pulse code modulation (PCM) interfaces, including FXO and FXS ports and 2-wire/4-wire AF EM interfaces. The main service scenarios are as follows:

- Z interface extension service: FXO and FXS ports work in pairs to implement transparent telephone transmission. Common telephones can connect directly to a private branch exchange (PBX) which extends to NEs with the FXO and FXS ports. Each telephone port occupies a 64 kbit/s E1 channel.
- Hotline service: FXO and FXS ports work in pairs to implement E-Line telephone services. It mainly completes the end-to-end voice communication between stations. Users can communicate with each other by just picking up the phone, that is, no dialing is required.
- 2-wire/4-wire AF EM regeneration: The PBXs are connected to transport NEs through the 2-wire/4-wire + EM interfaces. The EM interfaces transmit signaling and the 2-wire/4-wire ports transmit voice data. The transport NEs act as the regenerators of signaling and voice data.
- End-to-end control signal transmission: EM ports are used independently to transmit connection and disconnection signals through only one channel. In this manner, switch signals are transmitted remotely to implement remote control.

MPLS Ring Protection Management

This feature adds an independent ring layer, which does not affect services. The MPLS ring protection, similar to SDH ring protection, provides reliable protection capabilities to withstand multi-node failures. This feature provides the following functions:

- To discover MPLS rings automatically.
- To view the topology of MPLS rings.
- To refresh and query the protection switching status of MPLS rings.
- To create MPLS protection ring protection.
- To manage MPLS ring protection.
- To delete MPLS ring protection.
- To bind a tunnel to or unbind a tunnel from a protected MPLS ring.
- To unbind multiple tunnels from a protected MPLS ring at a time.
- To diagnose faults on protected MPLS rings.
- To display alarms for protected MPLS rings.
- To configure or delete the intersecting nodes of protected MPLS rings.

Maintaining and Troubleshooting

- IP Ping: In mobile backhaul scenarios, to diagnose a fault, engineers usually must find out on which network the fault occurred. IP ping enable you to preliminarily locate the fault on the transport or wireless network.
- Data Service Performance Test: E-Line service indicators such as the throughput and latency can be tested on the Web LCT to avoid costly and inefficient meter tests.

2.3.8 WDM/OTN NE Management

Network element (NE) management consists of attributes, communications, services, protections, and clock configurations of each NE. The configuration data is stored in the database of the Web LCT and the database of the corresponding NE.

NOTE

- Web LCT cannot manage the packet boards and EoS boards of WDM or OTN devices.

Basic NE Configurations

- Synchronize NE time: Specify the interval or exact time to automatically align the time of all NEs with the system time of the Web LCT server, NTP server, or standard NTP server. You can also set the time and period for automatic NE time synchronization.
 - If you use the scheme of synchronizing with the NMS server, all NEs use the NMS server time as the standard time. The NE time can be synchronized with the NMS server time manually or automatically. The NMS server time refers to the system time of the workstation or computer where the NMS server is located. This scheme features easy operation, and is applicable in networks that require a low accuracy with regard to time.
 - If you use the scheme of synchronizing with the NTP server or synchronizing with the standard NTP server, the NE time and the NMS time are synchronized with the NTP server time or the standard NTP server time automatically. The NTP server can be the NMS server or a special time server. This scheme enables the NMS and NEs to have a time

accuracy of one nanosecond in theory, and applies to a network with high requirement for time accuracy.

- Inform users of board replacement by blinking an indicator on the control board.
- If you set **Automatic Disabling of NE Function**, service-affecting operations, such as loopback and ALS, will be automatically disabled after the specified period. When the time for performing a service-affecting operation exceeds a certain period, the operation is disabled automatically.
- Modify the following NE attributes:
 - NE name
 - NE ID
 - NE extended ID
 - Remarks
- Environment monitor information: Set the NE fan speed and monitor the temperature and voltage.
- Search for and create NEs by automatically discovering NE IP addresses.
- When a faulty board is replaced, related indicators on the Web LCT will blink.
- View board legends and the meanings of different colors in the NE panel.
- Create the virtual WDM NE to simulate the network NE during the network planning.
- Configuration rollback management: If the NE is improperly operated and becomes unreachable to Web LCT, you can use the configuration rollback function to roll the NE configuration back to the state before the NE is unreachable.

NE License Authorization

In the **NE License Authorization** window provided by the Web LCT, you can control the basic functions, enhanced functions, and service access licenses of the TP Assistant, which greatly increases device O&M efficiency.

Orderwire Configuration

- Set a board as an orderwire board and query the orderwire board information.
- Set and query the orderwire phone numbers, call waiting time, dialing mode, and orderwire phone port availability.
- Set and query network-wide conference call numbers.
- Set and query the length of subnet numbers and the related subnet of an optical interface.

Optical Layer Configuration

- Schedule and manage wavelengths based on ITU-T recommendations.
- Schedule and manage wavelengths based on Flex Grid.
- Configure automatic commissioning at the optical layer for OptiX OSN 1800: The commissioning aims to establish data communication network (DCN) communication between the Web LCT and OptiX OSN 1800s, discover the adjacent nodes of each OptiX OSN 1800, and maintain high optical performance of main optical routes.

WDM Board Configuration

- Configure optical transponder units.
- Configure optical multiplexer and demultiplexer boards.
- Configure optical amplifier boards.
- Configure protection boards.
- Configure optical tributary and line boards.
- Configure PID boards.
- Configure spectrum analysis boards.
- Configure optical supervisory channel boards.
- Configure optical add/drop multiplexer boards.
- Configure variable optical attenuation boards.
- Configure dispersion compensation boards.
- Configure wavelength management boards.

Dynamically manage ports.

Query the line rate of the optical transport network (OTN).

You can set channels in batches, including customer information.

Each wavelength channel name supports a maximum of 127 characters, 84 of which can be Japanese characters. (Verification is required.)

Overhead Configuration

Configure OTN overheads.

- Configure and query section monitoring (SM) overheads.
- Configure and query optical transmission section (OTS) overheads.
- Configure and query path monitoring (PM) overheads.
- Configure and query tandem connection monitoring (TCM) overheads.
- Query optical channel payload unit (OPU) overheads.
- Configure and query fault type and fault location reporting channel (FTFL) overheads.
- Configure and query multiframe structure identifier (MSI) overheads.
- Configure and query reserved for future international standardisation (RES) overheads.

Supports SDH overhead configuration.

- Configure regenerator section overheads (J0).
- Configure VC4 higher-order path overheads (J1 and C2) and pass-through or termination.

WDM Service Configuration

Configure ADM for GE/FC services at an optical add/drop multiplexer (OADM) station by using the OTU board.

- Configure several WDM service boards in specified slots to form a cross-connect board group.

- Enable the add/drop, pass-through, and loopback functions for GE/FC services in each cross-connect board group.

Configure electrical cross-connections.

- Configure electrical cross-connections, which allows you to control service flow at the electrical layer, and to dynamically groom, converge, or split sub-wavelength services. In this manner, the networking capability and network survivability are greatly enhanced.
- Implement unified grooming based on GE, ODU0, ODU1, ODU2, ODU3, ODU4 and ODUflex services through the XCS board.
- Implement distributed grooming based on GE services, ODU0, ODU1, ODU2, ODU3 and ODU4 services, and Any services.
- Configure unidirectional and bidirectional SNCP at the ODU3, ODU2, ODU1, ODU0, ODUflex and ODU4 level.

Configure optical cross-connections.

- Dynamically create optical cross-connections.
- Manage optical cross-connections on boards and NEs including creating, activating, deactivating, deleting and querying such boards and NEs.
- Create, query, or delete edge ports.
- Configure NE-level optical broadcast services.

Implement transparent transmission for 100GE services.

Manage services.

- Lock WDM trails and display the lock status.
- Display client trails and server trails of a service.
- Query client trails and server trails of a service.

Manage service packages for the OptiX OSN 1800, OSN 6800 and OSN 8800 series. The service package module can complete typical service configurations, which frees engineers from having to perform onsite commissioning and also reduces the costs involved with deployment commissioning and maintenance. In addition, one-click configuration is supported.

Manage licenses controlling the service types and cross-connect capacity for the OptiX OSN 8800 series and OSN 9800 series.

ROADM Configuration

By using the reconfigurable optical add/drop multiplexer (ROADM) function, you can perform add/drop and pass-through configurations for optical channels. The WDM equipment can use the wave selective switch (WSS) to implement the ROADM function.

- Configure ROADM based on the WSS, including the WSSD + WSSM and WSS + RMU/ROAM networks. This mode applies to cross-connect nodes on a ring.
- Configure ROADM based on multiplexer and demultiplexer boards: Wavelengths cannot be groomed dynamically. This mode applies to common nodes on chain networks.

Clock Configuration

- Specify the clock source that the SCC board traces.
- Define clock source priorities.
- Configure a clock source for a board.
- Configure transparent transmission for an external clock.
- Configure a clock for the SCC board, including:
 - Configuring clocks for optical supervisory channel boards
 - Specifying the clock source that the SCC board traces
 - Defining clock source priorities

PTP Clock (IEEE 1588v2 Clock) Configuration

- Configure the frequency source mode.
- Configure PTP clock synchronization attributes.
- Query the clock source received at a port.
- Configure a PTP clock subnet.
- Configure PTP packet attributes.
- Configure an external time interface.

Physical Clock Configuration

- Configure the input attributes of external clock sources.
- Configure the priority table for system clock sources.
- Configure clock source protection and clock source switching.
- Configure phase-locked sources of external clock output.
- Configure the quality of clock sources.

WDM Protection Configuration

- Configure optical line protection.
- Configure extended OLP protection.
- Configure port protection.
- Configure optical wavelength share protection (OWSP).
- Configure board 1+1 protection, including:
 - Configuring 1+1 protection for SCC boards
 - Configuring 1+1 protection for cross-connect and synchronous timing (XCS) boards
 - Performing working/protection switching
 - Querying the switching status
- Configure Client 1+1 Protection.
- Configure SNCP protection, including:
 - Configuring sub-wavelength (SW) SNCP protection for OTU boards with GE services or Any services
 - Configuring SNCP protection for ODUk services

- Configuring MS SNCP protection
- Configuring VLAN SNCP protection for Ethernet boards
- Performing working/protection switching
- Querying the switching status
- Adding to SNCP Group Set
- Configure board protection switching (BPS).
- Configure a distribute board protect system (DBPS). The DBPS protects the 10 gigabit Ethernet (10GE) and GE ports on TBE boards. The cross-connection granularity is GE service.
- Configure ODUk SRPing base on ODU1, ODU2, ODU3 and ODU4.
- Query data backup status between the active and standby SCC boards that are configured with 1+1 protection.

Optical Power Adjustment

- Manage the optical power: Query the input power, output power, and power thresholds of each WDM board.
- Perform intelligent power adjustment (IPA): In the event of a fiber cut, the optical amplifier board detects signal loss at the local station. The local station reports an event to the Web LCT. After the event is confirmed, the optical amplifier boards at the upstream and downstream stations reduce their output power to a safe level to protect fiber maintenance engineers from being injured by the laser emitted from the cut fiber. After the fiber is reconnected, the optical signals are restored and the optical power of each optical amplifier board automatically returns to normal levels.
- Configure pre-alerts for optical power at ports.

Dispersion Compensation

Perform 40 Gbit/s dispersion compensation configurations. The tunable dispersion compensator (TDC) can be used for precise dispersion adjustment.

Wavelength Monitoring

On the Web LCT, you can perform wavelength monitoring management for the OptiX OSN 6800, the OptiX OSN 1800 series and the OptiX OSN 8800 series.

WDM PRBS

On the Web LCT, you can perform pseudo-random binary sequence (PRBS) tests on boards to check the path quality. You can also verify that the WDM link is functioning properly before service provisioning.

SDH Board Configuration

- Configure SDH ports dynamically.
- Adjust the rates of optical ports on SDH boards.
- Query port status.
- Supports the configuration of SDH interfaces, PDH interfaces, and Framed E1 interfaces.

- PCM board port management.
- PRBS test.
- Virtual port mapping.
- Supports the configuration of the sub-rate encapsulation mode and 8 kbit/s and 64 kbit/s services.

SDH Service and Protection Configuration

- Configure VC12, VC3, VC4, VC4-4C, VC4-16C, VC4-64C services.
- Configure SNCP services.
- Convert SNCP services into common services and vice versa.
- Configure linear multiplex section protection (MSP). On a chain network, the MSP protection uses bytes K1 and K2 in the SDH multiplex section overhead (MSOH) to transmit protocol information to control the transmit and receive paths of services.
- Configure an MSP ring, including two-fiber bidirectional MSP ring and four-fiber bidirectional MSP ring.
- Supports board-level protection.

Submarine Cable Line Management

Managing submarine cable line on the Web LCT:

- Create unidirectional or bidirectional submarine cable lines.
- Modify unidirectional or bidirectional submarine cable lines.
- Manage underwater devices.
- Activate unidirectional or bidirectional submarine cable lines.
- Delete unidirectional or bidirectional submarine cable lines.

Submarine Cable Line Monitoring

Web LCT supports submarine line monitoring, you can monitor and test the status of fibers and repeaters, and analyze test data for status monitoring and fault locating in a submarine system.

- Monitor the status of submarine lines and repeaters without interrupting services.
- Locate faults quickly.
- Locate faults on submarine lines for interrupted services.
- Perform a variety of tests, including manual tests, comparison tests in singletest mode, and comparison tests in periodic mode.
- Synchronize, query, and analyze test data.
- Refresh monitoring information in real time.
- Query the gain report and event report.
- Monitor forward and reverse submarine cable lines at the same time.
- Query the testing status of local and peer NEs.
- Query the submarine cable line diagram.

Submarine Line Terminal Equipment Management

The submarine line terminal equipment OptiX BWS 1600S T16 provides electricallayer services access and management.

Web LCT provides the following functions for the submarine line terminal equipment:

- Support configuring NE basic attributes:
 - Search for and create NEs by automatically discovering NE IP addresses.
 - Synchronize NE time.
 - Query physical inventories.
 - Implement automatic disabling of NE functions.
 - Modify NE attributes.
- Support extended C-band and 25 GHz channel spacing (at the rate of 10 Gbit/s).
- Support alarm cascading and signal control in the same rack.
- Support configuring orderwire.
- Support configuring WDM Services: implement unified grooming based on SDH service, Ethernet services, ODUk services.
- Support configuring overheads:
 - Configure WDM overheads: including OCh overheads, OTU overheads, ODU overheads, OPU overheads.
 - Configure OTN overheads: including PM overheads, TCM overheads, FTTL overheads, SM overheads, OPU overheads.
- Support configuring WDM protection:
 - Configure optical line protection.
 - Configure extended OLP protection.
 - Configure inter-board wavelength protection.
 - Configure inter-shelf 1+1 optical channel protection.
 - Configure 1+1 wavelength protection on the client.
 - Configure 1:N optical channel protection.
 - Configure 1+N optical channel protection.
 - Configure ODUk SNCP.
- Support configuring IPA.
- Support configuring APE.
- Support configuring LPT.
- Support configuring PRBS test.

BU Management

- Create BUs.
- Maintain BUs.
- Switch power supply over BUs.
- Delete BUs.

FC Service Test

You can perform FC service tests on the Web LCT with the 12LOM board, instead of the FC test instrument (such as the SmartBits). By performing such tests, you can determine whether FC service lines and the devices under test are working properly.

2.3.9 WDM ASON Network Management

An automatically switched optical network (ASON) is a new-generation optical network that integrates switching and transport functions. After a user initiates a service request, the ASON network automatically selects a route. The network then automatically establishes and removes connections through signaling control. A WDM ASON NE refers to a device that has both WDM and ASON features. The Web LCT combines ASON and WDM features to perform WDM ASON network management.

ASON Management on a Per-NE Basis

- Enable or disable ASON features.
- Manage ASON NE IDs.
- Manage the control plane status.
- Manage optical layer control plane parameters and electrical layer control plane parameters, including the bandwidth usage (%), bandwidth weight, distance weight(only supported electrical layer), hop weight, delay weight, and custom cost weight.
- Manage LMP control channels.
- Manage LMP TE links.
- Implement LMP automatic discovery.
- Manage OSPF control links.
- Manage OSPF TE links.
- Manage OSPF IP addresses.
- Manage OSPF protocol authentication.
- Manage the RSVP protocol authentication.
- Manage WDM fiber resource thresholds.
- Manage WDM ASON trails.
- Maintain ASON signaling.
- Maintain the ASON switching controller.
- Manage the status of the LMP protocol.
- Manage the status of the OSPF protocol.
- Manage the auto-reporting status of control plane alarms.
- Manage the severities and suppression status of control plane alarms.
- Query the SCN control route.
- Manage control plane performance parameters.
- Query control plane performance.
- Manage resource reservation.

- Manage the resource usage status.
- Manage wavelength performance monitoring of the auxiliary ASON function.
- Manage wavelength performance status of a board.
- Manage OMS with abnormal line attenuation.

2.3.10 RTN NE Management

NE management refers to the configurations of an NE in terms of attributes, communications, services, protections, and clocks. The configuration object is a single NE. The data is saved to the Web LCT NE layer database and to the NE database.

Basic NE Configurations

- Modify NE attributes, including:
 - NE name
 - NE ID
 - Extended NE ID
 - Remarks
 - Gateway IP address
 - Gateway port
- Synchronize NE time: Specify the interval or exact time to automatically align the time of all NEs with the system time of the Web LCT server, NTP server, or standard NTP server. You can also set the time and period for automatic NE time synchronization.
 - If you use the scheme of synchronizing with the Web LCT server, all NEs use the Web LCT server time as the standard time. The NE time can be synchronized with the Web LCT server time manually or automatically. The Web LCT server time refers to the system time of the workstation or computer where the Web LCT server is located. This scheme features easy operation, and is applicable in networks that require a low accuracy with regard to time.
 - If you use the scheme of synchronizing with the NTP server or synchronizing with the standard NTP server, the NE time and the Web LCT time are synchronized with the NTP server time or the standard NTP server time automatically. The NTP server can be the Web LCT server or a special time server. This scheme enables the Web LCT and NEs to have a time accuracy of one nanosecond in theory, and applies to a network with high requirement for time accuracy.
- Implement automatic NE function disabling: NE functions that affect services, such as loopback and automatic laser shutdown (ALS), are disabled at the scheduled time.
- Set environment monitoring interfaces.
- Implement automatic creation of RTN NEs: Creating an NE (Searching for the NE), Creating an NE Manually.
- Support the license management function for equipment.
- Support the press-to-install function for logical boards.

- Search for the opposite NE.
- Query the microwave performance events.
- Query physical bandwidth and bandwidth usage of the port.
- Perform IP Address-based Ping tests and traceroute tests.
- Test the fade margin.
- Manage outdoor racks.
- Support the database restoration from peer.
- Support RTN NEs fault auto recovery.
- Support align antenna.
- Support RTN NEs 1+1 Configuration Sync.
- Support XPD meter-free test.
- Support Wi-Fi security management.
- Support Radio Interface Encryption.
- Support CPRI Mode Setting.
- Support MIMO Configuration.
- Support test CPRI/OBSAI delay.
- Support configuration rollback: If the NE is improperly operated and becomes unreachable to Web LCT, you can use the configuration rollback function to roll the NE configuration back to the state before the NE is unreachable.

IF Cable Hardware Test

After hardware installation is complete, IF cables can be tested in a one-click manner to diagnose hardware faults.

NE License Authorization

In the **NE License Authorization** window provided by the Web LCT, you can control the basic functions, enhanced functions, and service access licenses of the TP Assistant, which greatly increases device O&M efficiency.

Orderwire Configuration

- Set and query the order wire phone numbers, call waiting time, and orderwire phone port availability.
- Set and query the bytes occupied by orderwires.
- Set and query the F1 data interface.
- Set and query the broadcast data interface.

Equipment Protection Configuration

- Configure 1+1 board protection.
- Configure 1+1 IF protection.

Interface Configuration

- Set the parameters for an SDH interface.

- Set automatic laser shutdown.
- Set the parameters for a PDH interface.
- Set the parameters for an IF interface.
- Set the parameters for a digital interface.
- Set the parameters for an outdoor unit (ODU) interface.
- Set overhead interfaces, including:
 - Orderwire
 - Broadcast data interface
- Query and set the overhead bytes including:
 - Regenerator section overhead (J0).
 - Lower-order path overhead (V5, J2)
 - VC-4 higher-order path overhead (J1, C2) and its pass-through or termination.
 - VC-3 higher-order path overhead (J1, C2).
- Enable IEEE 1588 overhead bytes.
- Perform PRBS testing.
- Set the parameters for an Ethernet virtual interface.
- Set the parameters for a serial interface.
- Configure enhanced compression.

Configure microwave links based on hop

Web LCT support configuring basic attributes for the local and remote NEs of a single-hop microwave link.

- Configure the NE and link attributes for both the local and remote NEs of a single-hop microwave link.
- Configure the IF attribute, RF attribute and IF protection for both the local and remote NEs of a single-hop microwave link.
- Configure the PLA, LAG, XPIC based on a single-hop microwave link.
- View the optical power of the microwave link in graph.
- View the radio link performance: Collect statistics on power and bit error rates (BERs) of the NEs at both ends of a radio link and view the statistics in a graph or table. You can also quickly query the current and historical performance of the two NEs, which improves routine maintenance efficiency.
- View the radio link alarm: Browse radio link alarms to obtain the important intermediate frequency information and alarm information of the NEs on both ends of a radio link.
- Configure loopback based on radio link: View or set the loopback status of the IF interface or ODU interface at the two ends of a radio link.
- View the microwave link frequency scan: Scan frequencies for IF 1+1 protection groups and XPIC groups in cascading and non-cascading scenarios at the two ends of a radio link.

Scanning ODU Frequency Interference

When channel interference occurs, the commonly-used method is using special instruments to check whether transmit frequencies are interfered with. However, using special instruments to scan frequencies is not cost-effective. You can use the automatic frequency scanning function provided by the Web LCT instead.

NE Offline Configuration

During new deployment, NEs can be created in offline mode. The general process is as follows: create and configure an NE on the NMS in offline mode, export the NE data to a script, import the script into the Web LCT, and apply configuration data in the script to the NE. Multiple NEs can be created in this manner at the same time, which significantly improves the NE configuration efficiency.

One-Click Microwave Link Acceptance Test for RTN NEs

The one-click microwave link acceptance test function for RTN NEs abandons the traditional item-by-item testing method. Test reports are generated after acceptance tests are complete. You can check these reports together. In this manner, the test and report generation efficiency is improved.

LLDP Configuration

LLDP is a link layer communication protocol. LLDP allows a piece of equipment attached to an Ethernet to advertise, to its adjacent equipment attached to the same Ethernet, information such as its major capability, management address, equipment identifier, and interface identifiers. The information distributed by this protocol is stored by its recipients in a standard management information base (MIB), making it possible for the information to be accessed by a network management system (NMS).

RTN Service and Protection Configuration

- Configure VC-12, VC-3, or VC-4 services.
- Switch between an SNCP service and an ordinary service.
- Modify attributes of SNCP services.
- Perform SNCP protection switching.
- Configure 1+1 linear MSP and 1:N linear MSP.
- Configure 1+1 IF or N+1 IF protection.
- Configure REG.
- Configure MSP rings.
- Configure the XPIC feature.
- Configure the hybrid radio and the AM features, carry E1 and Ethernet services, and enhance the availability of radio links.
- Query for the AM mode adjustment history.
- Configure Ethernet ring protection (support ERPS V1 and V2).

Ethernet Interface and Service Configuration

- Configure internal Ethernet interfaces, including:
 - TAG attributes
 - Encapsulation/mapping
 - Network attributes
 - Link capacity adjustment scheme (LCAS)
 - Bound path
- Configure external Ethernet interfaces, including:
 - Basic attributes
 - Flow control
 - TAG attributes
 - Network attributes
 - Advanced attributes.
- Configure jumbo frames.
- Configure QinQ types.
- Configure Ethernet private line (EPL) services.
- Configure EVPL (QinQ) services.
- Configure Ethernet private LAN (EPLAN) services. You can create a new virtual bridge (VB) and configure the following: service mount, VLAN filtering, VLAN unicast, disable MAC address, bound path, self-learning MAC address, and VLAN MAC address table capacity.
- Test frame receiving and sending on Ethernet boards.
- Configure QoS, including:
 - Flow
 - CAR
 - CoS
 - Port shaping
 - Board shaping
- Configure Ethernet Layer 2 switching, including:
 - Aging time
 - Spanning tree
 - IGMP snooping management.
- Perform operations of diagnosing protocol faults and restoring protocols.
- Configure point-to-point LPT management and point-to-multipoint LPT management.
- Configure intra-board Ethernet LAGs.
- Configure the RMON performance functions such as browsing history groups of Ethernet ports, setting an alarm group of Ethernet ports, collecting performance statistics of a group, and setting a history control group.
- Manage VPLS services.
- Configure the mirroring of Ethernet ports to facilitate packet listening, routine maintenance, and in-service commissioning. In this manner, the product does not resolve or process the captured data.

- Support E-LAN LD test management.

Clock Configuration

- Query the clock synchronization status.
- Set clock source priority, including:
 - Priority for system clock sources
 - Priority for phase-locked sources of the first external clock output
 - Priority for phase-locked sources of the second external clock output
- Set clock source switching, including:
 - Clock source restoration parameters
 - Clock source switching conditions
 - Clock source switching
- Configure clock subnets, including:
 - Clock subnets
 - Clock quality
 - Synchronization status message (SSM) output control
 - Clock ID status
- Set phase-locked sources of external clock output, including:
 - Phase-locked sources of external clock output
 - Attributes of 2M phase-locked sources of external clocks.
- Support frequency selection mode.
- Support clock source group configuration.
- Support PTP profile Configuration:IEEE-1588v2, G.8275.1.

Ethernet OAM Management

Configuring the 802.1ag Ethernet OAM:

- Configure maintenance domains (MDs), maintenance associations (MAs), maintenance points (MPs), and Test ID.
- Perform continuity checks.
- Perform LB checks.
- Perform LT checks.
- Perform ping tests.
- Execute performance tests.

Configuring the 802.3ah Ethernet OAM:

- Enable OAM self-loop detection.
- Enable OAM automatic discovery.
- Notify link events and adjust the OAM error frame monitoring threshold.
- Perform remote loopbacks.

IS-IS Protocol Configuration

The Web LCT uses the intermediate system-to-intermediate system (IS-IS) protocol for the network control plane, and provides the following functions:

- Configure IS-IS protocol instances.
- Enable the IS-IS protocol for a port.
- Import routes.
- Configure link TE information.

OSPF Protocol Configuration

The Web LCT uses the open shortest path first (OSPF) protocol for the network control plane, and provides the following configuration functions:

- Configure OSPF protocol instances.
- Enable the OSPF protocol for a port.
- Import routes.
- Configure link TE information.
- Configure Multi-Area OSPF management.

MPLS Signaling Protocol Configuration

The Web LCT supports the configuration of the following signaling protocols:

- RSVP-TE protocol: Resource reservation protocol-traffic engineering (RSVP-TE) is derived from the RSVP protocol. The RSVP protocol is a type of QoS protocol. The RSVP protocol reserves resources for specific services in a network to ensure service quality. With the developments in TE, the RSVP protocol has been further developed to support LSP deployments.
- LDP protocol: Label distribution protocol (LDP) is an MPLS control and signaling protocol.

RTN equipment supports dynamic LSP connections by means of the RSVP-TE protocol and PW connections by means of the LDP protocol.

Static Route Management Configuration

The Web LCT supports the configuration of static route management.

Address Resolution Configuration

The Web LCT supports the configuration of address resolution.

IEEE 1588 Packet Clock Configuration

- Configure the frequency source selection mode.
- Set the PTP system time.
- Configure a PTP clock subnet.
- Configure a PTP clock service.
- Set the WTR time for a PTP clock source.

- Set the PTP clock source priority.

ACR Clock Configuration

You can configure the CES ACR or 1588 ACR clock or clock domain.

LAG Configuration

A link aggregation group (LAG) aggregates multiple Ethernet physical links to form a logical link with a faster data transmission rate. This configuration improves link availability and increases link capacity.

The Web LCT supports the configuration of the following LAG attributes:

- Configure the load sharing type, including sharing and non-sharing.
- Configure the LAG type, including manual and static.
- Configure the service distribution algorithm of the LAG.
- Configure the port priority and system priority of the LAG.

BFD Configuration

The bidirectional forwarding detection (BFD) protocol can be used to check the Ethernet link

BFD is a simple Hello protocol. It is similar to the neighbor detection of well-known protocols in many aspects. A pair of systems periodically sends detection packets on the bidirectional channel where sessions between the two systems were created. If one system does not receive any detection packets from the other within a specified period, that system assumes that there is a failure on the bidirectional channel.

QoS Configuration

Quality of service (QoS) refers to the performance of the data flow transmission in a network. The QoS is used to ensure end-to-end service quality. The QoS cannot enhance the bandwidth, but it can minimize the delay and jitter in a network by properly allocating and monitoring network resources. In this way, the service quality is ensured.

The DiffServ (DS) domain consists of a group of network nodes with the DiffServ function. Nodes of this type are also called DS nodes. In a DS domain, all DS nodes adopt the same service provisioning policy to achieve the same per-hop behavior (PHB). DS nodes are classified into edge DS nodes and internal DS nodes. Edge DS nodes usually perform complex flow classification on the traffic that enters the DS domain. Traffic of different types is marked with different PHB service types. Internal DS nodes only need to perform simple flow classification based on PHB service types.

The Web LCT supports the following QoS configurations:

- Configure Diffserv domains.
- Configure ATM CoS mapping.
- Configure simple flow classification and complex flow classification.

- Configure CAR and shaping.
- Configure WFQ scheduling policies.
- Configure port WRED policies.
- Configure WRR scheduling policies.
- Simplify operations and share some common QoS configuration parameters. The Web LCT enables users to create QoS function point policies. The function point policies consist of port policies, ATM policies, and V-UNI ingress policies. By using these function point policies, you can bind configurations for CAR attributes, shaping attributes, flow classification attributes, WFQ scheduling policies, WRED policies and WRR scheduling policies.

MS PW Configuration

By creating multi step (MS)-PW to transmit services, you can transmit services over different networks while saving tunnel resources.

PW Dual-Homing Protection Configuration

As a network protection mechanism, PW automatic protection switching (APS) is intended to protect the services on the working PW with a protection PW. That is, when the working PW is faulty, the services on the working PW are switched to the protection PW. In this manner, the services on the working PW are protected.

As a network protection mechanism, PW fast protection switching (FPS) is intended to protect the services on the working PW with a protection PW. That is, when the working PW, core equipment or link between core equipment and RNC(Radio Network Controller) is faulty, the node core equipment switches services to the protection PW. In this manner, services are protected.

PWs with UDP Encapsulation

The Web LCT supports PWs with UDP encapsulations that are carried in IP tunnels.

MPLS Tunnel Configuration

The Multi-Protocol Label Switch (MPLS) protocol allows service packets to transmit transparently. The MPLS tunnel is defined by the MPLS protocol. Independent of services, an MPLS tunnel enables E2E transmission and provides channels for service-related PWs.

The Web LCT supports the following configurations and operations on MPLS tunnels on a per-NE basis:

- Configure basic attributes of the MPLS.
- Configure static unicast MPLS tunnels.
- Create forward and backward MPLS tunnels at the same time.
- Create the E-LSP.
- Manage PWs.
- Manage tunnel labels and PW labels.

MPLS Tunnel Protection Group Configuration

The Web LCT supports the following configurations and operations on MPLS tunnel protection groups:

- Create 1+1 MPLS tunnel protection groups and 1:1 MPLS tunnel protection groups that consist of the switching mode, revertive mode, wait-to-restore (WTR) time, and hold-off time.
- Perform MPLS tunnel protection switching.
- Query the protection switching status of an MPLS tunnel.

IP Tunnel and GRE Tunnel Configuration

If the equipment in the IP network does not support the MPLS tunnel, PWE3 services can be carried in the IP network by using IP tunnels or GRE tunnels.

IP tunnels and GRE tunnels mainly apply to the offload scenarios of mobile communication.

The Web LCT supports the configuration of bidirectional IP tunnels and GRE tunnels on a per-NE basis.

The Web LCT supports the offload protection between MPLS and IP or GRE tunnels.

RSVP Tunnel Configuration

RSVP tunnels are flexibly deployed dynamic tunnels. After the source and sink nodes are manually selected, the MPLS protocol automatically calculates tunnel routes. You can specify route restrictions to route the tunnel to the desired path. To keep services secure, you can configure hot backup protection for tunnels.

CES Service Configuration

CES is used for transparent transmission of switching data on TDM circuits in packet transport networks.

The Web LCT provides the following configuration functions for CES Service creation:

- Create PWs for a CES service.
- Create UNI-UNI and UNI-NNI CES services.
- Create CES services in CESoPSN and SATop modes. CESoPSN is short for structure-aware TDM circuit emulation services over packet switched network and SAToP is short for structure-agnostic TDM over packet.
- Configure QoS for CES services.
- Configure the value for idle timeslot recovery.
- Create CES services using either of the following transparent transmission modes: common or SOH.
- Calculate CES.

ATM Service Configuration

ATM emulation service is mainly used to transparently transmit ATM services in packet transport networks.

The Web LCT supports the following functions when users create ATM services:

- Create an ATM service with multiple ATM connections.
- Create UNI-UNI and UNI-NNI ATM services.
- Create ATM services using one of the following connection types: PVP, PVC, or port transparent.
- Create PWs for an ATM service.
- Configure IMA groups.
- Configure QoS for ATM services.
- Configure CoS mapping.

E-Line Service Configuration

E-line services are a point-to-point Ethernet service. The equipment transmits user packets from the user side to the network side based on Port or Port+VLAN. Service data can be transparently transmitted in a point-to-point manner.

The Web LCT supports the following functions when users create E-line services on a per-NE basis:

- Create UNI-UNI E-Line services.
- Create UNI-NNI E-Line services through ports.
- Create UNI-NNI E-Line services that are carried on PWs.
- Create UNI-NNI E-Line services that are carried on QinQ links.
- Configure QoS for the PWs of an E-line service.
- Configure V-UNI groups.

E-LAN Service Configuration

The E-LAN is a multipoint-to-multipoint Ethernet service. It connects to multiple V-UNI and NNI access points. It realizes packet forwarding and interconnection by using the MAC address self-learning scheme of layer 2.

Different VLANs are used to identify service data of different branches by using the E-LAN service. In this way, data is shared within a branch and is isolated from other branches. The Internet data of the HQ is also isolated from the internal service data by using the VLAN.

The Web LCT supports the following functions of configuring E-LAN services on a per-NE basis:

- Create E-LAN services that are carried on port.
- Create E-LAN services that are carried on QinQ links.
- Create E-LAN services that are carried on PW.
- Configure V-UNI and NNI interfaces for an E-LAN service.
- Configure the split horizon group of an E-LAN service.

- Configure V-UNI groups.
- Configure MAC address learning parameters.
- Configure the unknown frame processing mode.
- Configure the static MAC address.
- Configure the disabled MAC address.
- Configure the self-learning MAC address.
- Support the automatic loopback test for Ethernet services.
- Allow users to enable Ethernet services manually.

E-AGGR Service Configuration

E-AGGR services are a multipoint-to-point Ethernet service. The equipment uses several ports to access services from the V-UNI side and then converges the services into one PW at the network side for transmission. Service data from multiple points can be converged into one point.

The Web LCT supports the following configurations for E-AGGR services on a per-NE basis:

- Configure VLAN forwarding table items of an E-AGGR service.
- Configure QoS for the PWs of an E-AGGR service.
- Configure V-UNI groups.

IGMP Snooping Configuration

The Internet group management protocol snooping (IGMP snooping) is a scheme of multicast constraints on Layer 2 equipment, and is used to manage and control multicast groups.

The Web LCT supports the configuration of IGMP snooping for E-LAN services, and provides the following operations:

- Configure IGMP Snooping protocol parameters.
- Configure quick leaving ports.
- Manage routes.
- Configure route member ports.
- Query statistics of IGMP protocol packets.

MPLS OAM Configuration

MPLS OAM refers to a group of OAM functions that can check the quality of LSPs in an MPLS network. The MPLS OAM scheme can effectively detect, report, and handle a defect inside the network at the MPLS layer in addition to triggering protection switching when a malfunction occurs.

The Web LCT provides the following configurations for MPLS OAM:

- Configure MPLS OAM parameters for tunnels.
- Perform tunnel CV/FFD checks for tunnels.
- Perform tunnel ping checks.

- Perform tunnel traceroute checks.
- Perform PW ping checks.
- Perform LSP/PW traceroute checks.
- Enables or disables the FDI.

ATM OAM Configuration

ATM OAM refers to a group of end-to-end OAM functions for ATM services that can check the quality of an ATM link with multiple NEs. The ATM OAM functions check an ATM link by inserting some OAM cells with standard cell structures into the user cell flow.

The Web LCT provides the following configurations for ATM OAM:

- Set segment end attributes.
- Perform CC activation tests.
- Perform remote loopbacks.
- Set the LLID.
- Perform fault notification.

Setting SNMP NMS Parameters

When the OSS obtains alarm and performance data from NE over SNMP, you need to configure IP address and permission control parameters of OSS on the Web LCT.

Setting Control Plane DCN Packet Priority and Bandwidth

In a DCN in which packets travel on the control plane, DCN and service packets share the same forward channels. Therefore, you need to set the control plane DCN packet priority and bandwidth.

Configuring Layer 2 DCN

In the Layer 2 data communication network (DCN) solution, the Web LCT implements NE management through Layer 2 forwarding. DCN data is encapsulated into Ethernet frames and forwarded at Layer 2 between NEs.

Configuring PLA

Physical link aggregation (PLA) allows all Ethernet transmission paths in several Integrated IP radio links connected to the same equipment to be aggregated as a PLA. For MAC users, a PLA works as a single link.

MPLS-TP OAM Configuration

Complying with MPLS-TP standards, MPLS-TP OAM provides the following OAM functions for MPLS-TP networks:

- Checking, discovering, and locating a defect inside the network at the MPLS layer.

- Reporting and handling the defect.
- Triggering protection switching when a fault occurs.

This feature provides the following functions for tunnels and PWs:

- Switching OAM recommendations.
- Setting MEP parameters.
- Performing a CC check.
- Performing ping tests.
- Performing traceroute tests.
- Performing LB tests.
- Performing LT tests.
- Checking packet loss ratios and delay.
- Performing LCK and TST tests.
- Setting MIP parameters.

NE Loop

You can loop back all ports and query loopback ports on an NE.

Data Service Performance Test

E-Line service indicators such as the throughput and latency can be tested on the Web LCT to avoid costly and inefficient meter tests.

Simplifying the 1+1 hot standby(HSB) protection configuration

Creating 1+1 hot standby(HSB) protection is simplified to set parameters for four NEs in one window.

Fast Provisioning of P2MP

- APs can be configured on the Web LCT.
- Remote terminals (RTs) do not need to be configured on the Web LCT and work immediately after being replaced.
- Microwave and access NEs can be monitored by the same Web LCT.

Configuring CA

Carrier Aggregation (CA) allows multiple channels to be aggregated as a CA group to achieve higher logical bandwidth.

2.4 WDM/OTN NE Management(VRP)

This section describes the NE management functions for the WDM/OTN NEs (VRP) provided by the Web LCT.

Basic NE Configurations

- Display boards in plug-and-play (PnP) mode: After being inserted into slots, boards along with their information are automatically displayed in the NE Panel.
- Modify the following NE attributes:
 - NE name
 - NE ID
 - NE extended ID
 - Remarks
 - Preconfiguration attributes
- Environment monitor information: Set the subrack temperature alarm threshold, power management, and NE fan attributes.
- View board legends and the meanings of different colors in the NE panel.

Overhead Configuration

Configure OTN overheads.

- Configure and query section monitoring (SM) overheads.
- Configure and query optical transmission section (OTS) overheads.
- Configure and query path monitoring (PM) overheads.
- Configure and query tandem connection monitoring (TCM) overheads.
- Query optical channel payload unit (OPU) overheads.
- Configure and query fault type and fault location reporting channel (FTFL) overheads.
- Configure and query multiframe structure identifier (MSI) overheads.
- Configure and query reserved for future international standardisation (RES) overheads.

Alarm Function

- Query current and historical alarms.
- Set alarm attributes.
- Queries and sets alarm suppression status.
- Queries and sets alarm severity and automatic reporting status.

Communication Functions

- Set communications parameters.
- ECC management.
- Access control.
- ECC link management.
- Manages the IP protocol stack.
- Core routing table.
- DCN and DCC management.

NE Security Management

- Manages NE communication services.
- Query NE operation logs.

WDM Service Configuration

Configure ADM for GE/FC services at an optical add/drop multiplexer (OADM) station by using the OTU board.

- Configure several WDM service boards in specified slots to form a cross-connect board group.
- Enable the add/drop, pass-through, and loopback functions for GE/FC services in each cross-connect board group.
- Configure wavelength cross-connection protection (WXCP) with working and protection cross-connections configured on the sink NE.

Configure electrical cross-connections. Configure electrical cross-connections to control service flow at the electrical layer, and to dynamically groom, converge, or split sub-wavelength services. In this manner, the networking capability and network survivability are greatly enhanced.

Configure optical cross-connections.

- Dynamically create optical cross-connections.
- Manage optical cross-connections on boards and NEs including creating, activating, deactivating, deleting and querying such boards and NEs.
- Create, query, or delete edge ports.
- Configure NE-level optical broadcast services.

Implement transparent transmission for 100GE services.

WDM Protection Configuration

- Configure board 1+1 protection, including:
 - Configuring 1+1 protection for SCC boards
 - Configuring 1+1 protection for cross-connect and synchronous timing (XCS) boards
 - Performing working/protection switching
 - Querying the switching status
- Query data backup status between the active and standby SCC boards that are configured with 1+1 protection.

Optical Power Adjustment

Manage the optical power: Query the input power, output power, and power thresholds of each WDM board.

3 Getting Started

To help you better understand the Web LCT, this chapter describes some basic operations on it.

[3.1 Connecting Web LCT to NEs](#)

To configure and manage NEs by using the Web LCT, you need to connect the Web LCT to the NEs.

[3.2 Starting Web LCT](#)

This section describes how to start the Web LCT for configuring and managing NEs on it.

[3.3 Logging In to Web LCT](#)

This section describes how to log in to the Web LCT from Internet Explorer.

[3.4 Shutting Down Web LCT](#)

This section describes how to shut down the Web LCT.

[3.5 Window Description](#)

This section describes some main windows of the Web LCT and their functions.

[3.6 Operation Precautions](#)

This section describes the precautions that users must observe to ensure proper work of the Web LCT.

3.1 Connecting Web LCT to NEs

To configure and manage NEs by using the Web LCT, you need to connect the Web LCT to the NEs.

Procedure

- Method 1: Through a network cable
 - a. Insert a network cable into the Web LCT server.
 - b. Route the cable to the desired NE and connect its RJ-45 connector to the NMS interface of the NE.
- Method 2: Through a data communication network (DCN)
 - a. Connect the Web LCT server to a DCN with a network cable.

- b. Insert another Ethernet cable into the NMS interface of the NE desired and route the cable to the DCN.

----End

3.2 Starting Web LCT

This section describes how to start the Web LCT for configuring and managing NEs on it.

Prerequisites

The Web LCT has been correctly connected to NEs.

Context

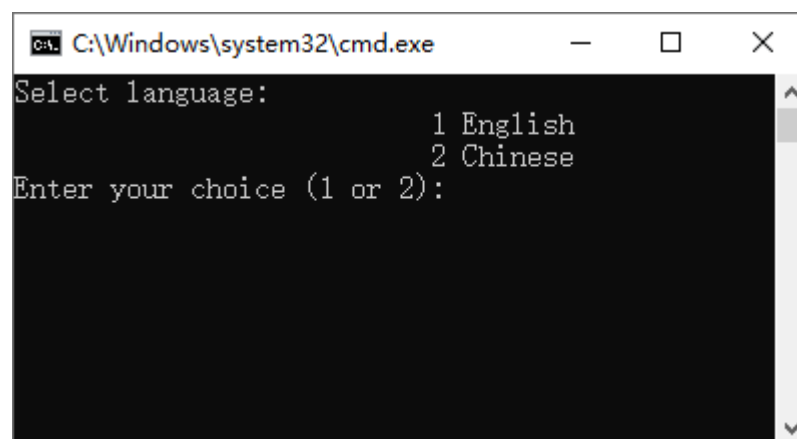
- By default, if four incorrect passwords are entered consecutively, the current account will be locked. Five minutes later, it will be automatically unlocked.
- If three incorrect passwords are entered consecutively, the verification code will show on the login page.
- If a password has expired or will expire in 10 days, the Web LCT prompts users to change the password when the users log in to the Web LCT.
- By default, the NE data configuration window of the Web LCT can be left inactive for 15 minutes. If no operation is performed within 15 minutes, the Web LCT automatically returns to the login page. Users have to re-log in to the Web LCT and reconnect to NEs because NEs have automatically gone offline.

Procedure

Step 1 Start the computer.

Step 2 Double-click the **Decompression directory\WebLCT\startweblct.bat** script to start the Web LCT.

Step 3 Enter the target language of the Web LCT as prompted, as shown in the following figure.



 NOTE

To switch the Web LCT language, double-click **Decompression directory\WebLCT\stopweblct.bat** to stop the Web LCT service. Then, start the Web LCT and select a language.

Step 4 On the user login page in the target language, enter the **User Name**, **Password** and **Confirm password**.

 NOTE

The default user name is **admin**. If you log in to the Web LCT for the first time, set the password as prompted. After the password is initialized, you need to log in again.

Step 5 Click **Login**, the Web LCT displays the NE list.

----End

Follow-up Procedure

- To ensure user security, click  after logging in to the Web LCT and set account and password policies in the **Set Security Policy** dialog box. For details, see [3.5.3 Set Security Policy](#).
- To ensure user security, click  after setting the security policies and change the password in the **Changing Password** dialog box. For details, see [3.5.2 Changing Passwords](#).

3.3 Logging In to Web LCT

This section describes how to log in to the Web LCT from Internet Explorer.

Prerequisites

- The Web LCT server is running correctly.
- The pop-up blocker of Internet Explorer is turned off.

Context

- The Web LCT server can be accessed only on the local computer. Therefore, keep the default server address of 127.0.0.1.
- By default, if four incorrect passwords are entered consecutively, the current account will be locked. Five minutes later, it will be automatically unlocked.
- If three incorrect passwords are entered consecutively, the verification code will show on the login page.
- If a password has expired or will expire in 10 days, the Web LCT prompts users to change the password when the users log in to the Web LCT.
- By default, the NE data configuration window of the Web LCT can be left inactive for 15 minutes. If no operation is performed within 15 minutes, the Web LCT automatically returns to the login page. Users have to re-log in to the Web LCT and reconnect to NEs because NEs have automatically gone offline.

Procedure

Step 1 Open Internet Explorer.

Step 2 Optional: To set the compatibility view in Internet Explorer 10, do as follows:

1. Choose **Tools > Compatibility View Setting** from the main menu.
2. In the **Compatibility View Setting** dialog box, enter **localhost** in the **Add this website** text box and click **Add**. Select **Display intranet sites in Compatibility View** and **Include updated website lists from Microsoft**.
3. Click **Close**.
4. Re-open Internet Explorer.

Step 3 Enter **https://127.0.0.1:13443/web/lct** in the IP address box.

NOTE

- **127.0.0.1** is the IP address of the server computer and **13443** is the port number.
- This uniform resource locator (URL) is case-sensitive.

Step 4 In the login page, enter a password.

NOTE

- The default user name is **admin**. If you log in to the Web LCT for the first time, set the password as prompted. After the password is initialized, you need to log in again.
- If the password is incorrect, click **Reset** to clear the password and enter a new one.

Step 5 Click **Login**, the Web LCT displays the NE list.

-----End

Follow-up Procedure

- To ensure user security, click  after logging in to the Web LCT and set account and password policies in the **Set Security Policy** dialog box. For details, see [3.5.3 Set Security Policy](#).
- To ensure user security, click  after setting the security policies and change the password in the **Changing Password** dialog box. For details, see [3.5.2 Changing Passwords](#).

3.4 Shutting Down Web LCT

This section describes how to shut down the Web LCT.

Prerequisites

You have logged in to the Web LCT.

Procedure

Step 1 Click  to close the opened NE Explorer.

- Step 2 Click  to close the NE list.
- Step 3 Double-click the **Decompression directory\WebLCT\stopweblct.bat** script to stop the Web LCT service.
- End

3.5 Window Description

This section describes some main windows of the Web LCT and their functions.

3.5.1 NE List

The home page of the Web LCT is an NE list. This list contains all the NEs managed by the Web LCT and supports the following operations: adding NEs, logging in to NEs, logging out of NEs, deleting NEs, backing up NE databases, browsing system logs, setting the time format.

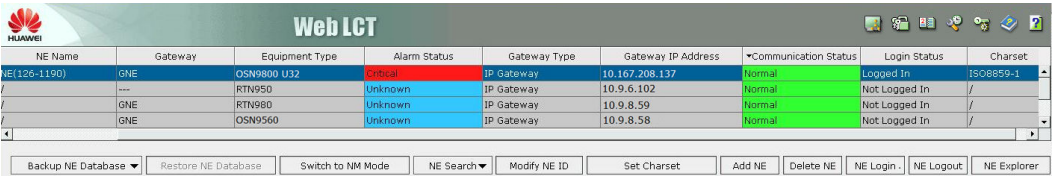
 NOTE

- The NE list is displayed after you successfully log in to the Web LCT client.
- The NE list is automatically refreshed every 5 seconds.
- A tooltip is displayed after the pointer hovers over any shortcut icon in the NE list for 2 seconds.
- The Web LCT can back up NE databases to control boards so that NE configuration data can be saved.

GUI

Figure 3-1 shows the NE list on the Web LCT.

Figure 3-1 NE list



Shortcut Icons

Icon	Name	Description
	DC Login	Logs in to the NE Software Management client.
	Logout	Logs off the current user and returns to the login page.
	System Log	Browses operation logs.

Icon	Name	Description
	Time Format	Sets the time format.
	Change Password	Changes passwords.
	Security Policy	Configures security policies.
	Help	Obtains help information.
	About	Obtains information about the Web LCT.

Buttons

Button	Description
NE Search	Searches for NEs.
Modify NE ID	Modifies an NE ID.
Set Charset	Sets a character set for an NE.
Add NE	Adds an NE.
Delete NE	Deletes NEs.
NE Login	Logs in to an NE.
NE Logout	Logs out of an NE.
Back Up NE Database	Backs up an NE database. Three methods are available: Automatically Backup to CF Card , Manually Backup to CF Card , and Backup to SCC .
Restore NE Database	Restores an NE database from a backup.
NE Explorer	Opens the NE Explorer.

Shortcut Menus

Shortcut Menu	Description
NE Login	Displays the NE Login dialog box.
NE Explorer	Displays the NE Explorer .

Shortcut Menu	Description
NE Logout	Changes the status of the selected NE to unlogged.
Reconnect	Reconnects to the NE if the communication status is abnormal.
Delete NE	Deletes the selected NEs.
Modify NE ID	Displays the Modify NE ID dialog box for modifying an NE ID.
Set Charset	Sets the character set for the NE.
Automatically Backup to CF Card	Backs up the NE data automatically to the CF card.
Manually Backup to CF Card	Backs up the NE data manually to the CF card.
Backup to SCC	Backs up the NE data to the Flash database.
EMK Check	Sets EMK check passwords for NEs and sets the parameters related to service encryption.

Parameters

Field	Value	Description
NE ID	Format: Extended ID-ID For example: 9-127	Indicates the NE ID that uniquely identifies an NE.
NE Name	For example: NE127	Indicates the NE name.
Gateway	GNE, - - -	Specifies whether the NE is a gateway NE (GNE).
Equipment Type	For example: OSN6800, OSN3800, RTN610, RTN620, RTN605	Indicates the product name.
Alarm Status	Unknown, Normal, Critical, Major, Minor, Warning	Indicates the alarm status of the NE, which is determined by the highest alarm severity.

Field	Value	Description
Gateway Type	IP Gateway, SSL Gateway NOTE SSL Gateway is recommended because of its higher security than others.	Indicates the type of the gateway that is used for communications between the NE and the Web LCT.
Gateway IP Address	IP address	Indicates the gateway address.
Communication Status	Normal, Abnormal	Specifies whether the Web LCT is properly communicating with the NE.
Login Status	Logged In, Not Logged In	Specifies whether the Web LCT has logged in to the NE.
Charset	GBK, OSI8859-1, UTF-8	Indicates the character set used by the NE.

3.5.2 Changing Passwords

You can change the passwords of the Web LCT users.

Navigation Path

In the **NE List**, click the icon .

NOTE

The password must meet the following rules to safeguard your user account.

1. The password length must be longer than or equal to **Min. Password Length** specified in [Set Security Policy](#).
2. The password length must be shorter than or equal to **Max. Password Length** specified in [Set Security Policy](#).
3. The password must contain at least 1 digit(s).
4. The password must contain at least 1 small letter(s).
5. The password must contain at least 1 capital letter(s).
6. The password must contain at least 1 special character: ` ~ ! @ # \$ % ^ & * () - _ = + \ | [{ }] ; : ' " , < . > / ? or space.
7. Do not use any of the last five passwords or passwords used in the last two months.

Buttons

Button	Description
Reset	If you click this button, the Old Password , New Password and Confirm Password fields are set to blank.

Parameters

Field	Description
User Name	Displays the name of the Web LCT user that is logged in to the Web LCT client. Displays admin by default and cannot be modified
Old Password	Enters the password of the Web LCT user that is logged in to the Web LCT client.
New Password	Enters the new password of the Web LCT user, which you need to enter during the next login to the Web LCT client.
Confirm Password	Enters the new password again.

3.5.3 Set Security Policy

This topic describes the parameters on the **Set Security Policy**. When setting an account policy, you can refer to this topic.

Navigation Path

In the **NE List**, click .

Parameters

Parameter	Value	Description
Min. Password Length	Value range: 8-16 Default value: 8 Rule: The parameter with a larger value is more secure. To ensure the security and facilitate memory, the recommended value is 8 .	Minimum length of the user name.

Parameter	Value	Description
Max. Password Length	Value range: 8-16 Default value: 16 Rule: The parameter with a larger value is more secure. The recommended value is 16 .	Maximum length of the user name.
Password Valid Date XX days	Value range: 0, 10-999 Default value: 0 Rule: - This parameter forces a user to change the password periodically. The recommended value is 180, that is, the password is checked every 180 days. - If 0 is entered, the user password will permanently valid.	The validity days of the user password. The user is forced to change a password after a specified period. Otherwise, the user cannot log in to the Web LCT.
Lock user account after XX invalid logins	Value range: 0-99 Default value: 3 Rule: - The parameter with a smaller value is more secure, the recommended value is 3. - If 0 is entered, the user account will not be locked.	Maximum number of login attempts (the login fails due to incorrect passwords) by using the account registered with the Web LCT. When the number of attempts reaches the specified value, the Web LCT locks this account automatically.
Auto Unlock (minutes)	Value range: 1-999 Default value: 5 Rule: The parameter with a larger value is more secure. To ensure the security and account recovery capability, the recommended value is 30 .	Automatic unlocking time specified for a user account.

3.5.4 NE Explorer

The NE Explorer is the main window for operating NEs on the Web LCT. It is NE-specific. In the NE Explorer, users can configure, manage, and maintain the current NE at the NE, board, or port level. Therefore, it is the primary window for NE commissioning and configuration. The NE Explorer provides an object tree and a function tree on the left, which helps quickly open the correct window at the correct level.

GUI

To open the NE Explorer, select an NE in the **NE List** and click **NE Explorer**; alternatively, double-click the NE.

Figure 3-2 shows the MSTP NE Explorer.

Figure 3-2 MSTP NE Explorer

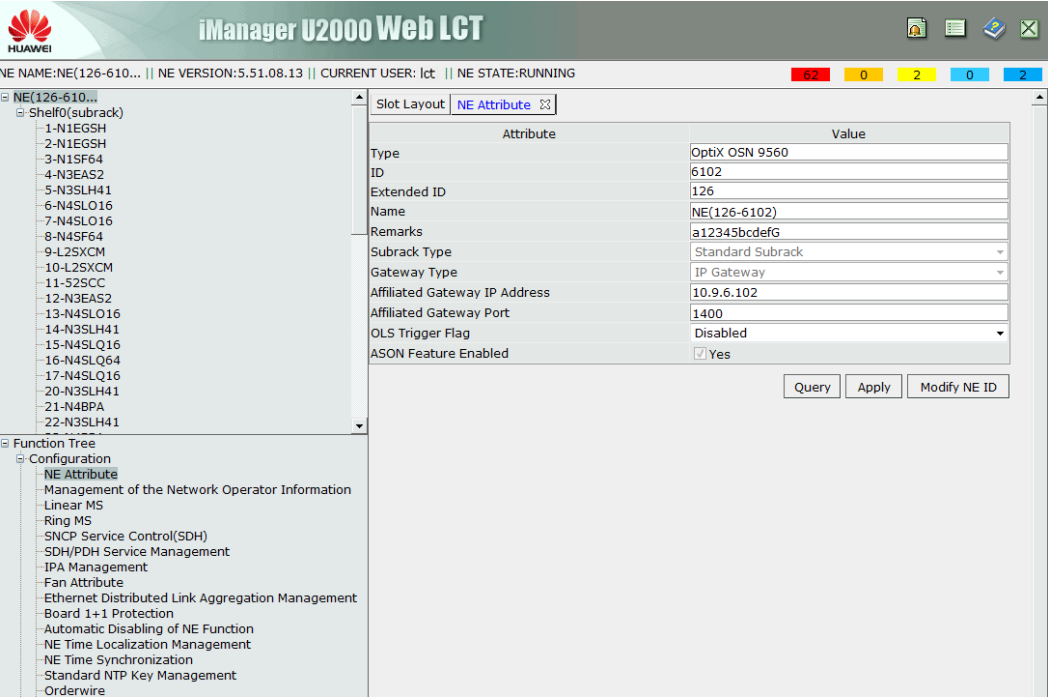


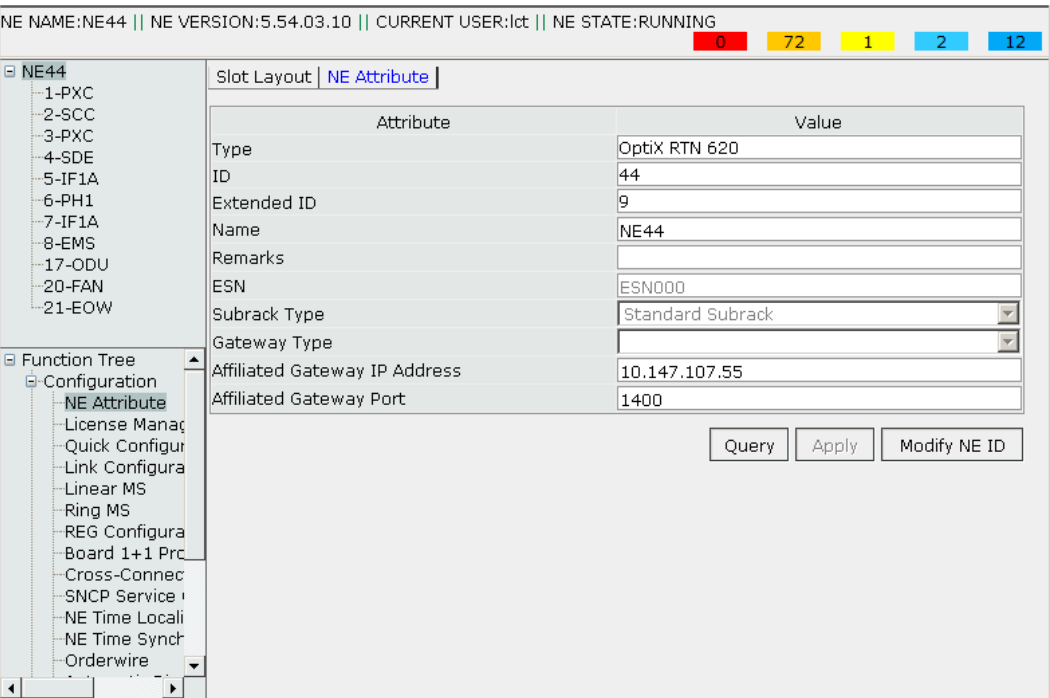
Figure 3-3 shows the NG WDM NE Explorer.

Figure 3-3 NG WDM NE Explorer



Figure 3-4 shows the RTN NE Explorer.

Figure 3-4 RTN NE Explorer



3.5.5 WDM NE Panel

The WDM NE Panel displays and color-codes the subracks, boards, and ports of the current NE. On the Web LCT, the NE Panel is an important place for configuring, monitoring, and maintaining NEs.

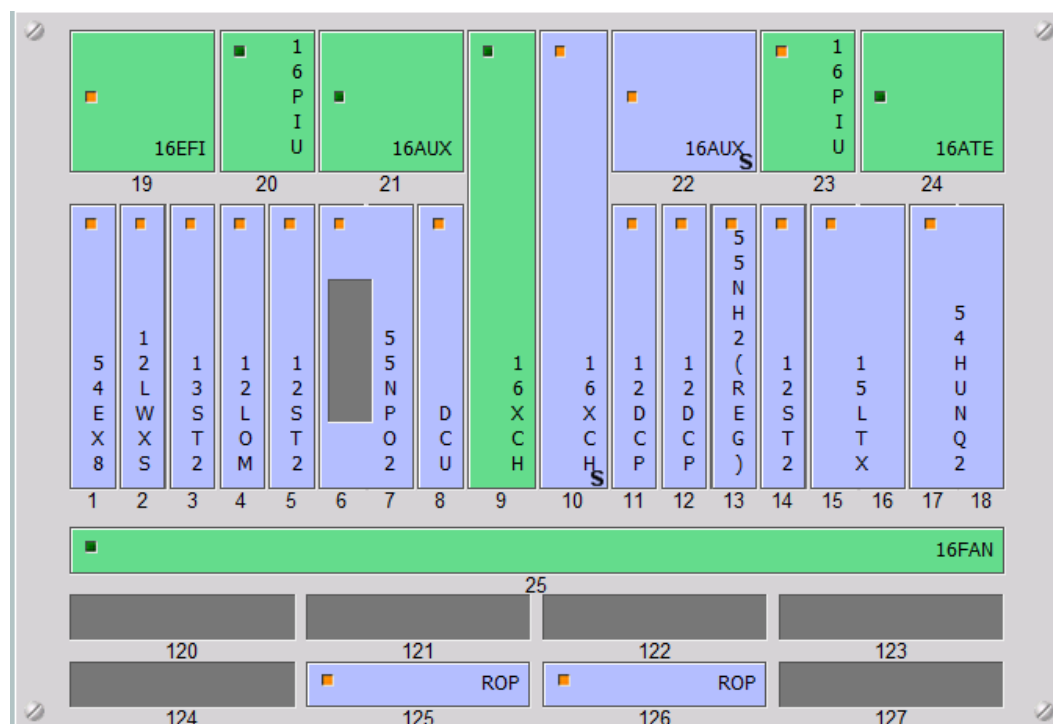
Navigation Path

The NE Panel is displayed by default when you open the NE Explorer.

NE Panel

Figure 3-5 shows the NE Panel.

Figure 3-5 NE Panel



NOTE

- For the OptiX OSN 8800 T64, the Web LCT displays the NE Panel for front and rear boards.
- If you want the NE Panel to always stay on top, select the **Always On Top** check box.
- A board may take one of the following indicators:
 -  The board has some acknowledged but uncleared alarms.
 -  The board has some unacknowledged and uncleared alarms.
 -  The board has some unacknowledged but cleared alarms.

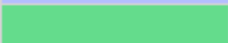
Features

NOTICE

Cold reset or warm reset may affect board services.

- To add a board, right-click a vacant slot and choose a board type from the shortcut menu.
- To delete a board, right-click it and choose **Delete** from the shortcut menu.
- To view board and port legends and the meanings of different colors, click  on the toolbar.

Figure 3-6 Legends

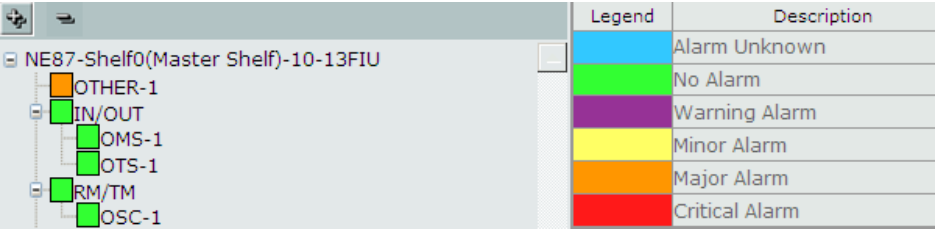
Legend	Description
	Not Installed
	Running Uninstalled
	Running Installed
	Physical Board
	Critical Alarm
	Major Alarm
	Minor Alarm
	Warning Alarm
	Abnormal Event
	Tributary/Line Loopback
	Protection Board Status
	Not Installed(Subrack Status)
	Physical Installed(Subrack Status)
	Logic Installed(Subrack Status)

 NOTE

The relationships among different board states are illustrated in [3.5.7 Board States](#).

- To perform an operation on an installed board, right-click the board and choose an item from the shortcut menu. For example, to open the path view for an 12FIU board, right-click the board and choose **Path View** from the shortcut menu. [Figure 3-7](#) shows the path view.

Figure 3-7 Path view



Shortcut Icon Description

Icon	Name	Description
	Current Alarm	Browses current alarms.
	Legend	Views legends.
	NE list	Opens the NE list.
	Critical Alarm	Dynamically monitors critical alarms in the window displayed.
	Major Alarm	Dynamically monitors major alarms in the window displayed.
	Minor Alarm	Dynamically monitors minor alarms in the window displayed.

3.5.6 RTN NE Panel

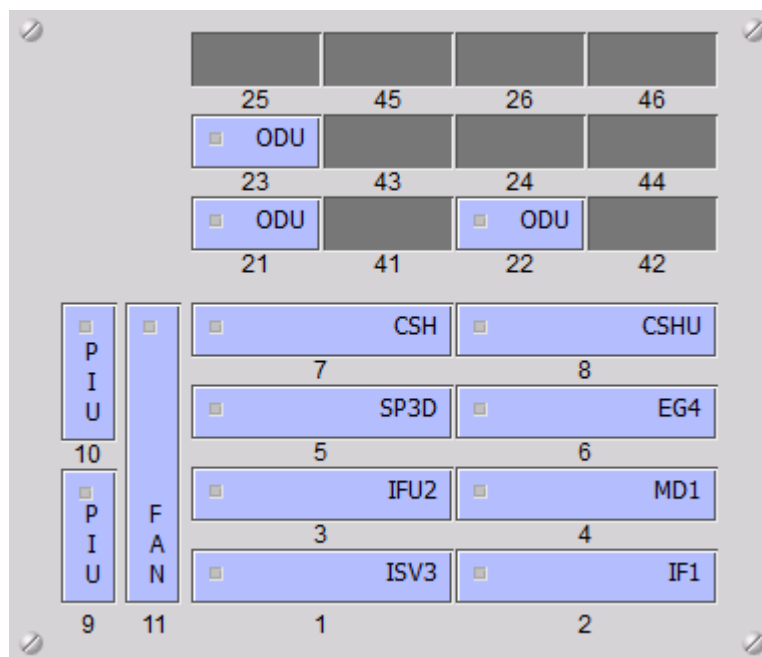
The RTN NE Panel displays and color-codes the subracks, boards, and ports of the current NE. On the Web LCT, the NE Panel is an important place for configuring, monitoring, and maintaining NEs.

Navigation Path

The NE Panel is displayed by default when you open the NE Explorer.

NE Panel

Figure 3-8 shows the NE Panel.

Figure 3-8 NE Panel**NOTE**

If you want the NE Panel to always stay on top, select the **Always On Top** check box.

Features

NOTICE

- Cold reset and warm reset may affect board services.
- Remote powering off may interrupt services.
- Replacing board types may interrupt services.

NOTE

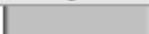
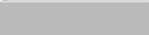
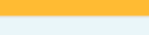
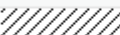
For split OptiX RTN 310s, the NE Panel displays ODU boards. Choosing **Board Manufacturer Information** from the shortcut menu of an ODU board will expand details about the board.

- To add a board, right-click a vacant slot and choose a board type from the shortcut menu.
- To delete a board, right-click it and choose **Delete** from the shortcut menu.
- To reset an installed board, right-click the board and choose **RF Reset** from the shortcut menu.
- To view board and port legends and the meanings of different colors, click



on the toolbar. [Figure 3-9](#) shows the legends for an OptiX RTN 950.

Figure 3-9 Legends

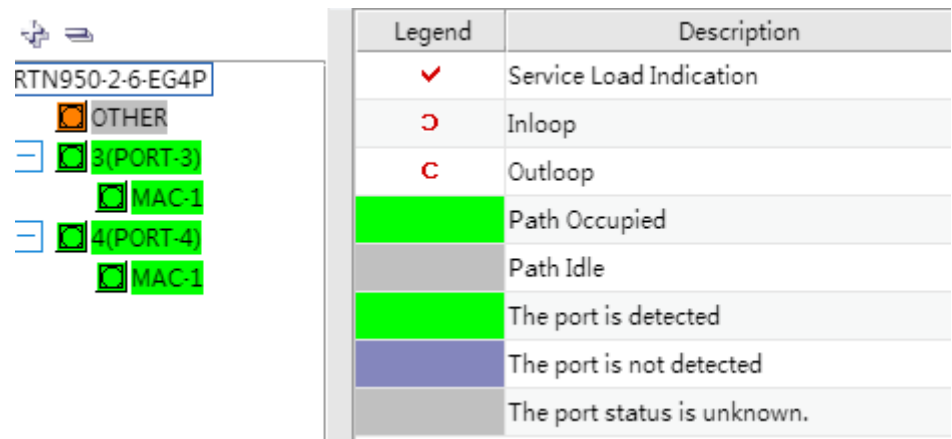
Legend	Description
	Vacant Slot
	Initial State
	No Physical Board
	Running
	Fixed Board
	Pluggable Board Without Logical Object
	Critical Alarm
	Major Alarm
	Minor Alarm
	Warning Alarm
	No Alarm
	Bidirectional Optical Port
	Ethernet Port
	Unidirectional Optical Port
	Protection Board
	Tributary/Line Loopback
	Resource Division
	Multi-slot Board (Primary Slot/Secondar...
	Interface Board Slot
	Physical Board Slot
	Slot in TPS Protection Group
	Inner Connection Port

NOTE

The relationships among different board states are illustrated in [3.5.7 Board States](#).

- To perform an operation on an installed board, right-click the board and choose an item from the shortcut menu. For example, to open the path view for a PH1 board, right-click the board and choose **Path View** from the shortcut menu. [Figure 3-10](#) shows the path view.

Figure 3-10 Path view



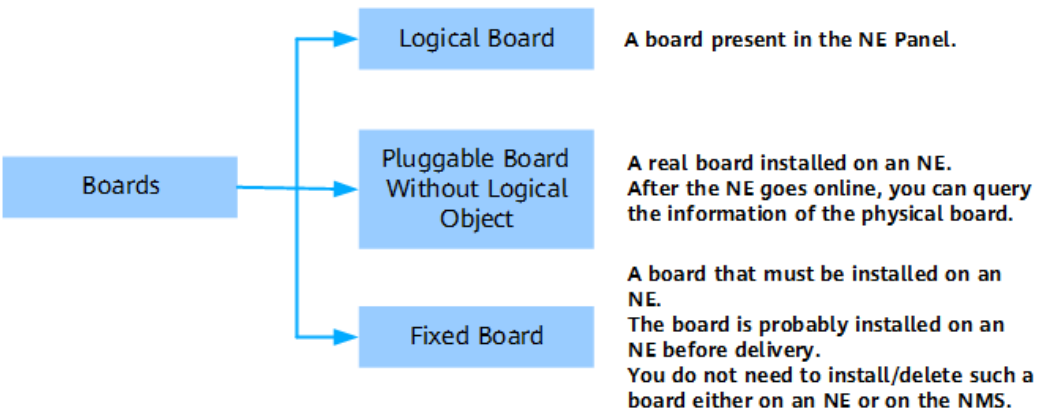
3.5.7 Board States

This topic describes the board states that may appear on the NE Panel and illustrates their relationships in a graph.

Board Type

Boards are hosted by NEs. All service functions depend on boards. Boards created on the Web LCT are logical boards, and those installed in devices are physical boards. [Figure 3-11](#) shows the types of boards.

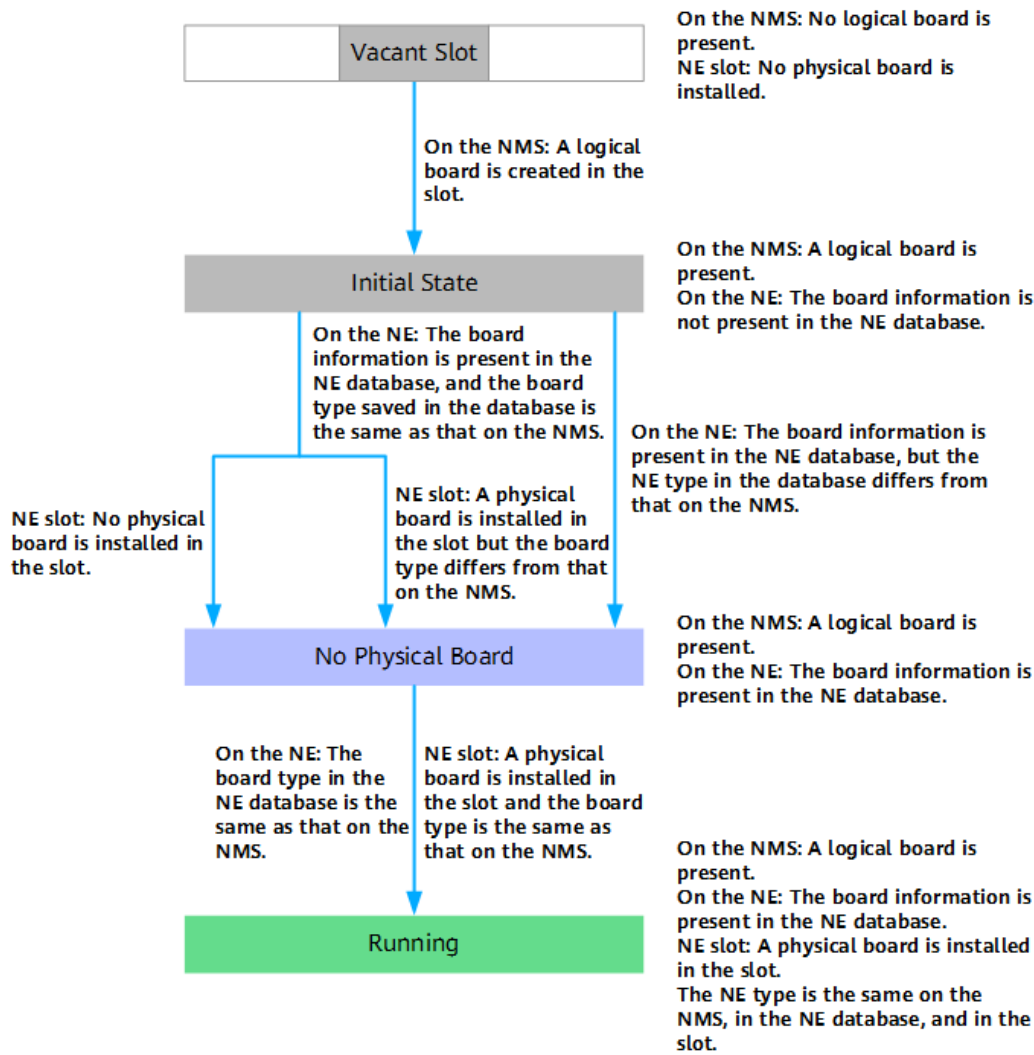
Figure 3-11 Board types



Board State

The board colors shown on the NE Panel reflect whether boards are present. [Figure 3-12](#) illustrates the relationships among board states.

Figure 3-12 Relationships among board states

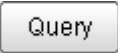
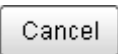


3.5.8 Frequently Used Buttons

The frequently used buttons on the Web LCT GUI are as follows:

Table 3-1 Frequently used buttons

Button	Functionality
	Decreases the priority of the selected object.
	Increases the priority of the selected object.
	Opens a dialog box.

Button	Functionality
	Queries data from NEs.
	Applies the current settings to NEs.
	Obtains and displays the latest data.
	Prints data in the current GUI to an HTM file.
	Puts the current settings into effect and closes the dialog box.
	Cancels the current settings and closes the dialog box.
	Deletes the selected records.
	Creates a service or protection group.
	Saves the selected records as a file. Supported file types are: • HTML • TXT • CSV • JPG • XLS • XLSX • PNG • SOR • MD

3.5.9 Table Operations

This section describes how to perform operations in tables provided by the Web LCT.

Context

- If a parameter is gray, it is non-editable.
- If a parameter is olive, its value has been changed but not applied.
- If the value of a parameter is "/", the value is unknown.
- If the value of a parameter is "-", the parameter is not supported by the object.

Sorting

You can sort records in a table in a certain order and quickly locate the type of information you want to view. Clicking a column header will sort records automatically and clicking it again will sort records in reverse order. The column header by which records are sorted is marked with ▲ or ▼. **Figure 3-13**, records are sorted by **NE ID**.

Figure 3-13 Sorting

▼NE ID	NE Name	Gateway	Equipment Type	Alarm Status	Gateway Type	Gate
9-44	NE44	GNE	RTN620	Critical	IP Gateway	10.14

Multi-selection

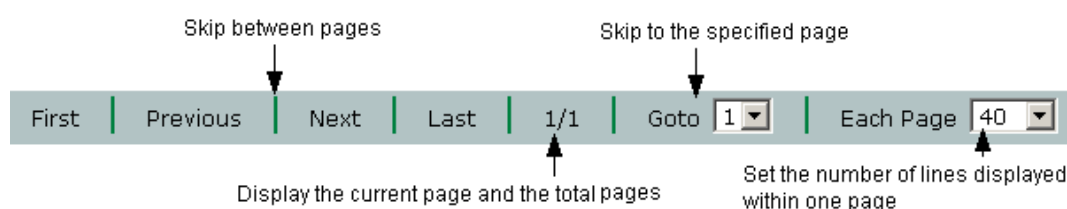
To select a consecutive group of rows, select the first row, hold down the **Shift** key and then select the last row.

To select non-consecutive rows, hold down the **Ctrl** key and select rows as required.

Paging

Some tables, such as the alarm and log tables, can be displayed in different pages. Users can set the number of records to be displayed in each page. **Figure 3-14** illustrates the paging function.

Figure 3-14 Paging



3.6 Operation Precautions

This section describes the precautions that users must observe to ensure proper work of the Web LCT.

- Do not change the IP address of the Web LCT server.
- Read through the warning that the Web LCT gives upon hazardous operations.
- Select an English directory to install the Web LCT Online Help. If non-English characters are contained in the directory name, the Online Help cannot work properly.

- When data is being queried or configured in the NE Explorer, do not close the related windows or switch to other windows. Otherwise, data will be incorrect or the Web LCT will malfunction.

4 Creating NEs

Actual OptiX series devices are represented as NEs on the Web LCT. Before the Web LCT manages an actual device, users need to create a corresponding NE on the Web LCT.

Context

There are two methods for creating NEs:

- Creating NEs through NE search: Use this method when a large number of NEs need to be created, for example, during deployments.
- Creating NEs manually: Use this method in some special situations (for example, communication failure) or when only a few NEs need to be created.

NOTE

The Web LCT allows a maximum of 32 online NEs to be added.

[4.1 Creating NEs Through NE Search](#)

When the Web LCT communicates with a GNE properly, it searches for all NEs connected to the GNE based on the IP address and network segment of the GNE or Wi-Fi connection, and create NEs in batches. Batch NE creation is more efficient and reliable than manual NE creation.

[4.2 Creating NEs Manually](#)

Creating NEs manually is not as quick and precise as creating NEs through NE search. However, creating NEs manually is applicable to all NEs no matter which communication mode they adopt.

4.1 Creating NEs Through NE Search

When the Web LCT communicates with a GNE properly, it searches for all NEs connected to the GNE based on the IP address and network segment of the GNE or Wi-Fi connection, and create NEs in batches. Batch NE creation is more efficient and reliable than manual NE creation.

Prerequisites

The Web LCT is properly communicating with NEs.

Context

There are two methods for creating NEs: creating NEs through NE search and creating NEs manually. Generally, NE IDs are unknown during the initial NE configuration. These NEs must be created through NE search.

NE search is divided into quick search and advanced search.

- Quick search: After this search, the Web LCT automatically adds the found NEs to the NE list and logs in to them. From the **Search NE** dialog box, you can switch to the NE Explorer directly, which facilitates NE management.
- Advanced search: After this search, you need to manually add and log in to the found NEs.

NOTE

- Before searching for NEs, add the related GNEs on the Web LCT. Otherwise, the Web LCT cannot log in to the found NEs.
- If the Web LCT is connected to an NE through a router, you need to create the NE by using the IP address of the GNE.
- You need to obtain the user name and password for logging in to the NE before creating an NE.
- When you use the **IP auto discovery** mode, Web LCT will send UDP packets to GNEs. The destination address is 225.225.225.225, and the destination port number is 8002. In addition, Web LCT listens to port 8001 at 224.224.224.224 and receives responses from the GNEs.

Table 4-1 Search modes

Search Mode		Application Scenario
Quick search	NE Search	• NMS port: You can search for the NE that is connected to the same network segment through the NMS port of the NE by the IP address of the PC where the Web LCT is installed. • User port: In specific scenarios, the PC where the Web LCT is installed is connected to the user port of the microwave device. You can search for the NE by user port on the Web LCT.
	NE Search by WIFI	After the Wi-Fi function is enabled on a microwave device, the PC where the Web LCT is installed can connect to the microwave device through Wi-Fi.
Advanced search	Search NE	• The IP address segment of the GNE is known. • The subnet mask of the PC where the Web LCT is installed is the same as that of the GNE. The NE search function searches only for the NEs in the specified network segment.

Search Mode		Application Scenario
	IP auto discovery	- The IP network segment or IP address of the GNE is unknown. IP auto discovery is applicable to the scenario where the Web LCT is directly connected to an NE. If the directly connected NE is a non-GNE, only its IP address can be obtained during the search. If the directly connected NE is a GNE, the IP address of the GNE can be obtained and all NEs under the GNE can be searched.
	Search by user port	- The IP address segment of the GNE is known. - In specific scenarios, the PC where the Web LCT is installed is connected to the user port of a microwave device. In this case, this function is the same as the user port-based search function under NE Search of Quick search.
	Search NE by WIFI	- The IP address segment of the GNE is known. - After the Wi-Fi function is enabled on a microwave device, the PC where the Web LCT is installed can connect to the microwave device through Wi-Fi. In this case, this function is the same as NE Search by WIFI under Quick search.

Quick Search (NE Search)

Step 1 In the **NE List**, click **NE Search** at the bottom of the page and choose **NE Search**.

Step 2 In the **Search NE** dialog box, select the **NMS port** or **User port**.

Step 3 Select the **Gateway Type**.

NOTE

SSL Gateway is recommended because the connection mode of **SSL Gateway** is more secure than that of **IP Gateway**.

Step 4 Select the local IP address from the **Local IP Address** drop-down list to start the automatic search.

The IP addresses of the NEs in the corresponding network segment are displayed in the **NE IP Address** drop-down list box.

Step 5 Select an NE from the **NE IP Address** drop-down list, enter the user name and password, and click **Apply**.

The NE Explorer is displayed. The Web LCT automatically adds the NE to the NE list and logs in to it.

----End

Quick Search (NE Search by WIFI)

Step 1 In the **NE List**, click **NE Search** at the bottom of the page and choose **NE Search by WIFI**.

Step 2 Select the local IP address from the **Local IP Address** drop-down list to start the automatic search.

- The **NE Search by WIFI** function can search for the peer NE of a microwave link through the microwave device connected to the Wi-Fi network.
- The IP addresses of the NEs connected to the same Wi-Fi network are displayed in the **NE IP Address** drop-down list box.

Step 3 Select an NE from the **NE IP Address** drop-down list, enter the user name and password, and click **Apply**.

The NE Explorer is displayed. The Web LCT automatically adds the NE to the NE list and logs in to it.

----End

Advanced Search (Search NE)

Step 1 In the **NE List**, click **NE Search** at the bottom of the page and choose **Advanced Search**.

Search NE is used by default.

Step 2 In the **Advanced Search** dialog box, click **Manage Domain**.

Step 3 In the **Manage Domain Search** dialog box, click **Add**.

Step 4 In the **New Domain** dialog box, set **Domain Type** to **GNE IP Domain** or **GNE IP Address**, and enter an IP address in the **Domain Address** text box.

Step 5 Click **OK**.

You can repeat [Step 3](#) to [Step 5](#) to add multiple search domains.

Step 6 Click **OK** to close the **Manage Domain Search** dialog box.

Step 7 Select the desired network segment address and click **Search**.

When the search is in progress, you can click **End Search** as needed.

Step 8 After the search is completed, select an NE in the search results and click **Add NE**.

A message is displayed, indicating that the NE is successfully added.

Step 9 Click **OK**.

The NE is displayed in the NE list.

- Step 10** In the **Advanced Search** dialog box, select one or more non-gateway NEs and click **Set Gateway NE** to set them as GNEs.

----End

Advanced Search (IP auto discovery)

- Step 1** In the **NE List**, click **NE Search** at the bottom of the page and choose **Advanced Search**.

- Step 2** In the **Advanced Search** dialog box, select **IP auto discovery** from the search mode drop-down list box.

- Step 3** Enter **User Name** and **Password** of the directly connected NE.

- Step 4** Click **Search**.

NOTE

When the search is in progress, you can click **End Search** as needed.

IF some NEs cannot be obtained by **IP auto discovery**, possible reasons are as follows:

- The NEs are connected to the Web LCT through a router.
- Firewall or antivirus software is set incorrectly.
- The port 8001 for the NE search is occupied, For details, see [6.10 How Do I Confirm and Resolve the Problem that NEs Cannot Be Searched out Because Port 8001 Is Occupied?](#)

- Step 5** After the search is completed, select an NE in the search results and click **Add NE**.

A message is displayed, indicating that the NE is successfully added.

- Step 6** Click **OK**.

The NE is displayed in the NE list.

- Step 7** In the **Advanced Search** dialog box, select one or more non-gateway NEs and click **Set Gateway NE** to set them as GNEs.

----End

Advanced Search (Search by user port)

- Step 1** In the **NE List**, click **NE Search** at the bottom of the page and choose **Advanced Search**.

- Step 2** In the **Advanced Search** dialog box, select **Search by user port** from the search mode drop-down list box.

- Step 3** Select the desired network segment address and click **Search**.

When the search is in progress, you can click **End Search** as needed.

- Step 4** After the search is completed, select an NE in the search results and click **Add NE**.

A message is displayed, indicating that the NE is successfully added.

- Step 5** Click **OK**.

The NE is displayed in the NE list.

- Step 6** In the **Advanced Search** dialog box, select one or more non-gateway NEs and click **Set Gateway NE** to set them as GNEs.

----End

Advanced Search (Search NE by WIFI)

- Step 1** In the **NE List**, click **NE Search** at the bottom of the page and choose **Advanced Search**.

- Step 2** In the **Advanced Search** dialog box, select **Search NE by WIFI** from the search mode drop-down list box.

- Step 3** Select the desired network segment address and click **Search**.

When the search is in progress, you can click **End Search** as needed.

- Step 4** After the search is completed, select an NE in the search results and click **Add NE**.

A message is displayed, indicating that the NE is successfully added.

- Step 5** Click **OK**.

The NE is displayed in the NE list.

- Step 6** In the **Advanced Search** dialog box, select one or more non-gateway NEs and click **Set Gateway NE** to set them as GNEs.

----End

Follow-up Procedure

To prevent unauthorized operations on the newly created NE, change the password for the NE user immediately. During routine maintenance, change the password regularly.

If login failure occurs on the newly created NE, possible causes are:

- The password for the NE user is incorrect. In this situation, enter the correct password.
- The NE user is invalid or has logged in. In this situation, switch to another NE user.

4.2 Creating NEs Manually

Creating NEs manually is not as quick and precise as creating NEs through NE search. However, creating NEs manually is applicable to all NEs no matter which communication mode they adopt.

Prerequisites

- The Web LCT is properly communicating with NEs.
- The NE ID is known.

Context

- There are two methods for creating NEs: creating NEs through NE search and creating NEs manually. Generally, NE IDs are unknown during the initial NE configuration. These NEs must be created through NE search.
- **SSL Gateway** is recommended because of its higher security than others.

 **NOTE**
Create GNEs prior to non-gateway NEs.

Procedure

Step 1 In the NE list, click **Add NE**.

Attribute	Value
NE ID	
Extended ID	9
Gateway Type	SSL Gateway
Certificate type	Standard certificate
IP Address	
Port	5432
User Name	lct
Password	

Step 2 In the **Add NE** dialog box, set NE attributes based on [Table 4-2](#).

Table 4-2 Setting guidance

Attribute	Setting Guidance
NE ID	Enter a value. Value range: 1 to 65534
Extended ID	Enter a value. Value range: 1 to 255
Gateway Type	Select a value from the drop-down list. Value range: IP Gateway, SSL Gateway, USB
Certificate type	Select a certificate type for the SSL gateway. The options are Standard certificate or SM certificate . Select a value based on the certificate type supported by the device. Unsupported certificate may result in abnormal NE communication.
IP Address	Set the IP address of the gateway NE.

Attribute	Setting Guidance
Port	Set the port for communicating with the gateway NE. The default port number for the SSL gateway is 5432 and cannot be changed. The default port number for the IP gateway is 1400 .
User Name	Enter the user name and password of the NE.
Password	

Step 3 Click OK.

One record is added to the NE list. The NE is properly communicating with the Web LCT and is in the **Logged In** state.

----End

Follow-up Procedure

To prevent unauthorized operations on the newly created NE, change the password for the NE user immediately. During routine maintenance, change the password regularly.

If login failure occurs on the newly created NE, possible causes are:

- The NE cannot communicate with the Web LCT. In this situation, check the communication parameters of the NE, such as the NE ID and IP address.
- The password for the NE user is incorrect. In this situation, enter the correct password.
- The NE user is invalid or has logged in. In this situation, switch to another NE user.

5 Logging In to an NE

After an NE is created, you need to log in to the NE before managing the NE.

Prerequisites

- The NE has been created.
- The Web LCT is properly communicating with the NE.

Context

For NEs in V100R020C10 and later versions, if you do not change the initial NE user password upon the first login on the Web LCT, the dialog box for password change will be displayed, prompting you to change the initial password.

NOTICE

You need to periodically change your password and properly save it to avoid NE login failures due to forgotten passwords and avoid misoperations or malicious damage caused by password disclosure.

Procedure

Step 1 In the **NE List**, select an NE and click **NE Login**.

 NOTE

You can select multiple NEs.

Step 2 In the **NE Login** dialog box, set **User Name** and **Password** and click **OK**.

The **Login Status** of the NE changes from **Not Logged In** to **Logged In**. The **Alarm Status** of the NE changes from **Unknown** to the actual alarm status.

Step 3 Click **NE Explorer**.

 NOTE

A quicker way to open the NE Explorer is to double-click the NE in the NE list.

 NOTE

- View legends to understand the meanings of different colors and symbols in the slot layout diagram.
- Click  to show or hide legends.

----End

Parameters

Parameter	Value Range	Default Value	Description
User Name	-	-	Indicates the user name of the NE.
Password	-	-	Indicates the password for the named user.
Use same user name and password to login	Selected or cleared	Cleared	Specifies whether to use the same user name and password to log in to all NEs.
Use the user name and password that was used last time	Selected or cleared	Cleared	Specifies whether to use the last user name and password to log in to the NE.

6 FAQs

This chapter provides answers to some frequently asked questions (FAQs).

[6.1 What Do I Do If the Web LCT Login Page Does Not Open up Automatically?](#)

[6.2 What Do I Do If My Browser Is Closed Unexpectedly upon Web LCT Login?](#)

[6.3 Why Cannot I Access Web LCT Through a Browser?](#)

[6.4 How Do I Switch Among Different Web LCT Versions?](#)

[6.5 What Do I Do If Internet Explorer Cannot Display Elements or Information Completely?](#)

[6.6 What Do I Do If Internet Explorer Cannot Be Correctly Refreshed or Gives No Response?](#)

[6.7 What Do I Do If the Web LCT Displays "LCT access disabled" When I Add an NE?](#)

[6.8 Why Is NE Communication Status Abnormal in the NE List?](#)

[6.9 How Do I Switch the Web LCT language?](#)

[6.10 How Do I Confirm and Resolve the Problem that NEs Cannot Be Searched out Because Port 8001 Is Occupied?](#)

[6.11 How Do I Update a Self-signed Certificate?](#)

[6.12 How Do I Update the Key of Web LCT?](#)

[6.13 How Do I Update the Trust Certificate List of Web LCT?](#)

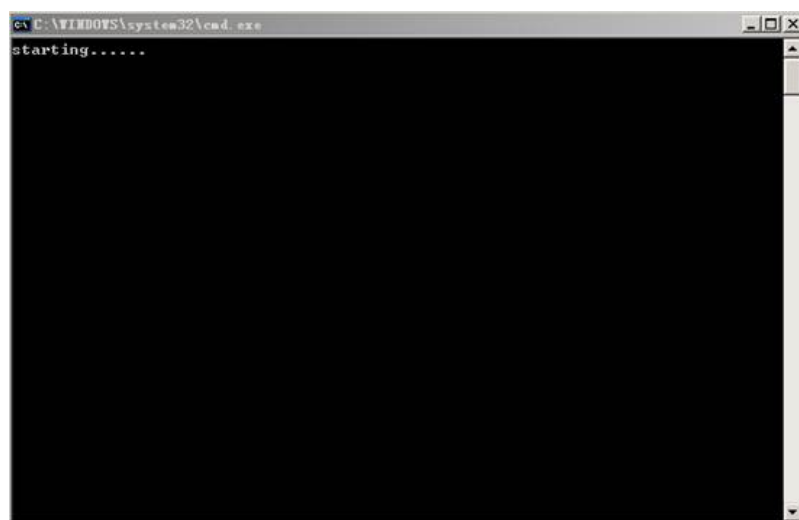
[6.14 How Do I Update an Identity Certificate of Web LCT?](#)

6.1 What Do I Do If the Web LCT Login Page Does Not Open up Automatically?

Question

After installing Web LCT, a user double-clicks **startweblct.bat** in **Decompression directory\WebLCT**. The script execution screen is displayed but disappears soon. The Web LCT login page does not open up automatically.

The Web LCT login page can be successfully opened by entering **https://localhost:13443/weblct/index.html** in the address box of Internet Explorer.



Answer

- Internet Explorer settings are incorrect.
 - a. Double-click the **Internet Explorer** icon on the desktop.
 - b. Choose **Tools > Internet Options** from the main menu.
 - c. On the **General** tab of the **Internet Options** dialog box, click **Settings** in the **Browsing history** area.
 - d. In the **Temporary Internet Files and History Settings** dialog box, click the **Every time I visit the webpage** option button and click **OK**.
 - e. In the **Internet Options** dialog box, click the **Privacy** tab, clear the **Turn on Pop-up Blocker** check box, and click **Apply**.
 - f. In the **Internet Options** dialog box, click the **Connections** tab and click **LAN settings**.
 - g. In the **Local Area Network (LAN) Settings** dialog box, clear the **Use a proxy server for your LAN (These settings will not apply to dial-up or VPN connections)** check box in the **Proxy server** area and click **Apply**.

NOTE

If your computer demands a proxy server, click **Advanced** in the **Proxy server** area. In the dialog box that is displayed, add the IP address of the Web LCT server to the text box in the **Exceptions** area and click **OK**.

- h. **Optional:** In the **Internet Options** dialog box, click the **Programs** tab, select the **Tell me if the Internet Explorer is not default web browser** check box, and click **Apply**. Skip this step in Windows 10.
 - i. In the **Internet Options** dialog box, click **OK**.
 - j. Restart Internet Explorer and set Internet Explorer as the default browser when prompted.
- Environment variable settings are incorrect. To start Web LCT, **explorer.exe** is invoked. **explorer.exe** is located in **%SystemRoot%** by default, and **%SystemRoot%** is contained in the environment variable **Path**. Due to some reasons, the directory of **explorer.exe** may be missing from **Path**. In that event, the Web LCT login page cannot open up.
 - a. Search for **explorer.exe** and record its location, which is **C:\WINDOWS** by default.
 - b. Right-click **Computer** on the desktop and choose **Properties** from the shortcut menu.
 - c. Click **Advanced system settings**.
 - d. On the **Advanced** tab of the **System Properties** dialog box, click **Environment Variables**.
 - e. In the **Environment Variables** dialog box, check for **Path** in the **System variables** area.
 - If **Path** does not exist, create it and set it to **%SystemRoot%\system32;%SystemRoot%;%SystemRoot%\System32\Wbem;D:\PROGRA~1\ULTRAE~1**.
 - If **Path** exists, check whether its value contains **%SystemRoot%\system32;%SystemRoot%;%SystemRoot%\System32\Wbem;D:\PROGRA~1\ULTRAE~1**. If not, add these environment variables. Then add the directory (**C:\WINDOWS** by default) of **explorer.exe** to **Path**.

----End

6.2 What Do I Do If My Browser Is Closed Unexpectedly upon Web LCT Login?

Question

In the Web LCT login page, I enter a correct user name, password, and verification code. However, the browser is closed unexpectedly when I click Login. How do I resolve this problem?

Answer

Possible causes:

- The Web LCT decompression directory contains Chinese characters, spaces, or other special characters.
- Internet Explorer settings are incorrect.

- Step 1** Check the name of the Web LCT decompression directory. Ensure that the name contains only letters, digits, and underscores (_). Other characters such as Chinese characters and spaces are not allowed.
- Step 2** Set basic attributes of Internet Explorer.
1. Double-click the **Internet Explorer** icon on the desktop.
 2. Choose **Tools > Internet Options** from the main menu.
 3. On the **General** tab of the **Internet Options** dialog box, click **Settings** in the **Browsing history** area.
 4. In the **Temporary Internet Files and History Settings** dialog box, click the **Every time I visit the webpage** option button and click **OK**.
 5. In the **Internet Options** dialog box, click the **Privacy** tab, clear the **Turn on Pop-up Blocker** check box, and click **Apply**.
 6. In the **Internet Options** dialog box, click the **Connections** tab and click **LAN settings**.
 7. In the **Local Area Network (LAN) Settings** dialog box, clear the **Use a proxy server for your LAN (These settings will not apply to dial-up or VPN connections)** check box in the **Proxy server** area and click **Apply**.

 NOTE

If your computer demands a proxy server, click **Advanced** in the **Proxy server** area. In the dialog box that is displayed, add the IP address of the Web LCT server to the text box in the **Exceptions** area and click **OK**.

8. **Optional:** In the **Internet Options** dialog box, click the **Programs** tab, select the **Tell me if the Internet Explorer is not default web browser** check box, and click **Apply**. Skip this step in Windows 10.
9. In the **Internet Options** dialog box, click **OK**.
10. Restart Internet Explorer and set Internet Explorer as the default browser when prompted.

- Step 3** If Internet Explorer settings are correct, check whether third-party plug-ins and antivirus software are installed and whether the pop-up window and advertisement blocker is enabled. If yes, uninstall the plug-ins and software and disable the pop-up window and advertisement blocker.
1. Choose **Start > Control Panel**.
 2. Select **Large icons** or **Small icons** from the **View by** drop-down list and click **Programs and Features**.
 3. Select the desired plug-in or software and click **Uninstall**.

----End

6.3 Why Cannot I Access Web LCT Through a Browser?

Question

Why cannot I access the Web LCT although I have entered a correct URL in the address box of my browser.

Answer

Probable cause:

The current browser version is not supported by the Web LCT.

Step 1 Select a supported browser version. Supported browser versions are listed in [1.1.1 Hardware and Software Requirements](#).

Step 2 If none of these supported browser versions is available, install a supported version.

----End

6.4 How Do I Switch Among Different Web LCT Versions?

Question

I have installed different Web LCT versions on the same computer, for example, first version A and then version B. After installing and running version A for some time, I stop it and switch to version B. The following problems may arise:

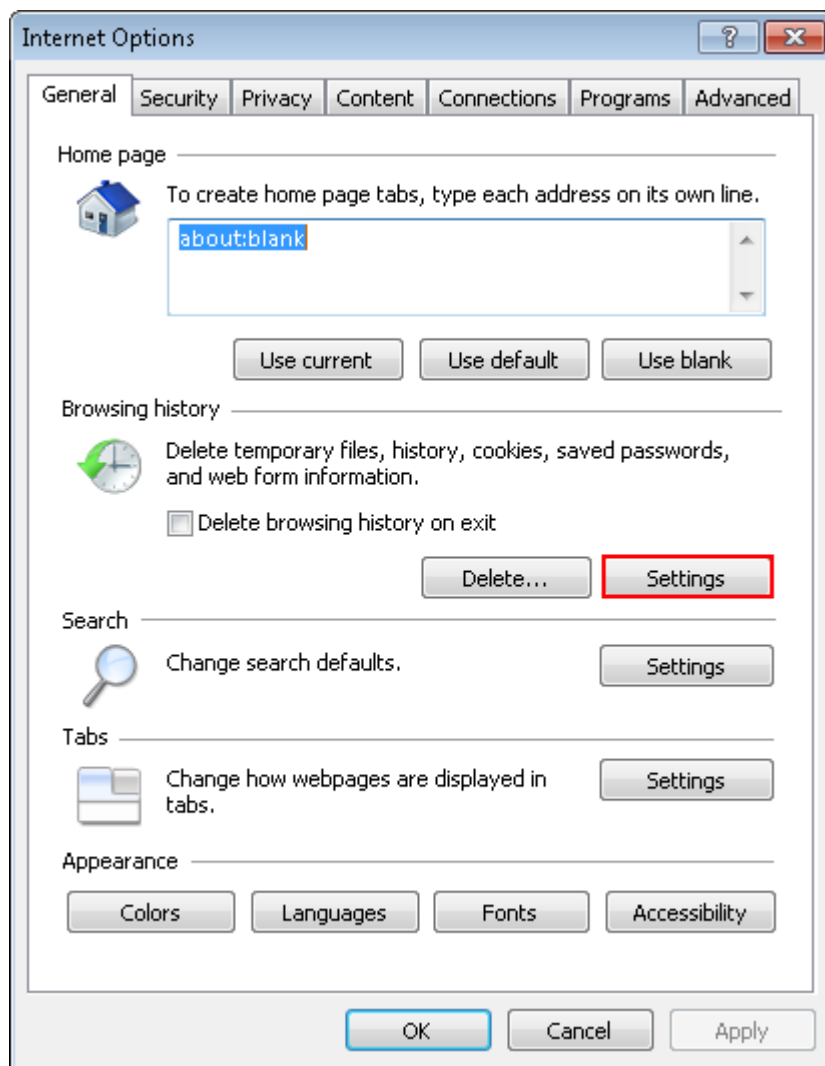
- The system language is different than I expected it to be: Version A uses Chinese and version B uses English. When I log in to version B through Internet Explorer, Chinese pages are displayed.
- Some functions are not available: Version A is later than version B. After I switch to version B, the functions newly supported by version A are not available.

Answer

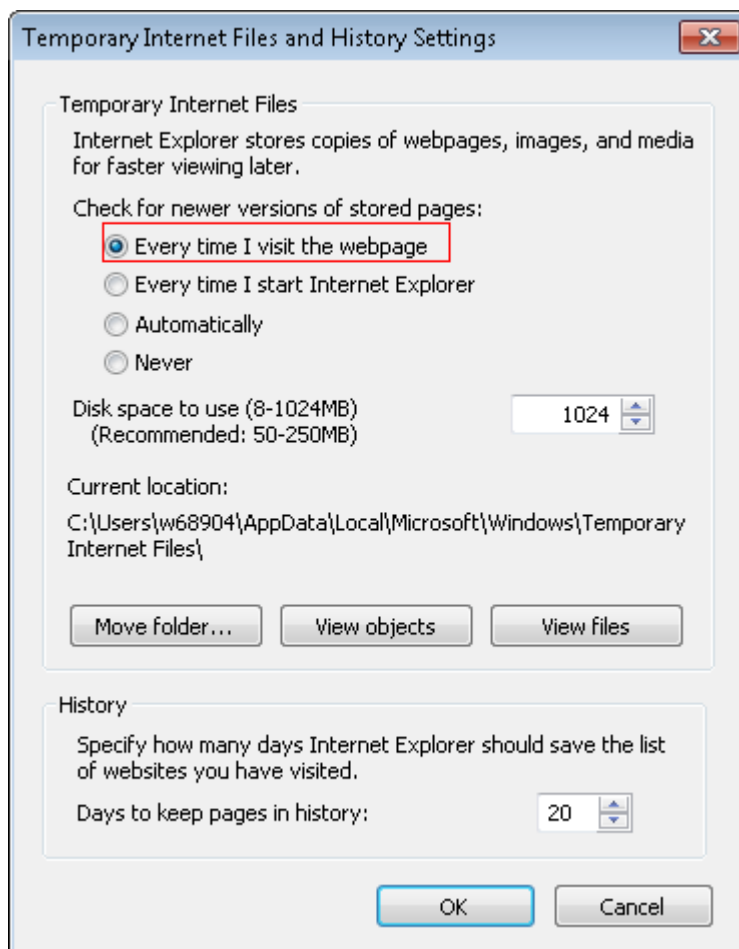
Probable cause:

The cache of Internet Explorer is not cleared or the Web LCT server runs abnormally.

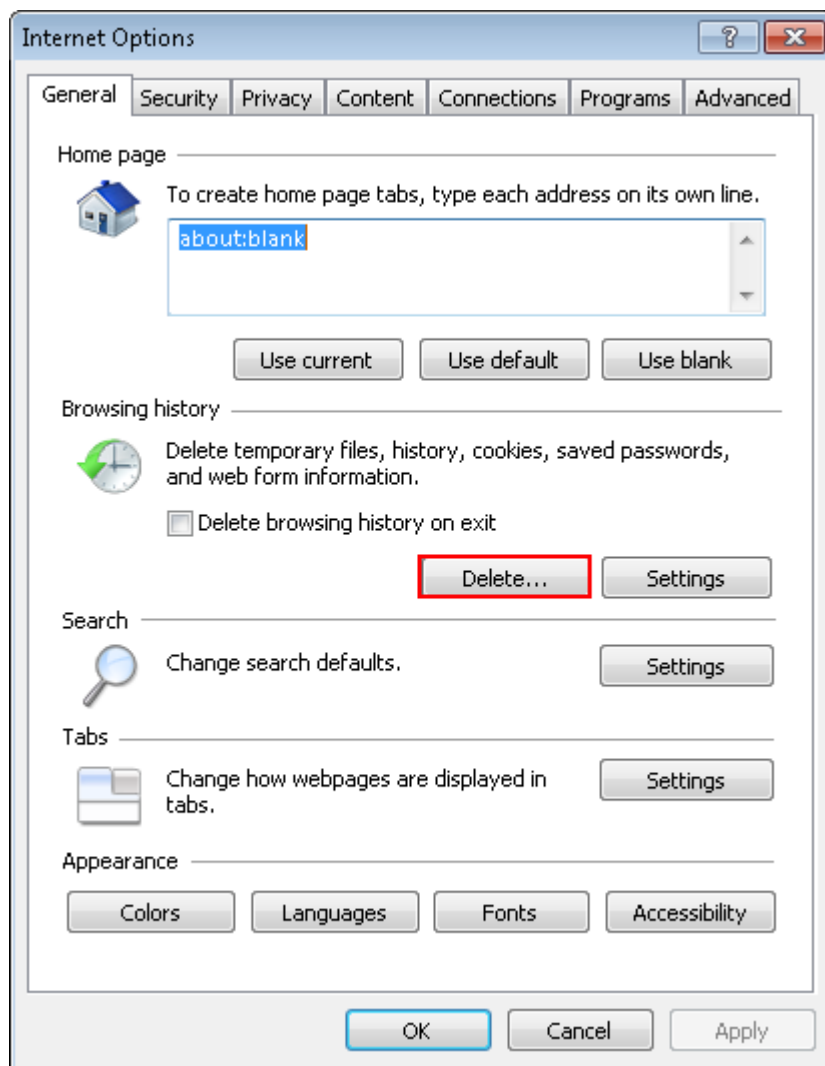
- Method 1: Clear the cache of Internet Explorer. The following procedure uses Internet Explorer 8.0 as an example.
 - a. Choose **Tools > Internet Options** from the main menu of Internet Explorer.
 - b. In the **Internet Options** dialog box, click **Settings** in the **Browsing history** area.



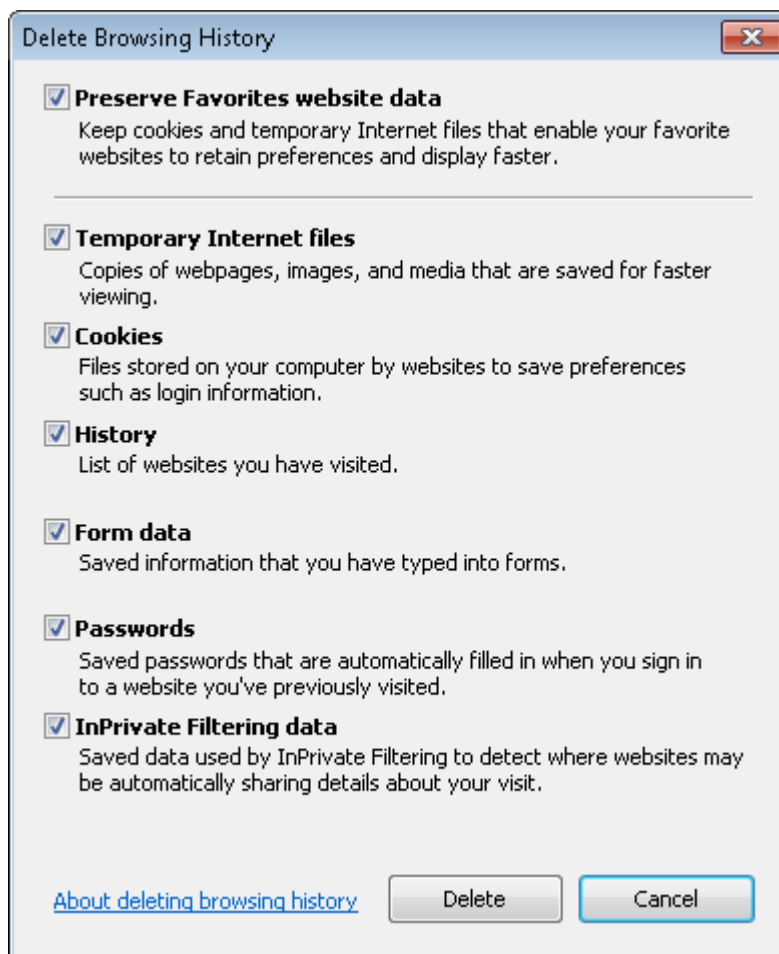
- c. In the **Temporary Internet Files and History Settings** dialog box, click the **Every time I visit the webpage** option button and click **OK**.



- d. In the **Internet Options** dialog box, click **Delete** in the **Browsing history** area.



- e. In the **Delete Browsing History** dialog box, select all check boxes.



- f. Click **Delete**.
- g. In the **Internet Options** dialog box, click **OK**.
- Method 2: Restart the Web LCT server. Take this method if method 1 does not work.
 - a. Shut down the Web LCT. For details, see [3.4 Shutting Down Web LCT](#).
 - b. Start the Web LCT. For details, see [3.2 Starting Web LCT](#).
- Method 3: Contact Huawei engineers to replace the OS or server and then reinstall the Web LCT. Take this method if methods 1 and 2 do not work.

----End

6.5 What Do I Do If Internet Explorer Cannot Display Elements or Information Completely?

Question

After logging in to the Web LCT through Internet Explorer, I maximize, minimize, or drag the Web LCT window. Unexpectedly controls or information in the window is displayed incompletely. How do I resolve this problem?

Answer

- Method 1: Open Internet Explorer and maximize it.
- Method 2: Change the screen resolution to 1680*1050. The following procedure uses Windows 10 as an example.
 - a. On the desktop, right-click in a blank area and choose **Display setting** from the shortcut menu.
 - b. Select **1680*1050** from the **Resolution** drop-down list.
 - c. Click **OK**.

----End

6.6 What Do I Do If Internet Explorer Cannot Be Correctly Refreshed or Gives No Response?

Question

When the Web LCT is running, Internet Explorer cannot be correctly refreshed or gives no response. How do I resolve this problem?

Answer

- Method 1: Restart Internet Explorer.
 - a. Close Internet Explorer.
 - b. Start Internet Explorer.
- Method 2: Restart the Web LCT.
 - a. Double-click the **Decompression directory\WebLCT\stopweblct.bat** script.
 - b. Double-click the **Decompression directory\WebLCT\startweblct.bat** script.

----End

6.7 What Do I Do If the Web LCT Displays "LCT access disabled" When I Add an NE?

Question

When I add an NE to the Web LCT, the message "LCT access disabled" is displayed. How do I resolve this problem?

Answer

- Step 1** Log in to another NMS (such as NCE/NCE Lite or other Web LCT) to which the NE has been successfully added.
- Step 2** Open the NE Explorer and choose **Security > LCT Access Control** from the navigation tree.

Step 3 In the right pane, click **Access Allowed** to enable the Web LCT to access the NE.

Step 4 Log in to the Web LCT and add the NE again.

----End

6.8 Why Is NE Communication Status Abnormal in the NE List?

Question

In the NE list on the WebLCT, **Communication Status** of an NE is displayed as **Abnormal**. However, the NE can be pinged properly. Why? How do I resolve this problem?

Answer

- **Probable cause 1:** When adding an NE, the user sets **Gateway Type** to **IP Gateway**, which should be **SSL Gateway**.

Procedure:

Delete the NE and add it again. When adding the NE, set **Gateway Type** to **SSL Gateway**.

- **Probable cause 2:** The Web LCT is disconnected from the NE. Because the Web LCT cannot automatically reconnect to NEs, **Communication Status** of the disconnected NE is always **Abnormal**.

Procedure:

- a. Log in to the Web LCT.
- b. In the NE list, right-click the NE and choose **Reconnect** from the shortcut menu. After the Web LCT successfully reconnects to the NE, **Communication Status** of the NE changes to **Normal**. If **Communication Status** is still **Abnormal**, verify that the NE has been started and its network connection is normal.

- **Probable cause 3:** The algorithm suites used by the NE are incompatible with those supported by the WebLCT.

By default, the WebLCT supports only secure algorithm suites. For compatibility with NEs of earlier versions, you need to manually enable insecure algorithm suites.

NOTE

Enabling insecure algorithms poses security risks. Exercise caution when performing this operation. For details about the algorithm suites supported by the WebLCT, see [Table 6-1](#)

Table 6-1 Cipher Suites matching the TLS protocol

Protocol Type	Security Cipher Suites	Insecure Cipher Suites
TLSv1.3	TLS_AES_256_GCM_SHA384 TLS_CHACHA20_POLY1305_SHA256 TLS_AES_128_GCM_SHA256	NA
TLSv1.2	TLS_DHE_RSA_WITH_AES_128_GCM_SHA256 TLS_DHE_DSS_WITH_AES_128_GCM_SHA256	TLS_DHE_DSS_WITH_3DES_EDE_CBC_SHA TLS_DHE_DSS_WITH_AES_128_CBC_SHA TLS_DHE_DSS_WITH_AES_128_CBC_SHA256 TLS_DHE_DSS_WITH_AES_256_CBC_SHA TLS_DHE_DSS_WITH_AES_256_CBC_SHA256 TLS_DHE_RSA_WITH_3DES_EDE_CBC_SHA TLS_DHE_RSA_WITH_AES_128_CBC_SHA TLS_DHE_RSA_WITH_AES_128_CBC_SHA256 TLS_DHE_RSA_WITH_AES_256_CBC_SHA TLS_DHE_RSA_WITH_AES_256_CBC_SHA256 TLS_RSA_WITH_3DES_EDE_CBC_SHA TLS_RSA_WITH_AES_128_CBC_SHA TLS_RSA_WITH_AES_128_CBC_SHA256 TLS_RSA_WITH_AES_256_CBC_SHA TLS_RSA_WITH_AES_256_CBC_SHA256

Protocol Type	Security Cipher Suites	Insecure Cipher Suites
TLSv1.1	NA	TLS_DHE_RSA_WITH_AES_256_CBC_SHA TLS_DHE_DSS_WITH_3DES_EDE_CBC_SHA TLS_DHE_DSS_WITH_AES_128_CBC_SHA TLS_DHE_DSS_WITH_AES_256_CBC_SHA TLS_DHE_RSA_WITH_3DES_EDE_CBC_SHA TLS_DHE_RSA_WITH_AES_128_CBC_SHA TLS_RSA_WITH_3DES_EDE_CBC_SHA TLS_RSA_WITH_AES_128_CBC_SHA TLS_RSA_WITH_AES_256_CBC_SHA
TLSv1	NA	TLS_RSA_WITH_RC4_128_MD5 TLS_DH_anon_WITH_AES_128_CBC_SHA TLS_DH_anon_WITH_RC4_128_MD5 TLS_DHE_DSS_WITH_AES_128_CBC_SHA TLS_DHE_DSS_WITH_RC4_128_SHA TLS_DHE_RSA_WITH_AES_128_CBC_SHA TLS_RSA_WITH_AES_128_CBC_SHA TLS_RSA_WITH_RC4_128_SHA
SSLv3	NA	SSL_DHE_RSA_WITH_3DES_EDE_CBC_SHA SSL_DH_anon_WITH_3DES_EDE_CBC_SHA SSL_DHE_DSS_WITH_3DES_EDE_CBC_SHA SSL_DHE_RSA_WITH_3DES_EDE_CBC_SHA

Procedure

- a. Double-click **decompression directory\WebLCT\stopweblct.bat** to stop the WebLCT.
- b. Double-click **Decompression directory\WebLCT\updatealgorithmsuite.bat**. When the following information is displayed, enter **Y**.

Do you want to keep insecure algorithms in the algorithm suite? Enter your choice (Y or N):

 NOTE

Y: The WebLCT is compatible with insecure algorithm suites.

N: The WebLCT supports only secure algorithm suites.

When the following information is displayed, enter **Y**.

This is a risky operation. The algorithm suite after the suite change contains insecure algorithms, which may cause security risks and the suite take effect only after the Web LCT is restarted.

Are you sure you want to continue? Enter your choice (Y or N)

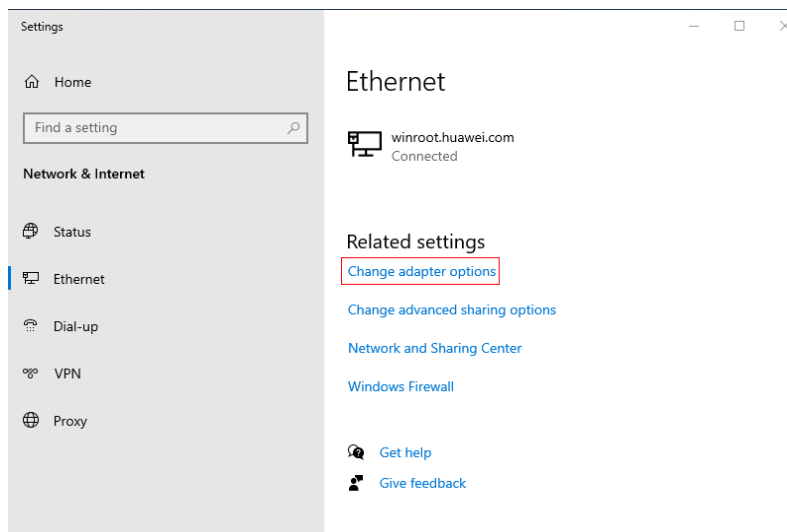
- c. Double-click **Decompression directory\WebLCT\startweblct.bat** to start the Web LCT.
- **Probable cause 4:** The OS where the Web LCT resides is connected to both a Wi-Fi network and a wired network. The OS preferentially uses the Wi-Fi network, but the Web LCT communicates with NEs using the wired network. As a result, the NE communication is abnormal.

Procedure:

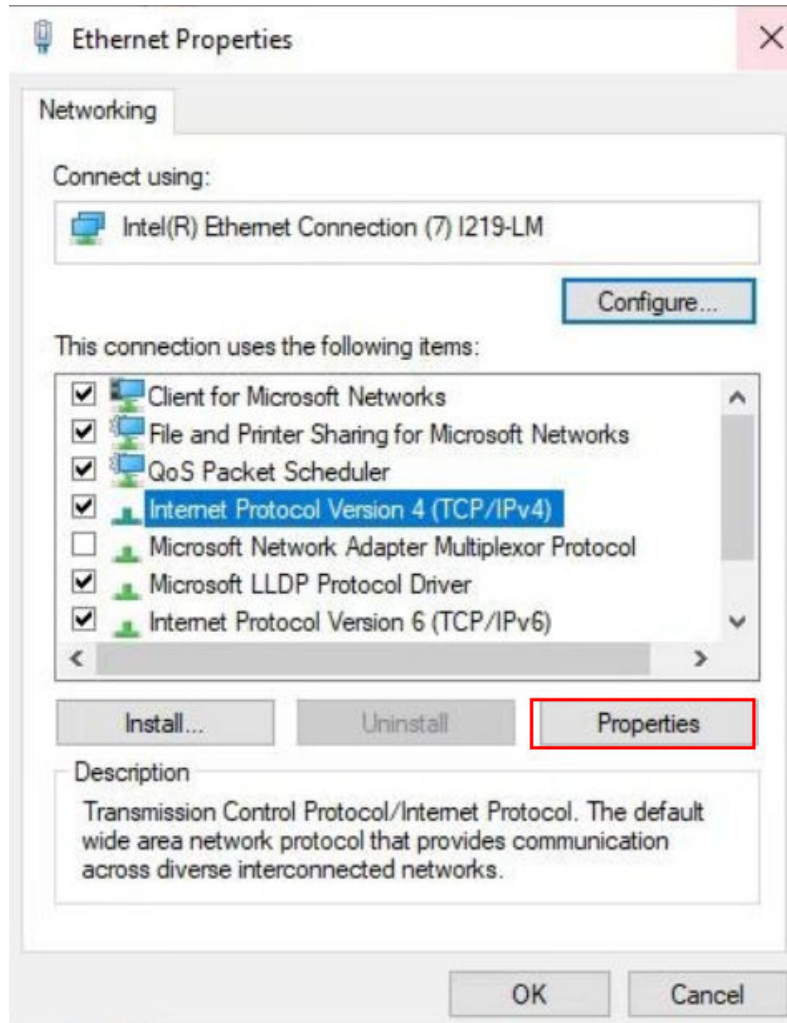
Method 1: Disconnect the Wi-Fi connection and reconnect the NEs.

Method 2: Adjust the priority of the wired network to be higher than that of the Wi-Fi network and reconnect NEs.

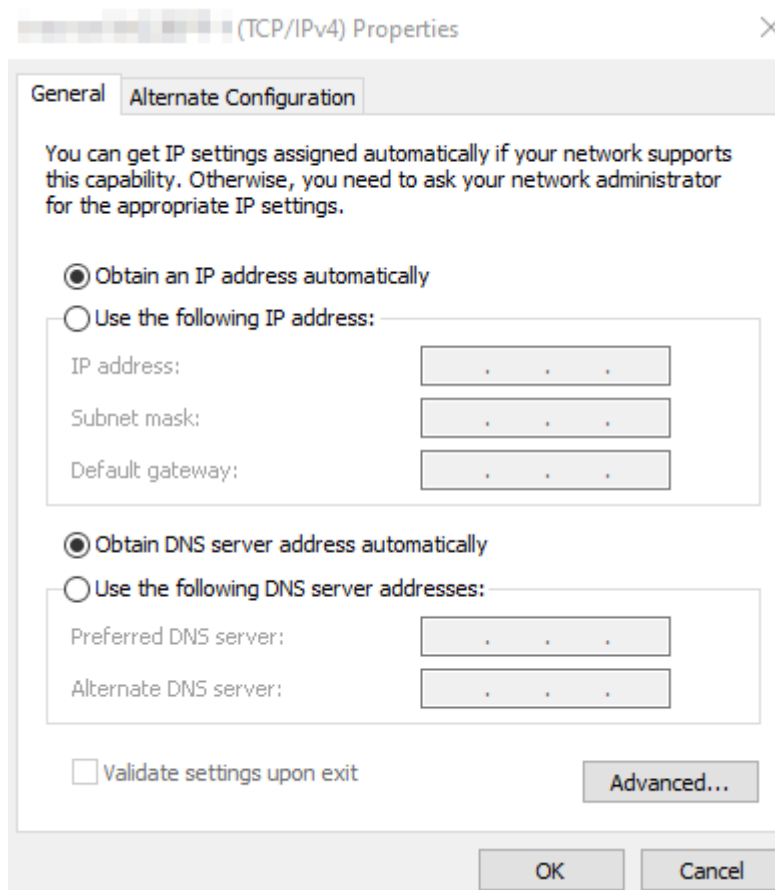
- a. Search for "Ethernet Settings" in the search box on the taskbar. On the **Settings** page that is displayed, click **Change adapter options**.



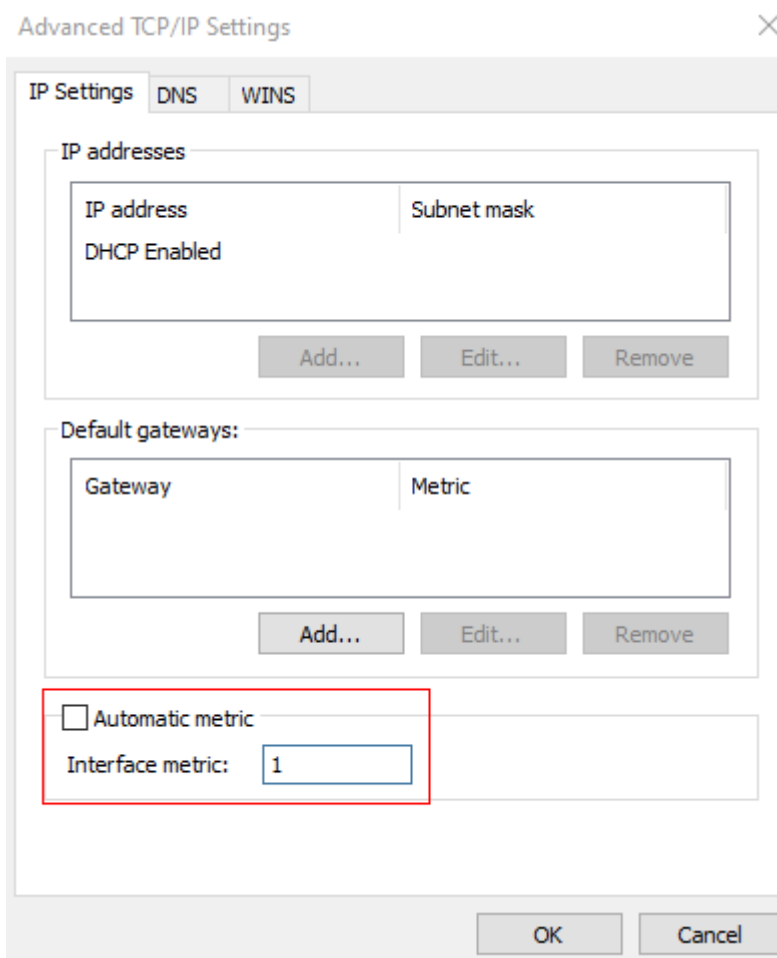
- b. Right-click the wired network and choose **Properties** from the shortcut menu.
- c. Select **Internet Protocol Version 4 (TCP/IPv4)** and click **Properties**.



- d. Click **Advanced**.



- e. Deselect the **Automatic metric** check box, and set **Interface metric** to a value, for example, 1.
A smaller value indicates a higher priority.



- f. Set Interface metric of the Wi-Fi network by referring to [.b](#) to [.e](#). The value must be larger than that of the wired network.
- g. Log in to the Web LCT.
- h. In the **NE list**, right-click an NE and choose **Reconnect** from the shortcut menu.

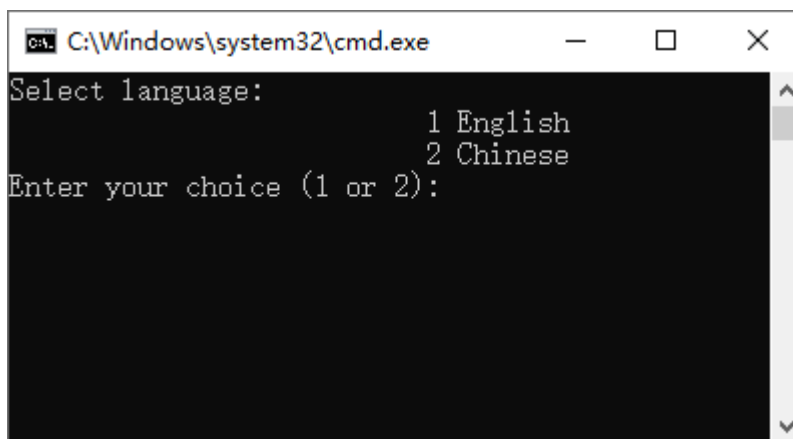
6.9 How Do I Switch the Web LCT language?

Question

How Do I Switch the Web LCT language?

Answer

- Step 1** Double-click the **Decompression directory\WebLCT\stopweblct.bat** script to stop the Web LCT service.
- Step 2** Double-click the **Decompression directory\WebLCT\startweblct.bat** script to start the Web LCT.
- Step 3** Enter the target language of the Web LCT as prompted, as shown in the following figure.



----End

6.10 How Do I Confirm and Resolve the Problem that NEs Cannot Be Searched out Because Port 8001 Is Occupied?

Question

During NE search, port 8001 (a local port for receiving multicast data) is used. If port 8001 is occupied by a program, messages cannot be sent or received over the port. As a result, NEs cannot be searched out.

For example, the fingerprint system usually occupies port 8001.

Answer

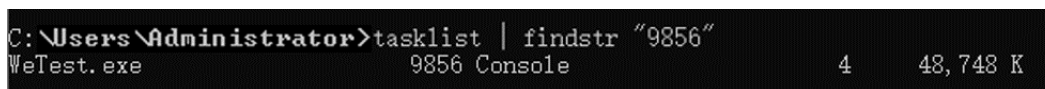
Step 1 On the CMD tool, run the following command to check whether port 8001 is occupied by a process:

```
netstat -ano|findstr 8001
```



Step 2 If yes, query the process name based on the PID.

```
tasklist | findstr "9856"
```



Step 3 Check whether the process can be stopped. If yes, run the following command to stop the process:

```
taskkill /f /pid 9856
```

```
C:\Users\Administrator>taskkill /f /pid 9856  
SUCCESS: The process with PID 9856 has been terminated.
```

Step 4 After the process is stopped, search for NEs again.

----End

6.11 How Do I Update a Self-signed Certificate?

Question

When the WebLCT is started for the first time, a self-signed certificate is automatically generated, and the validity period of the certificate is 10 years. How do I update the self-signed certificate after it expires?

Answer

1. Double-click **Decompression directory\WebLCT\stopweblct.bat** to stop the Web LCT service.
2. Delete the **server.jks** file from the **Decompression directory\WebLCT\etc\ssl\internal** directory.
3. Double-click **Decompression directory\WebLCT\startweblct.bat** to start the Web LCT.

6.12 How Do I Update the Key of Web LCT?

Question

A default key is generated during the installation of Web LCT. The key is used to encrypt the certificate password. To ensure password security, you are advised to update the key periodically.

Answer

1. Double-click **Decompression directory\WebLCT\stopweblct.bat** to stop Web LCT.
2. In the **Decompression directory\WebLCT\etc\cipher** directory, change the name of the **base.ksf** file to **super_base.ksf** and the name of the **common_shared.ksf** file to **super_common_shared.ksf**.

WebLCT > etc > cipher				
	Name	Date modified	Type	Size
	base.ksf	9/8/2022 5:22 PM	KSF File	3 KB
	cloudsop_cipher_mode.flag	3/31/2022 10:32 AM	FLAG File	0 KB
	common_shared.ksf	9/8/2022 5:22 PM	KSF File	3 KB

3. Double-click **Decompression directory\WebLCT\startweblct.bat** to start Web LCT.

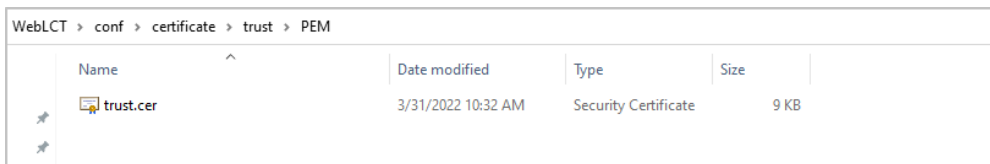
6.13 How Do I Update the Trust Certificate List of Web LCT?

Question

If the trust certificate list of Web LCT is not updated when the NE certificate changes, the communication between Web LCT and the NE will be abnormal.

Answer

1. Double-click **Decompression directory\WebLCT\stopweblct.bat** to stop Web LCT.
2. Use the text editor to open a trust certificate and copy the certificate content.
3. In the **Decompression directory\WebLCT\conf\certificate\trust\PEM** directory, use the text editor to open the **trust.cer** file and copy the trust certificate content to be trusted to the **trust.cer** file.



WebLCT > conf > certificate > trust > PEM				
Name	Date modified	Type	Size	
trust.cer	3/31/2022 10:32 AM	Security Certificate	9 KB	

4. Double-click **Decompression directory\WebLCT\startweblct.bat** to start Web LCT.

6.14 How Do I Update an Identity Certificate of Web LCT?

Question

A Huawei-developed SSL certificate is preconfigured when Web LCT is installed. This certificate is used for temporary communication, instead of commercial use. Web LCT supports certificate replacement. Before enabling SSL communication, apply for a certificate from the carrier's CA or make a digital certificate yourself, and use it to replace the temporary certificate in the commissioning phase, to improve communication security.

Answer

1. Double-click **Decompression directory\WebLCT\stopweblct.bat** to stop Web LCT.
2. Copy the new identity certificate to the **Decompression directory\WebLCT\conf\certificate\keyStore\PFX** directory, and change the new identity certificate name to **client.p12**.

WebLCT > conf > certificate > keyStore > PFX				
Name	Date modified	Type	Size	
client.p12	3/31/2022 10:32 AM	Personal Informati...	3 KB	
server.p12	3/31/2022 10:32 AM	Personal Informati...	3 KB	

3. In the address bar of the **Decompression directory\WebLCT** directory, enter "cmd" and press **Enter** to open the command line tool.
4. Run the certificate password setting script in the following format:
updatekey.bat "*Certificate password*".

```
D:\weblct\WebLCT>updatekey.bat "filepasswd"
```

5. Double-click **Decompression directory\WebLCT\startweblct.bat** to start Web LCT.

A Service Port Description

This section describes the service ports of the Web LCT, the precautions regarding the service ports, and how to query the service ports.

Context

This section describes the service ports used by the NMS.

To meet network security requirements, the customer network takes security hardening measures based on different scenarios:

- In the network environment where the NMS resides, security filtering has been configured on the routers or firewall. During project implementation, ensure that the service ports used by the NMS are not filtered out by these security settings.
- You can disable some service functions provided by the system by disabling system ports to prevent the system from being attacked by networks or viruses. Note that the service ports used by the NMS cannot be disabled. Otherwise, the NMS cannot run normally.

Precautions

In the practical communication process, the source (the server) and the sink (the client) use relevant ports. Usually, you only need to specify the source port, and the sink port is dynamically generated.

Note the following during the project implementation:

- The service ports used by the NMS cannot be disabled.
- If there are routers or firewalls between the source and sink, check all ports used by the source and sink. Ensure that these ports can be normally enabled to support the communication between the source and sink.

Service Ports Used by the Web LCT

[Table A-1](#) lists the service ports used by the Web LCT.

Table A-1 Service ports used by the Web LCT

Service	Source	Source Port	Destination	Destination Port	Protocol	Encryption Mode	Description
Web LCT	Web browser	Any	Web LCT server	13443	TCP	SSL	Service port of the web server, which is used to process HTTPS requests.
Web LCT	Web LCT server	Any	NESearch	1400	TCP	None	Communication interface between the NE software management process and transport NEs.
Web LCT	Web LCT server	Any	NESearch	5432	TCP	SSL	Port 5432 (SSL) enabled on the (gateway) NE side. The server communicates with and manages NEs through this port.
Web LCT	Web LCT server	Any	NESearch	3081	TCP	None	This port needs to be enabled on transport gateway NEs that run the TL1 protocol. The NMS server communicates with and manages NEs through this port.

Service	Source	Source Port	Destination	Destination Port	Protocol	Encryption Mode	Description
Web LCT	Web LCT server	Any	NESearch	1500	UDP	None	This port needs to be enabled on transport NEs. The NMS server communicates with NEs through this port to implement the NE search function.
Web LCT	Web LCT server	8001	NESearch	8002	UDP	None	The NMS server communicates with NEs through this port to implement the NE search function.
DC	NE	Any	DC server	20/21	TCP	None	FTP server process port. It provides FTP file transfer services and is used to update NE software, back up NE data, upload NE configuration information, and collect NE performance data.

Service	Source	Source Port	Destination	Destination Port	Protocol	Encryption Mode	Description
DC	DC server	Any	NE	5432	TCP	SSL	Port 5432 (SSL) enabled on the (gateway) NE side. The server communicates with and manages NEs through this port.
DC	Web LCT server	Any	DC server	31030	TCP	None	imapmrbr process port. This port is used to send MDP messages.
DC	DC server	Any	DC server	31095	TCP	None	Listening port for the imapmrbr process. It distributes and processes messages.
DC	DC server	Any	DC server	9800	TCP	None	Listening port for the imapmrbr process. It distributes and processes messages.

How to Query Service Ports

Run the following command to check the enabled service ports on Windows OS:

```
netstat -a
```