Datacom Network Open Programmability V100R020C00

User Guide

 Issue
 02

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Overview

After a function package is compiled locally, you can import it to the NCE open programmability system (OPS) for online commissioning and use, implementing device management, device configuration delivery, and service configuration delivery.

The OPS is applied in the following scenarios:

• Managing and configuring a device

The OPS automatically generates the device configuration page based on the device YANG model (compiling and loading an SND package) for you to manage and configure a device.

• Configuring network services across devices

The OPS automatically generates the service configuration page based on the service YANG model (compiling and loading an SSP package) for you to deliver service configurations to devices.

• Verifying data consistency between a device and the OPS

You can verify data consistency between a device and the OPS. If the data is inconsistent, you can perform data consistency comparison, synchronization, and verification.

2 Operation Procedure

You can develop a function package (such as an SND or SSP package) based on site requirements by referring to the development guide and then configure devices and services by referring to the following process.





- 1. Load an SND package:
 - a. Import the compiled SND package to the system.
 - b. Activate the SND package.
- 2. Manage a device:
 - a. Set protocol parameters, including the user name and password.
 - b. Add a device. After the device is added, the controller automatically initiates a connection to the device.
- 3. Configure the device using either of the following methods:
 - Method 1: After all device data is collected, synchronize data based on data on NCE and the device based on the NCE or device data.
 - Method 2: Configure the device on the device configuration page.

If the configuration data in the system is modified by a third party or is lost after a device restarts unexpectedly, the configuration data in the system will be inconsistent with that on the device. In this case, you can perform data consistency verification on the device.



Figure 2-2 Process of configuring network services across devices

If a device is not managed, manage the device by referring to the preceding flowchart and then configure services. If the device has been managed, you do not need to perform the first three steps.

- 1. Load an SND package:
 - a. Import the compiled SND package to the system.
 - b. Activate the SND package.
- 2. Manage a device:
 - a. Set protocol parameters, including the user name and password.
 - b. Add a device. After the device is added, the controller automatically initiates a connection to the device.
- 3. Configure the device using either of the following methods:
 - a. Method 1: After all device data is collected, synchronize data based on data on NCE and the device based on the NCE or device data.
 - b. Method 2: Configure the device on the device configuration page.
- 4. Load an SSP package:
 - a. Import the compiled SSP package to the system.
 - b. Activate the SSP package.
- 5. Configure services.

3 System Login

The open programmability system (OPS) provides two deployment modes: One is that the system is integrated into iMaster NCE-IP and released as an app (service open programmability). The app is deployed with iMaster NCE-IP. The other one is that the system is released as an independent software package. The open programmability mini software package is installed independently. This section describes how to log in to the system using a browser.

Logging In to the OPS App

Step 1 Log in to the NCE O&M plane. Access the O&M plane at https://IP address of the O&M plane.31943. Enter the user name and password and click Log In.



Figure 3-1 Logging in to the NCE O&M plane

D NOTE

- You need to change the password upon the first login. Keep the new password properly. To improve system security, you are advised to periodically change the password to prevent security risks such as brute force cracking.
- The IP address of the O&M plane is the client login IP address configured on the Common_Service node. If the Common_Service node is deployed in a cluster, the IP address is set to the floating IP address of the cluster. If the Common_Service node is deployed in single-node mode, the IP address is the client login IP address of the node.
- **Step 2** After logging in to the system, click **Service Programming** on the homepage to access the OPS.

K iMaster NCE	r NCE Provisioning Efficiency, Better Bearer Experience, and L	ower O&M Costs	admin v O
R III	Management System Settings	Service Programming	©
	SP Service	Add Devices Load Server Hod	are Configure Service
Global Statistics	Software Package Status Statistics	Template Data Statistics Service Template 9 NE Template 9 Parameter Set 9	Quick entry Package Repo Package Repo View Device

Step 3 On the home page, click the corresponding shortcut entry or click any shortcut entry based on the actual application scenario to access the main menu.

----End

Logging In to the open programmability Mini System

Step 1 Log in to the developer community and download the open programmability mini software package (**AOCmini_V100R020C00.zip**) on the resource download tab page.

Step 2 Decompress **AOCmini_V100R020C00.zip** and double-click **start.bat** to start the AOC mini service. The window is displayed.

C:\Users\swx944510\Desktop\AOCmini\envs\Product-AOCService\controller>..\..\.rtsp\tomcat\bin \catalina.bat start Using CATALINA_BASE: "C:\Users\swx944510\Desktop\AOCmini/envs/Product-AOCService/"

Using CATALINA_DASE. C.\USers\swx944510\Desktop\AOCmini/envs/Product-AOCService/ Using CATALINA_HOME: "C:\Users\swx944510\Desktop\AOCmini/envs/Product-AOCService/\temp" Using JRE_HOME: "C:\Users\swx944510\Desktop\AOCmini/rtsp/jdk/" Using CLASSPATH: "C:\Users\swx944510\Desktop\AOCmini/rtsp/tomcat\bin\bootstrap.jar;C:\Users \swx944510\Desktop\AOCmini/rtsp/tomcat\bin\bootstrap.jar;C:\Users

AOCmini is starting, please wait a moment.

Step 3 Wait for about three minutes until the system is started.

2020-09-10 16:10:28 Console message: AOCmini is starting, progress: 95.70% 2020-09-10 16:10:33 Console message: AOCmini is starting, progress: 95.70% 2020-09-10 16:10:39 Console message: AOCmini is starting, progress: 95.70% 2020-09-10 16:10:43 Console message: AOCmini is starting, progress: 95.70% 2020-09-10 16:10:48 Console message: AOCmini is starting, progress: 95.70% 2020-09-10 16:10:53 Console message: AOCmini is starting, progress: 95.70% 2020-09-10 16:10:58 Console message: AOCmini is starting, progress: 95.70% 2020-09-10 16:10:58 Console message: AOCmini is starting, progress: 97.68% 2020-09-10 16:11:03 Console message: AOCmini is starting, progress: 97.68% 2020-09-10 16:11:08 Console message: AOCmini is starting, progress: 97.68% 2020-09-10 16:11:13 Console message: AOCmini started successfully, please visit https://127.0.0.1:32018/ aocwebsite/ in browser.

Step 4 Log in to the AOC mini system at https://127.0.0.1:32018/aocwebsite.

	Pande	Add Devices Load Service Pack	Configure Sentires	
Global Statistics	Software Package Status Statistics	Template Data Statistics	Quick entry	
		Service Template 0		
0 Normal 0 Total	Active: 0	NE Template 0	Package Repo	Commit History
	Inactive: 0	Template Group 0	ê	
Device Status		Parameter Set 0	View Device	Service Management

Figure 3-2 Home page of the AOC mini system

Step 5 On the home page, click the corresponding shortcut entry or click any shortcut entry based on the actual application scenario to access the main menu.

----End

4 Package Repository Management

Package repository management includes repository management, package management, public key management, and task management.

Repository management is used to create, modify, and delete repositories where software packages are stored. Package management is used to import, deploy, update, and delete software packages. Public key management is used to upload and delete public keys. Task management is used to check software package tasks.

- 4.1 Repository Management
- 4.2 Package Management
- 4.3 Public Key Management
- 4.4 Task Management

4.1 Repository Management

Scenario Description

A repository stores software packages. Before creating or importing a software package, you must create a repository. You can create repositories of different types or authentication modes as required.

Procedure

- **Step 1** Choose **Package Repo** from the main menu.
- **Step 2** Choose **Repo** from the navigation pane, and click **New Repo** in the upper right corner of the page. In the **New Repo** dialog box that is displayed, set required parameters.

Parameter	Description
RepoType	FS: Packages are stored in the disk of the node where the package repository management service is deployed, delivering low reliability.
	HOFS: Packages are stored in the HOFS file system, implementing high reliability. If you have high requirements on package reliability, HOFS is strongly recommended.
CheckType	SHA256: Integrity verification is performed only on packages stored in the repository.
	ASC: Signature verification is performed on packages stored in the repository to ensure that the packages are not tampered with.
	CMS: Signature verification is performed on packages stored in the repository to ensure that the packages are not tampered with.
	NOTE The security level of SHA256, ASC, and CMS increases in ascending order. To ensure secure storage of packages in the repository, you are advised to select ASC or CMS .
	If two or more authentication modes are selected, the system performs authentication based on the selected authentication modes in sequence when you upload a package. As long as one authentication mode is passed, the package can be successfully uploaded to the repository.

Table 4-1 Key parameters

Figure 4-1 Creating a repository



----End

Follow-up Procedure

If **CheckType** is set to **ASC** or **CMS**, you need to import the public key for signature verification. The public key is used to verify the signature of each package managed by the repository. Otherwise, signature verification cannot be performed.

Related Operations

You can perform the following operations as required:

- To modify a repository, click **Modify** in the **Operation** column of the repository to be modified. You can modify the repository name and authentication mode.
- To delete a repository, click **Delete** in the **Operation** column of the repository to be deleted.

4.2 Package Management

4.2.1 Creating a Software Package

Scenario Description

When a software package is created, the default software template directory and sample code are generated for you to develop the software package.

Procedure

- **Step 1** Choose **Package Repo** from the main menu.
- **Step 2** Choose **Package Management** from the navigation pane, and click **Add** in the upper right corner of the page.

Figure 4-2 Creating a software package

Package Manag	ement 💿								
Please enter name	, package type, version, p	ro Q						Add Impo	rt
Name \$	Version \$	Type \$	Provider \$	Package Status	Owned Repo	Operation Status 💠	Operation Details	Operation	

Step 3 In the Add dialog box that is displayed, set mandatory parameters, such as Name, Version, Provider, and Package type. The name and version uniquely identify a software package. The provider refers to the provider of a software package.

Figure 4-3 Parameters for creating a software package

Add					
• Repo:	HOFSPUB1	~	Name:	NE40E_X3	
Version:	1.0.0		• Provider:	HUAWEI	
Description:			Package type:	Specific NE driver	~
Device type:	NE40E_X3		Mapping type:	python	~
 Protocol type: 	NETCONF	~			

Step 4 After the software package is created, you can view the new software package on the **Package Management** page.

Figure 4-4 Exporting a software package

Р	ackage Managem	ent 🛛						
	Please enter name, pack	kage type, version, p	ro Q					Add Import
	Name 🖨	Version \$	Type 🜲	Provider 💠	Package Status	Owned Repo	Operation Status \$ Operation Details	Operation
	> NE40E_X3	1.0.0	PROJECT	HUAWEI		HOFSPUB1	UPLOAD_SUCCESSFUL	

----End

Follow-up Procedure

You need to export the new software package locally for programming. After the development is complete, import the software package to the system.

Related Operations

- To view a software package, click ⁽²⁾ in the **Operation** column.
- To uninstall a software package, click $\overline{\nabla}$ in the **Operation** column.
- To delete a software package, click $\overline{\amalg}$ in the **Operation** column.
- To export a software package, click 🖄 in the **Operation** column.

4.2.2 Importing a Software Package

Scenario Description

You can import a software package that has been programmed or obtained from other developers to the system. The imported software package can be used only after being deployed as required.

Procedure

Step 1 Choose **Package Repo** from the main menu. Then choose **Package Management** from the navigation pane, and click **Import** on the displayed page.

Figure 4-5 Importing a software package

Pa	ackage Managei	ment 💿								
	Please enter name, pa	ackage type, version, p	ro Q						Add Import	1
	Name 🌩	Version \$	Type \$	Provider \$	Package Status	Owned Repo	Operation Status \$	Operation Details	Operation	

Step 2 In the **Import** dialog box that is displayed, select the software package to be imported.

Figure 4-6 Dialog box for selecting the software package to be imported



Figure 4-7 Selecting the software package and signature file to be imported

🌍 Open		×
← → × ↑ 📙 « test → NE40E-X3 → output	✓ Ö Search output	Q,
Organi Forward (Alt + Right Arrow)	 Ⅲ ▼	
🖳 disc 🛷 ^ 🔲 Name ^	Date modified Type	Size
nce_v1r18c10 x	2020/5/18 10:06 WinRAR ZIP archive	277
nce_pd_ci 🖈 🔽 🛽 NE40E-X3.zip.asc	2020/5/18 10:06 OpenPGP Text File	1
Desktop This PC Libraries Network		
File name: "NE40E-X3.zip" "NE40E-X3.z	ip.asc" V Copen C	cms;*. ~ ancel

Step 3 Click Upload.

Figure 4-8 Uploading a software package



After the software package is imported, you can view the imported software package on the **Package Management** page.

Figure 4-9 Successfully importing a software package

Package M	anagement 🔊									
Please ente	r name, package type	e, version, pro	Q						Add	Import
Name	¢ Ver	rsion \$	Type \$	Provider \$	Package Status	Owned Repo	Operation Status \$	Operation Details	Operation	
> NE40	-X3 1.0	0.0	SND	HUAWEI	INACTIVE	HOFSPUB1	UPLOAD_SUCCESSFUL		◎ ▲ ີ ୯	5 m

----End

Follow-up Procedure

You need to deploy the software package after being imported to ensure that software package functions take effect in the system.

Related Operations

- To view a software package, click ⁽²⁾ in the **Operation** column.
- To uninstall a software package, click $\overline{\nabla}$ in the **Operation** column.
- To delete a software package, click $\overline{\amalg}$ in the **Operation** column.

- To export a software package, click 🖄 in the **Operation** column.
- To deploy a software package, click 🚔 in the **Operation** column.

4.2.3 Deploying a Software Package

Prerequisites

The software package has been successfully uploaded or uninstalled, and all dependent software packages have been successfully deployed.

Scenario Description

You need to deploy a software package to make it take effect in the system.

Procedure

Step 1 Choose **Package Repo** from the main menu. Then choose **Package Management** from the navigation pane. On the **Package Management** page, click in the **Operation** column to deploy the software package.

Figure 4-10 Installing a software package

Package Manage	ment 💿								
Please enter name, p	ackage type, version, p	рго Q						Add Imp	ort
Name \$	Version \$	Type \$	Provider \$	Package Status	Owned Repo	Operation Status \$	Operation Details	Operation	
> NE40E-X3	1.0.0	SND	HUAWEI	INACTIVE	HOFSPUB1	UPLOAD_SUCCESSFUL		💿 🔮 🕃 🏥 🖽	

Step 2 Wait for a few minutes until the software package is deployed.

When a software package is deployed, the system loads the corresponding code, script, and model in the package, and generates database entries based on the model.

Depl oym ent Statu s	Pack age Stat us	Operation Status	Description
DEPL OY_S UCCE SS	ACTI VE	DEPLOY_SUCCESS	The software package is successfully deployed.
DEPL OY_F AILU RE	INAC TIVE	UPLOAD_SUCCESS (same as the operation status before you click 씁)	As long as the software package fails to be deployed, the system performs a rollback and the rollback succeeds. For details about the deployment failure cause, see operation details.

 Table 4-2 Status change after deployment

Depl oym ent Statu s	Pack age Stat us	Operation Status	Description
	ABN ORM AL	DEPLOY_FAILURE	 As long as the software package fails to be deployed, the system performs a rollback and the rollback fails. For details about the deployment failure cause, see operation details. If the status of a software package is abnormal, click to enable the
			system to automatically restore the software package to the inactive state.

----End

Related Operations

• To update a software package:

Click G in the **Operation** column to update the software package to the target version.

NOTE

Before updating the software package, ensure that the original software package is successfully activated and deployed. When the software package is updated, the system automatically uninstalls the original software package and deploys the new software package (that is, the software package of the target version).

 Table 4-3
 Status change after update

Upd ate Stat us	Package Status	Operation Status	Description
UPD ATE_ SUC CESS	Software package of the target version: ACTIVE Original software package: INACTIVE	Software package of the target version: DEPLOY_SUC CESS Original software package: UNINSTALL_ SUCCESS	The software package is successfully updated. NOTE When an SSP package is updated and some YANG model objects of the original package are deleted, the system automatically deletes data of the deleted objects during the update. Therefore, exercise caution when you perform this operation.

Upd ate Stat us	Package Status	Operation Status	Description
UNI NST ALL_ FAIL URE	Software package of the target version: INACTIVE Original software package: ACTIVE	Software package of the target version: UPLOAD_SUC CESS Original software package: DEPLOY_SUC CESS	As long as the software package fails to be updated, the system performs a rollback and the rollback succeeds. For details about the update failure cause, see operation details.
	Software package of the target version: ABNORMAL Original software package: ABNORMAL	Software package of the target version: DEPLOY_FAIL URE Original software package: UNINSTALL_F AILURE	As long as the software package fails to be updated, the system performs a rollback and the rollback fails. For details about the uninstallation failure cause, see operation details.

• To uninstall a software package, click $\overline{\nabla}$ in the **Operation** column.

Table 4-4 Status change	after uninstallation
-------------------------	----------------------

Unin stall atio n Stat us	Package Status	Operation Status	Description
UNI NST ALL_ SUC CESS	INACTIV E	UNINSTALL_ SUCCESS	The software package is successfully uninstalled.
UNI NST ALL_ FAIL URE	ACTIVE	DEPLOY_SU CCESS	As long as the software package fails to be uninstalled, the system performs a rollback and the rollback succeeds. For details about the uninstallation failure cause, see operation details.

Unin stall atio n Stat us	Package Status	Operation Status	Description
	ABNOR MAL	UNINSTALL_ FAILURE	As long as the software package fails to be uninstalled, the system performs a rollback and the rollback fails. For details about the uninstallation failure cause, see operation details.

- To delete a software package, click $\overline{\amalg}$ in the **Operation** column.
- To export a software package, click 🖄 in the **Operation** column.

4.2.4 Viewing Software Packages

Scenario Description

You can view the software packages that exist in the system on the page.

Procedure

Step 1 Choose **Package Repo** from the main menu. Then choose **Package Management** from the navigation pane, and click ⁽²⁾ on the displayed page.

Figure 4-11 Software package view

Pa	аскауе мапауеп	nent U								
	Please enter name, par	ckage type, version, p	ro Q						Add Impo	rt
	Name ≑	Version 🖨	Type 🗘	Provider 💠	Package Status	Owned Repo	Operation Status 💠	Operation Details	Operation	
	> NE40E-X3	1.0.0	SND	HUAWEI	ACTIVE	HOFSPUB1	DEPLOY_SUCCESSFUL		I 🖞 S 🗣 🗊	

Step 2 In the file view displayed on the **check** page, click a file. The file content then is displayed on the right area.

```
Package Management > check ⑦
                                                                        ,
Copyright (C) 2019 Huawei Technologies Co., Ltd. All rights reserved.
 Package Management
                                                                3
    9
10 }
11 import huawei-radius {
12 prefix radius;
               com

    11
    import huawei-radius {

    12
    prefix radius;

    13
    }

    14
    import huawei-extension {

    15
    prefix ext;

    16
    }

    17
    organization

    18
    "Huawei Technologies Co.

    19
    contact

    20
    "Musuei Technologies Co.

                    - huawei
                       controller

    devicetype

                                   snd.pvc
                                                                                "Huawei Technologies Co., Ltd.";
                                      __init__.p
                                                                        contact
"Huawei Industrial Base
                                   __init__.pyc
                                                                        Bantian, Longgang
Shenzhen 518129
People's Republic of China
                                                             21
                               __init__.pyc
        __init__pyc 23 People's neposition

24 Website: http://www.i

25 Email: support/nuawei

26 description

huawei-aaa-deviations 27 "Security management,

huawei-aaa-lam.yang 29 description
                                                               23
                                                                            Website: <a href="http://www.huawei.com">http://www.huawei.com</a>
Email: support@huawei.com";
                                                                              "Security management, which includes the management on authentication, authorization, accounting, domains, and users.";
```

Figure 4-12 Software package file view

----End

4.3 Public Key Management

4.3.1 Uploading a Public Key

Scenario Description

If a package signed using a private key is uploaded to the repository, you need to use the public key to verify the signature of the package so as to ensure that the package is not tampered with. In this case, you need to import the corresponding public key before uploading the package.

NOTE

A private key supports only the RSA algorithm, and the private key length must be in the range from 3072 to 4096.

Context

Keys are generated in pairs, including a public key and a private key. The private key is used to sign packages, and the public key is used to verify signatures. If the signature passes the verification, the package is not tampered with.

Procedure

Step 1 Choose **Package Repo** from the main menu. Choose **Publickey Manage** from the navigation pane, and click **Import** on the displayed page.

Figure 4-13 Importing a public key

Package Repo	Publickey Manage 🛛			
Repo				
Package Management				Import
Publickey Manage	File Name	Prolvder	Operation	
Task Manage				
		No records found.		

Step 2 In the **Import** dialog box that is displayed, set **Provider** to the software package provider, and select the public key file.



Figure 4-14 Entering the public key provider

Import	Cancel
	·

Figure 4-15 Selecting the public key file



Step 3 Click Import.

I iguic + io importing a public key
--

Import		\times
• Proivder	Huawei	
• File	public.asc (3KB) ① × ···· 1 file has been added.	
	Import Cancel	4

Step 4 After the public key is imported, you can view it on the **Publickey Manage** page.

Figure 4-17 Successfully importing a public key

Publickey Manage 💿			
			Import
File Name	Proivder	Operation	
public.asc	Huawei	Delete	
Total Records: 1			10 ~ 🔇 🕽 📎
	Publickey Manage () File Name public.asc Total Records: 1	Publickey Manage File Name Provider public.asc Total Records: 1	Publickey Manage () File Name Polyder Operation public.asc Huawei Delete Total Records: 1

----End

Related Operations

To delete a public key, click **Delete** in the **Operation** column.

4.4 Task Management

4.4.1 Managing Software Packages

Scenario Description

You can view the progress of each software package task on the page.

Procedure

Step 1 Choose **Package Repo** from the main menu. Then choose **Task Manage** > **Package Management** from the navigation pane.

Figure 4-18 Software package view

Package Repo	Package Management 💿					
Repo Package Management						Refresh
Publickey Manage	Task ID	Package Name	Service Template	Work Flow	Operator Step	Operator Progress
Task Manage	> cf7675f2-f119-2f00-3302-052	ne40-ned	1.0.3	ONESTEPACTIVE	D:ACTIVE:POST	100%
Package Management	> 46885616-38f9-e51f-c6d1-32f	ne40-ned	1.0.3	UPLOAD	UPLOAD	100%
Transport package ma	Total Records: 2					10 - 3

Step 2 Click the collapse icon on the left of the software package to be viewed to expand the software package task details.

Figure 4-19 Expanding details about a software package task

Task ID	Package Name	Service Template	Work Flow	Operator Step	Operator Progress
> cf7675f2-f119-2f00-3302-0521	ne40-ned	1.0.3	ONESTEPACTIVE	D:ACTIVE:POST	100%
46885616-38f9-e51f-c6d1-32f	ne40-ned	1.0.3	UPLOAD	UPLOAD	100%
ModuleID	Operation Type	Operator Step	Detail Progress	i	Detail Message
RepoMgrService	DEAL	deal file		100%	Deal success
RepoMgrService	INIT	save metadata		100%	success

----End

4.4.2 Managing Transport Packages

A transport package is a collection of product software packages. You can manage software packages in batches.

Scenario Description

You can view the progress of each transport package task on the page.

Procedure

Step 1 Choose Package Repo from the main menu. Then choose Task Manage > Transport package manage from the navigation pane.

Figure 4-20 Transport package view

Package Repo	Transport package manage 🛛
Repo	
Package Management	Please enter a name Q All status ~
Publickey Manage	name 0 Transmission status 0 RepolD 0 Specific steps 0 Process result 0
Task Manage	
Package Management	
Transport package ma	
	No records found.
	Total Records: 0

Step 2 Click the collapse icon on the left of the transport package to be viewed to expand the transport package task details.

----End

5 Device Management

5.1 Adding a Device

- 5.2 Importing a Device
- 5.3 Configuring Device Parameter Templates
- 5.4 Configuring SNMP
- 5.5 Configuring an SSH Client

5.1 Adding a Device

Prerequisites

- Protocol parameters have been configured on a device.
- The network between the device and NCE is normal.

Scenario Description

Device adding indicates that a device is added to NCE for management. You can perform subsequent service operations on the device only after the device is managed by NCE.

After a device is added, NCE automatically establishes a NETCONF connection with the device. If the connection is normal, the device status is online. If the device is disconnected, NCE will attempt to establish a connection with the device again.

Procedure

Step 1 Choose Resource > Device Management from the main menu. On the Device Management page, choose Create > Create.

Figure 5-1 Creating an NE

Resource / Device Management				
NE Type: ALL	✓ NE Name or NE IP			Reset Protocol Delete Create
NE Name \$	NE Type \$	NE IP \$	Protocol type	Operation
test7	NetEngine 8000 M14	1.1.1.1	NETCONF	Edit Delete
test8	NetEngine 8000 M14	1.1.1.1	NETCONF	Edit Delete

Step 2 On the displayed **Create NE** page, set mandatory parameters such as **NE Name** and **NE IP**, and set communication parameters such as NETCONF and SNMP. You can click **Customized** or **Template selection** to configure communication parameters.

sic Info				
NE Name VE8000M14_01	*NE Type NetEngine 8000 M14	*Software Version V800R012C10	*Manufacturer HUAWEI	
NE IP 92 168 20 10	MAC : : : : :	ESN		
mmunication Parameters				
mmunication Parameters				
mmunication Parameters				
mmunication Parameters Configure NETCONF Configure Open:	Customized O Template selection			
mmunication Parameters configure NETCONF Configure Open: Protocol configuration mode: Configuration mode: Configuration mode: Configuration mode: Con	Customized O Template selection			
Configure NETCONF Configure Open: Protocol configuration mode: Please manually enter the t	Customized O Template selection			

Figure 5-2 Communication parameters

Step 3 After the device is added, you can view the new device on the **Device Management** page.

Figure 5-3 Viewing device information

Resource / E	Device Management				
NE Type:	ALL ~	NE Name or NE IP			Reset Protocol Delete Create
	NE Name ¢	NE Type ©	NE IP ¢	Protocol type	Operation
	test7	NetEngine 8000 M14	1.1.1.1	NETCONF	Edit Delete
	test8	NetEngine 8000 M14	1.1.1.1	NETCONF	Edit Delete
	test9	NetEngine 8000 M14	1.1.1.1	NETCONF	Edit Delete
	test10	NetEngine 8000 M14	1.1.1.1	NETCONF	Edit Delete

Step 4 After the protocol connection is established, the device status changes to normal, indicating that the device is successfully managed by NCE. Choose Device Configuration > Device Configuration from the main menu. to view the device status.

Figure 5-4 Device status

Enter a device na	ame or IP address.	2					Synchronize 💌	Discov	er Inconsistencies	Apply Template	More 🔻
lcon	Device Name	IP Address \$	Device Model \$	Hardware Version	Software Version	Status	Vendor	Sync	Sync Status	Operation	0
	router	192.168.20.10	NE40E-X8A(V8)	NE40E-X8A(V8)	V800R010C10SPC500	Normal	HUAWEI	No	Discovered	Edit View Inconsis	More •

----End

Related Operations

- To edit a device, choose **Resource** > **Device Management**, and click **Edit** in the **Operation** column corresponding to a device.
- To delete a device, choose **Resource** > **Device Management**, and click **Delete** in the **Operation** column corresponding to a device.

5.2 Importing a Device

Prerequisites

- Protocol parameters have been configured on a device.
- The network between the device and NCE is normal.

Scenario Description

Device import indicates that a device is imported to NCE for management. You can perform subsequent service operations on the device only after the device is managed by NCE.

After a device is imported, NCE automatically establishes a NETCONF connection with the device. If the connection is normal, the device status is online. If the device is disconnected, NCE will attempt to establish a connection with the device again.

Procedure

Step 1 Choose Resource > Device Management from the main menu. On the Device Management page, choose Create > Import.

Figure 5-5 Import

Resource / Device Management				
NE Type: ALL	✓ NE Name or NE IP			Reset Protocol Delete Create
NE Name ‡	NE Type ©	NEIP ±	Protocol type	Operation Create
test7	NetEngine 8000 M14	1.1.1.1	NETCONF	Edit Delete Import
test8	NetEngine 8000 M14	1.1.1.1	NETCONF	Edit Delete
test9	NetEngine 8000 M14	1.1.1.1	NETCONF	Edit Delete

Step 2 On the displayed **NE Import** page, select the template file to be imported and click **Upload**.



Figure 5-6 Importing a template file

Step 3 After the template file is imported, you can view the new device on the **Device Management** page.

Figure 5-7 Checking the device

esource / D	evice Management				
NE Type:	ALL ~	NE Name or NE IP Q			Reset Protocol Delete Create
	NE Name \$	NE Type 💠	NE IP \$	Protocol type	Operation
	test7	NetEngine 8000 M14	1.1.1.1	NETCONF	Edit Delete
	test8	NetEngine 8000 M14	1.1.1.1	NETCONF	Edit Delete
	test9	NetEngine 8000 M14	1.1.1.1	NETCONF	Edit Delete
	test10	NetEngine 8000 M14	1.1.1.1	NETCONF	Edit Delete

Step 4 After the protocol connection is established, the device status changes to normal, indicating that the device is successfully managed by NCE. Choose Device Configuration > Device Configuration from the main menu. to view the device status.

Figure 5-8 Device status

Enter a device name o	or IP address. Q						Synchronize 🔻	Discove	r Inconsistencies	Apply Template	More 💌
lcon Der	evice Name 💠	IP Address \$	Device Model 💠	Hardware Version	Software Version	Status	Vendor	Sync	Sync Status	Operation	0
not 🔐	outer	192.168.20.10	NE40E-X8A(V8)	NE40E-X8A(V8)	V800R010C10SPC500	Normal	HUAWEI	No	Discovered	Edit View Inconsis	More 👻

----End

5.3 Configuring Device Parameter Templates

Scenario Description

Parameter management refers to configuring NETCONF, SNMP, Telnet, and STelnet parameter templates on NCE. When adding a device, you can select the corresponding template.

NOTE

The device parameter management function is provided in the development state. This function is unavailable in the official version.

Procedure

Step 1 Choose Resource > Device Communication Param Templates from the main menu. On the Device Communication Param Templates page, click Create.

Figure 5-9 Parameter management

TemplateType:	All	~	Please input template name			Del Cre
Ter	mplateName \$		TemplateType \$	TemplateDesc	Operation	

Step 2 On the displayed page, select a template type, configure template information, and click **Confirm**.

Figure 5-10 Template information

Plase manually enter the template related Ording Content ************************************	reate				
TemplateName emplateName emplateName fease enter comment Image: Please manually enter the template related Ort 2 Image: Please manually enter the template related State Ort 2 Image: Please manually enter the template related State State Image: Please manually enter the template related State	emplateType: 🔽 Netconf 🗌 Snm	p 🗌 Telnet/Stelnet			
Please manually enter the template related Part *Response Timeout Period (s) 60 60 60 60 9 Jeer Name 9 9 9 10 <th>*TemplateName test</th> <th></th> <th></th> <th></th> <th></th>	*TemplateName test				
Please manually enter the template related vort 2 Please manually enter the template related vort 5 Please manually e	mplateDesc				
Please manually enter the template related tort 2	ease enter comment				
recer instruent of the Computer Found of the Comp	ease enter comment				0/
ort *Augnitineout Period (s) *Response Timeout Period (s) *Authentication Mode 60 60 User	Please manually enter the ten	nstar astar			0/
ser Name +Password userPrivateKey	Please manually enter the ten	nplate related			0/
inet ······	Please manually enter the ten	nplate related +t.ogin Timeout Period (s) 60	+Response Timeout Period (s) 60	*Authentication Mode User	0,
	Please manually enter the ten ort ser Name	nplate related +Login Timeout Period (s) 60 -Password	+Response Timeout Period (s) 60 userPhystekey	*Authentication Mode User	0/
	Please manually enter the ten ort ser Name Inet	nplate related *Cogin Timeout Period (s) 60 *Password *****	+Response Timeout Period (s) 60 userPrivateKey ******	*Authentication Mode User	0)

Step 3 After the template is created, you can view the new template on the **Device Communication Param Templates** page.

Figure 5-11 Viewing the created template

TemplateType:	All	✓ Please input template name Q		Del	Cre
Tem	plateName \$	TemplateType \$	TemplateDesc	Operation	
> 🗆 test		NETCONF		Edit Delete	

----End

Related Operations

- To edit device parameters, choose **Resource** > **Device Communication Param Templates**, and click **Edit** in the **Operation** column of a template.
- To delete device parameters, choose Resource > Device Communication
 Param Templates, and click Delete in the Operation column of a template.

5.4 Configuring SNMP

To enable the controller to receive device alarms, you need to set SNMP parameters.

Context

The controller uses SNMP to receive alarms and discover devices and topologies.

If alarm triggering conditions are met, the forwarders send SNMP trap messages to notify the controller of forwarder events, so that network administrators can handle these events in a timely manner.

Prerequisites

Forwarders have been added to the controller.

Procedure

NOTICE

The SNMP protocol does not support data consistency verification. Therefore, once the SNMP configuration is delivered, it cannot be modified on the device. Otherwise, the data between NCE and the device is inconsistent.

- **Step 1** Choose **Resource** > **SNMP Configuration** from the main menu. On the displayed page, set **Trap Service** and **SNMPv3 Security Parameters**.
- **Step 2 Trap Service** allows the controller to transparently transmit trap messages received from forwarders to the trap server. You can determine whether to enable this function.

Set parameters and click **Apply**.

Figure 5-12 Trap service

Trap Service		
Enable service:		
Receiving private VB:		
Protocol version:	v3 ~	
• Port:		
	Apply	

Table 5-1 Trap service parameters

Parameter	Description
Receiving private VB	Whether the controller receives trap messages that carry extended private VBs.
Protocol version	SNMPv3 and SNMPv2c are supported. SNMPv2c has security risks. To improve security, SNMPv3 is recommended.
Port	Port used by the controller to send and receive information.

Step 3 By configuring parameters in the **SNMPv3 Security Parameters** area, the controller can perform authentication and encryption on trap messages received from forwarders before transmitting them.

In the **SNMPv3 Security Parameters** area, click **Create**. In the **Create** dialog box that is displayed, set required parameters and click **OK**.



Cancel OK

Table 5-2 SNMPv3 security parameters

Parameter	Description
User name	The prefix has a fixed value of ACTrap , and the suffix is user- defined. The user name prefixed with ACTrap is used only for Agile Controller and cannot be configured using commands.
Authentication protocol	Authentication protocol, which can be SHA, MD5, SHA2_256, SHA2_384, or SHA2_512. You are advised to use SHA2_512 for higher security.
Authentication key	Authentication key.

Parameter	Description
Encryption algorithm	Encryption algorithm, which can be AES_128, AES_256, or CBC_DES. This parameter is optional, but it is recommended that you use AES_256 for higher security.
Private key	Private key for encryption.

----End

5.5 Configuring an SSH Client

To interconnect with a device that supports only the weak encryption algorithm, you need to configure an SSH client and enable risk encryption algorithms.

Context

SSH provides powerful encryption and authentication functions. A public key is generated by the SSH server and bound to the SSH client. The SSH client checks the validity of the public key bound to the SSH server to ensure protocol transmission security and protect devices against attacks such as IP address spoofing and simple password interception. Currently, SSH2.0 is supported.

Prerequisites

The southbound protocols NETCONF and CLI have been configured on a device, and the SSH function has been enabled.

Procedure

- **Step 1** Choose **Resource** > **SSH Client Configuration** from the main menu.
- **Step 2** On the **SSH Client Configuration** page, select the **NETCONF** or **CLI** tab to check binding information between all managed SSH servers and RSA or DSA public keys.

Figure 5-14 NETCONF

NETCONF			
SSH Public Key			
Enter the IP address. Q		Refresh Delete	Disable Authentication Enable Authentication
IP Address	Public Key	Public Key Type	Authentication

Figure 5-15 CLI

NETCONF CLI			
SSH Public Key			
Enter the IP address.		Refresh Delete	Disable Authentication Enable Authentication
IP Address	Public Key	Public Key Type	Authentication

Step 3 (Optional) Enable risk encryption algorithms. Risk encryption algorithms have poor security and are disabled by default. You are not advised to enable risk encryption algorithms.

To enable this function, set **Enable risk encryption algorithms**. In the displayed **Warning** dialog box, click **OK**.

----End

Parameter Description

Table 5-3 Parameters	for	configuring	an	SSH	client
----------------------	-----	-------------	----	-----	--------

Parameter	Description
IP Address	IP address of the SSH server.
Public Key	Public key generated by the SSH server. The public key is bound to the SSH client so that the SSH client can authenticate the server.
Public Key Type	Currently, two types of public keys are supported:
	 RSA: Uses the public key for encryption and private key for decryption.
	• DSA: Uses the digital signature and authentication to ensure security. The private key is used to sign the files or messages. The SSH client uses the public key to authenticate the signature. The security verification process of DSA is faster than that of RSA.
Authentication	The authentication function is disabled by default. To ensure data transmission security, you are advised to enable this function.
	• ON
	• OFF

Follow-up Procedure

You are advised to periodically delete the invalid public key information from the SFTP server. If the peer public key is incorrect, you can click **Delete** to manually delete the SSH public key.

6 Device Configuration

- 6.1 Configuring a Device on the Web UI
- 6.2 Configuring a Device Using the Northbound CLI
- 6.3 Verifying Device Data Consistency
- 6.4 Device Group Management
- 6.5 Applying a Template

6.1 Configuring a Device on the Web UI

Procedure

Step 1 Choose Device Configuration > Device Configuration from the main menu. On the Device Configuration page, click Edit in the Operation column of a device to be configured.

Figure 6-1 Accessing the device configuration page



Step 2 On the page that is displayed, select the required model.
Figure 6-2 Selecting a model

Hardware w Device mod	Showed In IndeXEXEALV8) Software version V800R010C105FC500 Show data source: Dry-run Changed Content Configuration Reset In VEADEXEALV8) IP address 192:1682.010
Configuration Information	
⊥ Enter a model node	Q. Enter a model node path or no Q brasbasicaccess/authorization
huawei-aaa huawei-acl huawei-bfd	brasbasicaccess:brasbasicaccess/accessDelays/accessDelay
huawei-bgp huawei-bmp	brasbasicaccess.brasbasicaccess/accessPolicy
huawei-brasbasicaccess huawei-brasdhcpaccess	brasbasicaccess:brasbasicaccess/domains/domain
huawei-brasdhcps6access huawei-brasdhcps6access huawei-brasdhcps6server	brasbasicaccess:brasbasicaccess/userGroups/userGroup
huawei-brasdot1xaccess huawei-brasipv4addrmng	brasbasicaccess:brasbasicaccess/basinterfaces/basinterface
huawei-brasipvoaodirmig huawei-brasipv6basicacce huawei-brasl2tpaccess	brasbasicaccess:brasbasicaccess/accessInterfaces/accessInterface

- Step 3 Edit the selected model.
- Step 4 Click Dry-run.
- Step 5 Click Changed Content.

Figure 6-3 Viewing the changed content

Device Configuration / Device Configuration / router	
Fouter Abnormal Hardware version NE40E Device model NE40E-X8A	VRANOR) Software version V6000010C105FC500 Show data source: Dry-run Changed Content Commit Configuration Reset
Configuration Information	
Ê Enter a model node Q	Enter a model node path or no Q
huawei-aaa nuawei-acl huawei-acl huawei-bfd	brasbasicaccess.brasbasicaccess/accessDelays/accessDelay
huawei-bgp huawei-bmp	brasbasicaccess/brasbasicaccess/accessPolicy
huawei-brasbasicaccess huawei-brasdhcpaccess	brasbasicaccess/brasbasicaccess/domains/domain
huawei-brasdhcpv6access huawei-brasdhcpv6access	brasbasicaccess/brasbasicaccess/userGroups/userGroup
huawei-brasdot1xaccess huawei-brasipv4addrmng	brasbasicaccess/basinterfaces/basinterface
huawei-brasipv6addrmng huawei-brasipv6basicaccess	brasbasicaccess/brasbasicaccess/accessInterface

Step 6 In the dialog box that is displayed, view the protocol packets delivered to the device.

	Hame, router	
1	.vlan xmlns="http://www.huawei.com/netconf/vrp/huawei-vlan">	- January
2	<vlans></vlans>	
3	<vlan ns0:operation="merge" xmlns:ns0="urn:ietf:params:xml:ns:netconf:base:1.0"></vlan>	
4	<vlanid>111</vlanid>	
5		
6		
7 <	:/vlan>	
8		

Figure 6-4 Previewing device data to be delivered

Figure 6-5 Previewing inconsistent data

		Add 📕	Modify 📕 Delet
Attribute	Old Data	New Data	
router[2ddbe75d-d170-	11ea-a4f3-2		
router/(http://www.h	uawei.com/n		
Vlan			
lans			
Vlan			
[vlanId=11	11]		
vlanId		111	

Step 7 If the result meets expectations, click **Commit Configuration**.

Figure 6-6 Committing the configuration

router Abnorma Hardware version N Device model NE40	Letter XMAVV9 0 Padress 1921642010 Commit Configuration Reset KAAVV9 0 Padress 1921642010
	^
Configuration Information	
	Enter a model node path or no Q.
🏦 Enter a model node 으	
	vlan:vlan/vlans/vlan[11]
huawei-telnets	
huawei-timerange	vlan.vlan/vlans/vlan[111]/setisoportlists/setisoportlist
huawei-tm	
huawei-tnlm	
huawei-ttv	vlan:vlan/vlan[111]/memberPorts/memberPort
huawei-vlan	
huawei-vrrp	vlan:vlan/vlans/vlan[111]/vlanif
huawei-vtv	
buawei-aaa	vlan:vlan/vlan[111]/unkownUnicastDrop

Step 8 If the result does not meet expectations or reconfiguration is required, click **Reset**.

Figure 6-7 Resetting data

Hardwi Device	er Abnormal are version NE40E-X8A(V8) model NE40E-X8A(V8)	Software version V800R010C10SPC500 IP address 192.168.20.10	Show data source:	Dry-run Changed Content	Commit Configuration Reset	
Configuration Information Enter a model node huavei-telnets huavei-timerange huavei-tim huavei-tim	- Q En	ter a model node path or noQ. vlan:vlan/vlans/vlan[111] vlan:vlan/vlans/vlan[111]/setisoportlists/s vlan:vlan/vlans/vlan[111]/memberPorts/m	etisoportiist emberPort			

D NOTE

- After a user opens a web page, the foreground applies for a transaction ID from the background. If the user does not edit the page for a long time, the background will age the transaction ID. The default validity period of a transaction ID is 5 days. If the third-party package used for editing the configuration is forcibly uninstalled, the background clears the transaction ID that is being used. If the user continues to use the old transaction ID to edit the configuration, a dialog box is displayed, indicating that the local transaction ID has expired. In this case, click **OK** and then click **Reset** to edit the configuration again.
- If multiple users modify the same data at the same time, a transaction conflict may occur. In this case, click **OK** and then click **Reset** to edit the configuration again.

Specifications of transaction conflicts

- In the following scenarios, no conflict will occur:
 - 1. Multiple users modify irrelevant data nodes at the same time.
 - 2. User 1 and user 2 perform operations at the same time. Node A functions as a container or list node. User 1 deletes Node A, and user 2 adds Subnode B under Node A. User 1 commits the configuration first, then user 2 commits the configuration of adding Subnode B without refreshing the page. In this scenario, no conflict will occur, and Node A and Subnode B are retained.
- In the following scenarios, a conflict will occur:
 - 1. Multiple users modify the same leaf node at the same time, and commit the configurations in sequence.
 - 2. User 1 and user 2 perform operations at the same time. Node A functions as a container or list node, and contains Node B that functions as a leaf or leaflist node. User 1 deletes Node A, and user 2 modifies or deletes Node B. User 1 commits the configuration first, and then user 2 directly commits the configuration without refreshing the page.

----End

6.2 Configuring a Device Using the Northbound CLI

Step 1 Choose CLI from the main menu. The CLI is displayed.

Welcome to NCE CLI [NCE]>

Step 2 Optional: Run a command to enter the device view.

[NCE]> nes ne ? [ipi-zba900-r-bn-01] [NCE]> nes ne ipi-zba900-r-bn-01 [nes:nes/ne[ipi-zba900-r-bn-01]]>

Step 3 Edit device features.

<pre>[nes:nes/ne[ipi-zba900-r-bn-01]]> sys syslog system [nes:nes/ne[ipi-zba900-r-bn-01]]> system systemInfo fileCollectTaskInfos [nes:nes/ne[ipi-zba900-r-bn-01]]> system systemInfo sysName sysContact sysLocation sysDesc sysObjectId sysGmtTime sysUpTime sysService platformName [nes:nes/ne[ipi-zba900-r-bn-01]]> system systemInfo sysName Huawei1 [nes:nes/ne[ipi-zba900-r-bn-01]/huawei-system/system/system/systemInfo]></pre>
Conduct a dry-run on the device features.
[nes:nes/ne[ipi-zba900-r-bn-01]/huawei-system/system:system/systemInfo]> dry-run [OK]
Preview the configuration of device features.
<pre>[nes:nes/ne[ipi-zba900-r-bn-01]/huawei-system/system/systemInfo]> display dry-run preview ### ipi-zba900-r-bn-01 ### <system xmlns="https://www.huawei.com/netconf/vrp/huawei-system"> <systeminfo> <systeminfo> </systeminfo> </systeminfo> </system></pre>
 If the displayed result in Step 5 meets expectations, commit the configuration. Inestines/nelini-zba900-r-bn-011/buawei-system/sys
 To delete the configuration, reset the configuration. Inestings/pelini-zba900-r-bn-011/buawei-system/s

```
----End
```

[NCE]> reset

6.3 Verifying Device Data Consistency

Prerequisites

A southbound device has been imported to NCE, and the network connection between the southbound device and NCE is working properly.

Scenario Description

• Configuration comparison

If the southbound device is configured offline or data is lost after it restarts unexpectedly, the configurations of the southbound device and NCE will be inconsistent.

To learn the differences between the NE configurations on NCE and running configurations on southbound devices, click **Discover Inconsistencies**.

- If the NE configurations on NCE and running configurations on forwarders are inconsistent:
 - If forwarder configurations are considered correct, select Synchronize from Device to synchronize inconsistent configurations from forwarders to NCE.
 - If NE configurations on NCE are considered correct, select Synchronize to Device to synchronize inconsistent configurations from NCE to forwarders.

In normal cases, the NE configurations on NCE and forwarder configurations must be consistent.

6.3.1 Comparing Configurations

Procedure

Step 1 Choose Device Configuration > Device Configuration from the main menu. On the Device Configuration page that is displayed, select a southbound device and click Discover Inconsistencies.

Figure 6-8 Triggering inconsistency discovery

Ente	r a device nan	ne or IP address.							Synchronize 🔻	Discov	er Inconsistencies	Apply Template	More *
~	lcon	Device Name 💠	IP Address	\$	Device Model \$	Hardware Version	Software Version	Status	Vendor	Sync	Sync Status	Operation	٢
		router	192.168.20	.10	NE40E-X8A(V8)	NE40E-X8A(V8)	V800R010C10SPC500	Normal	HUAWEI	No	Init	Edit View Inconsis	More 👻

Step 2 After inconsistency discovery is complete, the value of **Sync Status** changes to **Discovered**. Click **View Inconsistencies** in the **Operation** column to access the inconsistency display page and view the inconsistent configurations.

Figure 6-9 Inconsistency discovery completed

Enter a device nar	ne or IP address.						Synchronize 🔻	Discov	er Inconsistencies	Apply Template	More *
lcon	Device Name 🔶	IP Address \$	Device Model \$	Hardware Version	Software Version	Status	Vendor	Sync	Sync Status	Operation	0
	router	192.168.20.10	NE40E-X8A(V8)	NE40E-X8A(V8)	V800R010C10SPC500	Normal	HUAWEI	No	Discovered	Edit View Inconsis	More 🕶

NOTE

The value of **Sync** indicates whether the forwarder and NCE configurations are consistent.

If the value is **No**, the forwarder and NCE configurations may be inconsistent, and the actual result depends on the SND implementation. To determine whether the configurations are consistent, use the inconsistency discovery function.

Step 3 On the inconsistency display page, the data in the **Old Data** column indicates the NCE data, and the data in the **New Data** column indicates the forwarder data.

Figure 6-10 Inconsistency display page

View Inconsis	stencies 🕖				×
					Add Modify Delete
Attribute		Old Data		New Data	
aaa					
accour	ntingSchemes				
acc	ountingScheme				
Ξ (acctSchemeName=default0]				
	acctSchemeName			default0	
	accountingMode			none	
	acctSchemeName=default1]				•
Combine Terr	nplates Export Templates	5			
			Close		



6.3.2 Synchronizing Data from a Device

Procedure

Step 1 Choose Device Configuration > Device Configuration from the main menu. On the Device Configuration page that is displayed, select a southbound device, click Synchronize, and select Synchronize from Device.

Figure 6-11 Triggering synchronization



Step 2 After data is successfully synchronized, the value of **Sync Status** changes to **Synchronized**. Click **View Inconsistencies** in the **Operation** column to access the inconsistency display page and view the inconsistent configurations between NCE and the forwarder before the synchronization.

----End

6.3.3 Data Consistency Verification

Procedure

Step 1 Choose Device Configuration > Device Configuration from the main menu. On the Device Configuration page that is displayed, select a southbound device, click Synchronize, and select Synchronize to Device.

Figure 6-12 Triggering data consistency verification



Step 2 After data consistency verification is complete, the value of **Sync Status** changes to **Reconciled**. Click **View Inconsistencies** in the **Operation** column to access the inconsistency display page and view the inconsistent configurations between NCE and the forwarder before the data consistency verification.

----End

6.3.4 Saving Southbound Device Configurations

Context

After NCE delivers configurations (including data consistency verification) to a southbound device, the southbound device needs to periodically save the configurations to prevent configuration loss caused by device restarts. Theoretically, devices should automatically save the configurations. However, some devices cannot automatically save configurations. To prevent this problem, NCE provides the function of manually saving southbound device configurations.

Procedure

Step 1 Choose **Device Configuration** > **Device Configuration** from the main menu. Select a southbound device, click **More**, and select **Save**.

Figure 6-13 Triggering the saving of southbound device configurations



Step 2 View the saving result. After southbound device configurations are saved successfully, the saving result is **Success**.

----End

6.3.5 Managing Device Group Data Consistency

Procedure

- Step 1 Choose Device Configuration > Device Group Management from the main menu. Then select a device group.
 - Click **Discover Inconsistencies** to trigger inconsistency discovery for the device group.

Figure 6-14 Triggering inconsistency discovery for a device group

Device Configuration / Device Group Management		
Enter a device group name. Q		Discover Inconsistencies Synchronize Create Delete
✓ Device Group Name\$	Device Quantity	Operation
> 🗹 test	1	Edit Delete Apply Template
Total Records: 1		10 🗸 🔇 🕽 📎

• Click **Synchronize** and select **Synchronize from Device** to trigger synchronization for the device group.

Figure 6-15 Triggering synchronization for a device group

Enter a device group name. Q		Discover Inconsistencies Synchronize Create Delete
Device Group Name\$	Device Quantity	Synchronize from Device
> 🗹 test	1	Synchronize to Device py Template
Total Records: 1		10 🗸 🔇 🚺 📎

• Click **Synchronize** and select **Synchronize to Device** to trigger data consistency verification for the device group.

Figure 6-16 Triggering data consistency verification for a device group

Di	vice Configuration / Device Group Management		
	Enter a device group name. Q		Discover Inconsistencies Synchronize • Create Delete
	Device Group Name\$	Device Quantity	Synchronize from Device
	> 🗹 test	1	Synchronize to Device huply Template
	Total Records: 1		10 ~ 🔇 🜖 📎

Step 2 After inconsistency discovery, synchronization, or data consistency verification is triggered for a device group, the **Information** dialog box is displayed. Click the hyperlink in the dialog box to access the **Device Configuration** page and view the operating status of specific devices.

Figure 6-17 Dialog box that contains the hyperlink for accessing the **Device** Configuration page



----End

6.3.6 Managing Configuration Records

Context

NCE provides the configuration record function. You can view device configuration records on the **Device View** and **Record View** pages. In addition, you can view the configuration records delivered to southbound devices after service instances are decomposed.

Procedure

Step 1 Choose **Device Configuration > Device Configuration History** from the main menu.

The **Device Configuration History** page displays configuration records by device or record sequence.

Figure 6-18 Device view

) Υοι	u can e	xport up to 50,000 records.				
inter	the de	evice name or IP address. Q				Export Refre
		Device Name	Device IP Address	Total Records	Start Time	End Time
		610 BBB/00	10.04544	130	2019-07-15 14:31:44	2019-07-15 14:32:39
		ALC: NOT THE OWNER.	1000000	0		

Figure 6-19 Record view

Device View Record View				
You can export up to 50,000 records.				
Enter the device name or IP address.				Refresh Export
Device Name	Device IP Address	Total Records	Start Time	End Time
> 🗆 NE	192.168.3.186	1	2020-08-28 11:48:21	2020-08-28 11:48:21
Total Records: 1				20 🗸 🔇 🕽 🔊

Step 2 In the device view, click > to view the configuration record details. Click View in the Details column to view the configuration data delivered by NCE to southbound devices.

Figure 6-20 Configuration record details in the device view

evice View Record View				
You can export up to 50,000 record	ls.			
Enter the device name or IP address.				Refresh Export
Device Name	Device IP Address	Total Records	Start Time	End Time
NE NE	192.168.3.186	1	2020-08-28 11:48:21	2020-08-28 11:48:21
Feature: Please input. Details ③: Please input.		Start time: Processing result: All	☐	End time:
Feature	Operation Type merge	Configuration Time Re 2020-08-28 11:48:21 No	cord Source Processing Result	Details View
Total Records: 1				20 🗸 🔇 🌖 📎

NOTE

If too many records exist, filter them by **Feature**, **Details**, **Start time**, **End time**, and **Processing result**.

Parameter	Description
Device Name	Name of a southbound device.
Device IP Address	IP address of a southbound device.
Total Records	Number of configuration records delivered by NCE to a southbound device.
Start Time	Start time of configuration delivery.
End Time	End time of configuration delivery.
Feature	Name of a feature.
Operation Type	Operation type of delivered packets.
Configuration Time	Configuration time of a feature.
Record Source	There are two record sources:Normal configurationRollback configuration
Processing Result	There are two processing results: Succeed Failed
Details	Check the configuration data delivered by NCE to a southbound device.

Table 6-1 C	Configuration	record	parameters
-------------	---------------	--------	------------

Step 3 Compared with the device view, the record view has two more fields: **Transaction ID** and **Service Instance**.

Table 6-2	Fields	specific	to th	e record	view
	inclus	specific		c i ccoi a	1010

Parameter	Description
Transaction ID	Transaction ID used when NCE delivers configurations to a southbound device. This field is empty when configurations are delivered in non-transaction mode.
Service Instance	Service instance path configured for a southbound device.

Step 4 In the device view, select a southbound device and click **Export** to export the southbound device configuration records of the selected device. After the records have been exported, the exported records are automatically downloaded.

Figure 6-21 Export operation in the device view

Device View Record View				
You can export up to 50,000 records.				
Enter the device name or IP address.				Refresh Export
Device Name	Device IP Address	Total Records	Start Time	End Time
> 🗹 testssp	192.168.1.110	0		
>	192.168.20.10	0		
Total Records: 2				20 🗸 🔇 🜖 📎

Step 5 In the record view, select configuration records, and click **Export**. In the dialog box that is displayed, click **Export all data** or **Export selected data** to export specific device configuration records. After the records have been exported, the exported records are automatically downloaded.

Figure 6-22 Export operation in the record view

Device View Record View					
You can export up to 50,000 records.					
Feature: Please input.	Start time:			End time:	
Details ③: Please input.	Processing result:	All ~		Service instance:	Please input.
					Clear Filter
					Export
Device Name Device IP Address Feat	ure Operation Type Configurat	tion Time Record Source	Transaction ID Service Instance	Processing Re	esult Details

Figure 6-23 Options for exporting configuration records

Export Configuration	×
• Export all data C Export selected data	
OK Cancel	

----End

6.4 Device Group Management

Scenario Description

Before applying a template or template group to multiple devices, add these devices to the same device group. A device group may contain multiple devices and device groups.

6.4.1 Creating a Device Group

Procedure

- **Step 1** Choose **Device Configuration** > **Device Group Management** from the main menu.
- **Step 2** On the **Device Group Management** page that is displayed, click **Create**. In the dialog box that is displayed, enter the device group name and click **OK**.

Figure 6-24 Creating a device group

e Configuration / Device Group Management		
Enter a device group name. Q		Discover Inconsistencies Synchronize Create Delete
Device Group Name\$	Device Quantity	Operation
	Create ×	
	Device group name: text	
	Cancel OK	

Step 3 In the displayed list, add a sub device group or device.

NOTE

- On the **Device** tab page, click **Add** to add a device.
- On the **Device Group** tab page, click **Add** to add a sub device group.

The following example adds a sub device group.

Figure 6-25 Adding a sub device group

Device Configuration / Device Group Management / text	
Device Device Group	
Enter a device group name. Q	Add Delete
Device Group Name\$	Operation

Step 4 In the displayed list, select the device or device group to be added and click **Submit**.

Add				
Enter a device group name.				
✓ Device Group Name ♦		Device Quantity		
✓ text1		0		
Total Records: 1			10 🗸 🔇 1 👂	
	Cancel	Submit		

Figure 6-26 Selecting a sub device group

Step 5 On the **Device Group** tab page, you can view the added sub device group.

Figure 6-27 Viewing the added sub device group

Device Configuration / Device Group Management / text	
Device Device Group	
Enter a device group name.	Add Delete
Device Group Name¢	Operation
text1	Delete
Total Records: 1	10 ~ 🔇 🚺 🔊

Step 6 Click **Device Group Management** in the upper left corner to return to the **Device Group Management** page and view the created device group.

----End

Related Operations

- To edit a device group, choose Device Configuration > Device Group Management. On the page that is displayed, click Edit in the Operation column.
- To delete a device group, choose **Device Configuration** > **Device Group Management**. On the page that is displayed, click **Delete** in the **Operation** column.

6.5 Applying a Template

Scenario Description

To orchestrate and deliver configurations to devices or networks in batches, you can select devices or device groups or access the **Application Template** page from the **Service Management** page to orchestrate configuration templates and deliver configurations.

6.5.1 Applying a Template to a Device

Prerequisites

- Interconnection between NCE and the device is normal.
- A template has been created according to **8.1.3 Creating an NE Template**.
- (Optional) The parameter set required by the template has been created according to **8.4.1 Creating a Parameter Set**.

Procedure

- **Step 1** Choose **Device Configuration** > **Device Configuration** from the main menu.
- **Step 2** On the **Device Configuration** page that is displayed, select a device and click **Apply Template**. Alternatively, click **More** in the **Operation** column of the device, and select **Apply Template**.

Figure 6-28 Accessing the Apply Template page from the Device Configuration page

Total Dev	ce 🤣 🦉) bnormal	ß	0 Non-persistent				Dry-run	Changed Co	ntent	Commit Config	guration	Res
Enter a device	name or IP address.							Synchronize 🔻	Discov	er Inconsistencies	Apply T	Template	More *
Enter a device	name or IP address. Device Name	Q •	IP Address	Device Model 0	Hardware Version	Software Version	Status	Synchronize Vendor	Discov	er Inconsistencies Sync Status	Apply Tr Oper	Template	More *

Step 3 On the Template tab page, select a template in the available template area, click and click Next. Alternatively, click the Template Group tab, and select a template group in the available template group area. Then click and click Next.

Figure 6-29 Adding a template

Select Template			Configure Para	imeter	Preview and Edit Parameters		
Template Template Group							
Available		Template N Y		Selected	Template N Y		
Template Name‡	Description	Driver ID\$		Template Name‡	Driver ID\$		
testa		③ NE40E_V800R010C10SPC	00	testa	③ NE40E_V800R010C10SPC500		
			>				
Total Records: 1		10 ~ 🔇 🚺	>	Total Records: 1	10 ~ 🔇 🔕		
					Cancel and Return Next		

Step 4 On the **Configure Parameter** page that is displayed, modify parameter values and click **Next**.

You can modify the parameters as follows:

- Click **Reference Parameter Set** to reference the parameter content in a parameter set.
- Enable the **Encrypted** function if a parameter needs to be displayed in ciphertext on the GUI.
- Directly enter the parameter value.

Figure 6-30 Configuring parameters

Select Template		Configure Paramete	er			Preview and Edit Parameters
Enter the parameter name.					Sa	ve as Parameter Set
Parameter Name	Description		Encrypted	Parameter Value		Operation
vlanid				1	0	Clear
vlanname						Clear
						Cancel and Return Previous Next

Step 5 Preview and edit parameters.

- 1. On the **Preview and Edit Parameters** page that is displayed, click **View** in the **Operation** column of a device.
- 2. View the template content in the preview dialog box that is displayed.

Figure 6-31 Viewing the template content

1	<pre><vlan xmlns="http://www.huawei.com/netconf/vrp/huawei-vlan"></vlan></pre>	2
2	<vlans></vlans>	
3	<vlan></vlan>	
4	<vlanid>*****</vlanid>	
5		
6		
7		
8		

- 3. Click Edit in the Operation column of a device.
- 4. In the edit dialog box that is displayed, click **Edit** to modify a parameter value. After completing the modification, click **Save**.

Figure 6-32 Setting parameters

dit			
Device Names: router			
Parameter Name	Encrypted	Parameter Value	Operation
vlanid	Yes	*****	Edit
Total Records: 0			10 ~ (1)
		Close	

Step 6 Deliver a template.

NOTE

- To commit the configuration to the cache of NCE and deliver the configuration to the device, click **Submit and deliver**.
- To commit the configuration to NCE only, click **Submit**.
- 1. Click Apply.

Figure 6-33 Applying a template

	Ø		⊘		
Select Template		Col	Configure Parameter		dit Parameters
Device Name \vee					
Device Name	IP Address	Device Type	Device Model	Template Quantity	Operation
router	192.168.20.10	ROUTER	NE40E-X8A(V8)	1	View Edit
al Records: 1					10 👻 🔇 🚺

2. In the dialog box that is displayed, click **Submit and deliver** and click **OK**.

Figure 6-34 Apply dialog box

Apply	×
Select an application submission mode:	
💿 Submit and deliver 🛛 🔿 Submit	
If a large number of data are configured, you are adv select Submit and deliver.	vised to
Cancel OK	



6.5.2 Applying a Template to a Device Group

Procedure

- **Step 1** Choose **Device Configuration** > **Device Group Management** from the main menu.
- **Step 2** On the **Device Group Management** page that is displayed, click **Apply Template** in the **Operation** column of a device group.

Figure 6-35 Accessing the Apply Template page from the Device Group Management page

Enter a device group name.		Discover Inconsistencies Synchronize Create Delete
Device Group Name\$	Device Quantity	Operation
> 🗹 test	1	Edit Delete Apply Template
> test123	1	Edit Delete Apply Template
Total Records: 2		10 🗸 🔇 🕽 📎

Step 3 On the Template tab page, select a template in the available template area, click and click Next. Alternatively, click the Template Group tab, and select a template group in the available template group area. Then click and click Next.

Figure 6-36 Adding a template

Select Template	Select Template Configure Parameter P			
Template Group				
Available	Template N Y	Selected	Template N V	
Template Name Description	Driver ID\$	Template Name\$	Driver ID\$	
testa	③ NE40E_V800R010C10SPC500	testa	③ NE40E_V800R010C10SPC500	
Total Records: 1	10 - ⓒ 🜒 💿	Total Records: 1	10	
			Cancel and Return Next	

Step 4 On the **Configure Parameter** page that is displayed, modify parameter values and click **Next**.

You can modify the parameters as follows:

- Click **Reference Parameter Set** to reference the parameter content in a parameter set.
- Enable the **Encrypted** function if a parameter needs to be displayed in ciphertext on the GUI.
- Directly enter the parameter value.

Figure 6-37 Configuring parameters

	Ø		o						
	Select Template		Configure Paramete	r			Preview and Edit Para	ameters	
inter the parameter name.						Sa	ive as Parameter Set	Reference Para	meter Se
Parameter Name		Description		Encrypted	Parameter Value			Operation	
vlanid					1	۲		Clear	
vlanname								Clear	

Step 5 Preview and edit parameters.

- 1. On the **Preview and Edit Parameters** page that is displayed, click **View** in the **Operation** column of a device.
- 2. View the template content in the preview dialog box that is displayed.

Figure 6-38 Viewing the template content

1	<pre><vlan xmlns="http://www.huawei.com/netconf/vrp/huawei-vlan"></vlan></pre>	
2	<vlans></vlans>	
3	<vlan></vlan>	
4	<vlanid>*****</vlanid>	
5		
6		
7		
8		
-		

- 3. Click Edit in the Operation column of a device.
- 4. In the edit dialog box that is displayed, click **Edit** to modify a parameter value. After completing the modification, click **Save**.

Figure 6-39 Setting parameters

Device Names: router			
Parameter Name	Encrypted	Parameter Value	Operation
vlanid	Yes	*****	Edit
Total Records: 0			10 ~ (<) (1 (>
		Close	



D NOTE

- To commit the configuration to the cache of NCE and deliver the configuration to the device, click **Submit and deliver**.
- To commit the configuration to NCE only, click **Submit**.
- 1. Click **Apply**.

Figure 6-40 Applying a template

	Select Template	Co	Configure Parameter		C Edit Parameters
Device Name V					
Device Name	IP Address	Device Type	Device Model	Template Quantity	Operation
router	192.168.20.10	ROUTER	NE40E-X8A(V8)	1	View Edit
Total Records: 1					10 🗸 🔇 🚺 📎
				Cancel and	Return Previous Apply

2. In the dialog box that is displayed, click **Submit and deliver** and click **OK**.

Figure 6-41 Apply dialog box

Apply ×	$\langle \rangle$
Select an application submission mode: Submit and deliver Submit If a large number of data are configured, you are advised to select Submit and deliver.	
Cancel OK	



6.5.3 Applying a Template to a Network-Level Service

Procedure

Step 1 Choose **Service Management** from the main menu. The **Service Management** page is displayed.

Step 2 On the **Service Management** page that is displayed, click **Apply Template** to access the **Apply Template** page.

Figure 6-42 Accessing the Apply Template page from the Service Management page

appmini	Show data source: Dry-run Changed Content Commit Configuration Reset
mininame	Restore Services Apply Template Discover Inconsistencies ▼ Delete Add Last-committed-time related-pkg-version Inconsistency Discovery In-depth Inconsistency Operation ©

Step 3 On the Template tab page, select a template in the available template area, click , and click Next. Alternatively, click the Template Group tab, and select a template group in the available template group area. Then click > and click Next.

Figure 6-43 Adding a template

Select Template	Co	nfigure Parameter	Preview and Edit Parameters
Template Group			
Available	Template N V	Selected	Template N.,, 👻 🔍
Template Name Description	Driver ID\$	Template Name‡	Driver ID\$
testa	③ NE40E_V800R010C10SPC500	testa	③ NE40E_V800R010C10SPC500
		2 K	
Total Records: 1	10 🗸 🔇 🚺 🍛	Total Records: 1	10 🗸 🔇 🚺 📎
			Cancel and Return Next

Step 4 On the **Configure Parameter** page that is displayed, modify parameter values and click **Next**.

You can modify the parameters as follows:

- Click **Reference Parameter Set** to reference the parameter content in a parameter set.
- Enable the **Encrypted** function if a parameter needs to be displayed in ciphertext on the GUI.
- Directly enter the parameter value.

Figure 6-44 Configuring parameters

	Select Template		Configure Parameter				Preview and Edit Parar	neters	
Enter the parameter name.						Sa	ve as Parameter Set	Reference Par	ameter Set
Parameter Name		Description		Encrypted	Parameter Value			Operation	
vlanid					1	•		Clear	
vlanname								Clear	
							Cancel and Return	Previous	Next

Step 5 Preview the template.

Figure 6-45 Viewing the template content



Step 6 Click **Apply** to deliver the template.

Figure 6-46 Applying a template



Cancel and Return Previous Apply

----End

7 Service Configuration

This chapter describes how to configure services on multiple devices using the service management function. You can configure services on the service management page or using commands.

Prerequisites

- Devices are online.
- Service packages have been activated.

Scenario Description

This scenario applies if you need to perform end-to-end service configurations across devices on NCE.

7.1 Configuring Services on the Web UI

7.2 Configuring Services Using the Northbound CLI

7.3 Verifying Service Data Consistency

7.1 Configuring Services on the Web UI

Procedure

Step 1 Choose **Service Management** from the main menu. On the **Service Management** page that is displayed, click the required service model.

Figure 7-1 Selecting a service model

Service Management		
Service Type ① Enter a model node Q	eas	Show data source: Dry-run Changed Content Commit Configuration Reset
eas eva		Restore Services Apply Template Discover Inconsistencies Delete Add
evs	eas-id	Inconsistency Inconsistency Discover In-depth Incon In-depth Inconsistency Operation
	eas-id-100	Not executed Edit Delete More *
	Total Records: 1	10 ~ 🛞 🛈 🔊

D NOTE

The service type information in the left pane of the **Service Management** page derives from the instances defined in the service package.

Step 2 Click Edit to edit the model data.

Click \blacksquare to recompute the data of a service instance that is not modified.

NOTE

After a service instance is updated, it is decomposed and recomputed. The decomposed data is updated to the latest based on the current computing result and corresponds to the current configuration of the service instance.

Figure 7-2 Recomputing data

Service Management / aaamini		
Kan Inconsistency discovery ③ ● Not executed In-depth inconsistency discovery ③ ● Not executed	Show data source: Dry-run Changed Content Comm	nit Configuration Reset
Basic Information Decomposed Data		
Enter a model node path or no Q		
▼ aaamini:aaamini[vlan]		
	Permit dele	etion 🕥 🖪 🕄 🖪 🛱
	nename	
vlan	test_device	
password		
Valid length: [1, 432]		
rate tengtes [miner]		
Inconsistency Discovery	Inconsistency Discovery Start Time	
Not executed		
In-depth Inconsistency Discovery	In-depth Inconsistency Discovery Start Time	
Not executed	-	

NOTE

On the **Service Management** page, you can trigger recomputing of a service instance that is not modified. When this function is used, the service instance is recomputed and converted to logic codes for delivery.

When a service instance is modified, the internal code logic is invoked to recompute and deliver configurations. Therefore, you can update or create a service instance to deliver modified configurations to devices.

In some scenarios, the service instance is not updated, but the internal code logic needs to be invoked to recompute and deliver service configurations. For example:

- 1. If the service processing code changes while the service instance configurations do not change, the configurations need to be recomputed and delivered again.
- 2. If the device configuration is modified in other modes, for example, through the CLI or synchronization on NCE, the service instance needs to be deployed again to overwrite the synchronized data.

Click $\overline{\mathbb{I}}$ to undeploy a service instance.

NOTE

On the **Service Management** page, you can trigger undeployment of a service instance. When this function is used, the service instance deletes decomposed NE configurations.

If services of devices are affected after decomposed NE configurations are deleted by the service instance and the original network configurations needs to be retained, roll back the NE configurations and wait for the configurations to be delivered again. (Recomputing must be triggered before configuration redelivery.)

Step 3 Click Changed Content to view service data changes.

Figure 7-3 Clicking Changed Content

Van Inconsistency discovery ① ● Not executed In-depth inconsistency discovery ① ● Not executed	Show data source: Dry-run Changed Content	Commit Configuration Reset
c Information Decomposed Data		
Enter a model node path or no Q		
▼ aaamini:aaamini[vlan]		
	P	ermit deletion 🛛 🖪 🕄 🗟 🖬
≠ username	nename	
vlan	test_device	
password		
Valid length: [1432]		
Inconsistency Discovery	Inconsistency Discovery Start Time	
Not executed		
In-depth Inconsistency Discovery	In-depth Inconsistency Discovery Start Time	

Figure 7-4 Viewing service data changes

anged Content		
		Add Modify Delete
Attribute	Old Data	New Data
aaamini		
□ [username=%23%79@!]		
username	%23%79@!	%23%79@!
nename	dsdd	
🖃 aaamini:aaamini		
[username=vlan]		
username		vlan

Step 4 Click **Dry-run** to check whether the configuration is correct.

Figure 7-5 Clicking Dry-run

Service N	Aanagement / aaamini			
1	Vian Inconsistency discovery ② ● Not executed In-depth inconsistency discovery ③ ● Not executed	Show data source: Dry-run Changed Content Comm	nit Configuration	Reset
Basic In	formation Decomposed Data			
E V	inter a model node path or no Q.			
		Permit del	etion	
1	username	nename		
	vlan	test_device		
	password			
	Valid length: [1.432]			
	Inconsistency Discovery	Inconsistency Discovery Start Time		
	Not executed			
	In-depth Inconsistency Discovery	In-depth Inconsistency Discovery Start Time		
	Not executed	-		

Step 5 After the dry run is complete, the **Dry-run View** page is displayed. You can view device data to be delivered and inconsistent data.

Figure 7-6 Viewing device data to be delivered on the Dry-run View page



Step 6 If the result displayed on the **Dry-run View** page meets expectations, click **Commit Configuration**.

agement / aaamini Vlan Inconsistency discovery ⊙ ● Not executed In-depth inconsistency discovery ⊙ ● Not executed Show data source: Dry-run Changed Content Commit Configuration Reset Basic Information Decomposed Data Enter a model node path or no... aaamini:aaamini[vlan] Permit deletion 🛛 🖪 🕄 层 🖺 vlan test_device password Valid length: [1..432] Inconsistency Discovery Inconsistency Discovery Start Time In-depth Inconsistency Discovery In-depth Inconsistency Discovery Start Time

Figure 7-7 Committing the configuration

D NOTE

When the current configuration is delivered, the following conflicts are checked:

1. Multi-terminal operation conflict

Before delivering configurations, NCE checks whether the operation configurations of multiple terminals conflict with each other. Assume that the same service instance service 1 (x=1, y=2) is configured for both terminal 1 and terminal 2. The service instance is then edited, submitted, and updated to service 1 (x=2, y=2) for terminal 1, while terminal 2 performs operations based on the original service 1 (x=1, y=2). In this case, the system displays a message indicating a conflict when terminal 2 submits data.

Current solution: Roll back to the previous configuration and perform configuration again.

2. Device configuration conflict

Before delivering device configurations, NCE checks whether the device data is inconsistent with the NCE data. If so, a message is displayed indicating that a configuration conflict may occur. A conflict message is displayed in the following scenarios:

- 1. When NCE manages a device for the first time and does not synchronize the device data, data is not synchronized between NCE and the device.
- NCE saves the sequence IDs of device configuration changes. (The IDs can be obtained from the device or calculated on NCE based on the total value of device configuration verification times.) Before redelivering configurations, NCE obtains the sequence IDs again. If an ID change is detected, NCE considers that a configuration change occurs.
- 3. When a device is disconnected from NCE during configuration delivery, NCE rolls back the configurations. If the device is offline for a long time, the NCE data is inconsistent with the device data.

Current solution:

- 1. Commit the device configurations forcibly. In this case, NCE does not check conflicts.
- 2. Synchronize data with the device, then edit and commit the configurations again.

3. Service configuration conflict

Before delivering service configurations, NCE checks whether the configurations delivered to a device conflict with each other. Assume that both service 1 and service 2 deliver the description configurations of VLAN 2 to device 1. In this case, NCE checks whether the two configurations are the same. If not, the system displays a message indicating that a configuration conflict occurs.

Current solution:

- 1. Commit the service configurations forcibly. In this case, NCE does not check conflicts.
- 2. Delete the previous service configurations and attributes related to the service configurations to avoid conflicts with the current service configurations.

No networking mode

When configurations are delivered through NCE, the configurations will be written to the NCE database and delivered to devices. When configurations are delivered in no networking mode, the configurations will only be written to the NCE database without being delivered to devices.

Step 7 If the result displayed on the Dry-run View page does not meet expectations or you need to reset the configuration, click Reset.

Figure 7-8 Resetting the configuration

Service Management / aaamini		
Van Inconsistency discovery ② ● Not executed In-depth inconsistency discovery ③ ● Not executed	Show data source: Dry-run Changed Content	Commit Configuration Reset
Basic Information Decomposed Data		
Enter a model node path or no Q		
▼ aaamini:aaamini[vlan]		
		Permit deletion 🛛 🖪 🕄 🛱 🛱
	nename	
vlan	test_device	
password		
Valid length: [1_432]		
Inconsistency Discovery	Inconsistency Discovery Start Time	
Not executed		
In-depth Inconsistency Discovery	In-depth Inconsistency Discovery Start Time	
Not executed		

Step 8 If the configuration is not edited for a long time or the third-party package is forcibly deleted, the system displays a message indicating that the transaction has expired when you perform operations on the GUI. In this case, click OK in the displayed Tip dialog box to refresh the page and edit the configuration again.

Figure 7-9 Message indicating that the transaction has expired

BngPairs:bngBn	_	
	Tip Transaction ID has expired and uncommitted data has expired. Please click 'OK' to refresh the page and re-edit.	
h Delete		
lame	ОК	airName
	< 1 > To 1 ▼ Total: 0	

NOTE

After a user opens a web page, the foreground applies for a transaction ID from the background. If the user does not edit the page for a long time, the background will age the transaction ID. The default validity period of a transaction ID is 5 days. If the third-party package used when the user edits the configuration is forcibly uninstalled, the background clears the transaction ID that is being used.

If the user continues to use the old transaction ID to edit the configuration, a dialog box is displayed, indicating that the local transaction ID has expired.

----End

7.2 Configuring Services Using the Northbound CLI

- Step 1 Choose CLI from the main menu. The CLI is displayed. Welcome to NCE CLI [NCE]>
- Step 2 Optional: Run the command to enter the service view.

[NCE]> applications [app:applications]>

Step 3 Edit the service.

[app:applications]> hbng hbng_ins [app:applications/hbng:hbng[hbng_ins]]> core_id 4033 [app:applications/hbng:hbng[hbng_ins]]> pool_soo ZBB [app:applications/hbng:hbng[hbng_ins]/hbng:pool_soo[ZBB]]> soo 501 [app:applications/hbng:hbng[hbng_ins]/hbng:pool_soo[ZBB]]> quit [app:applications/hbng:hbng[hbng_ins]]>

Step 4 Conduct a dry run for the service configuration. [app:applications/hbng:hbng[hbng_ins]]> dry-run [OK]

Step 5 Preview the configuration.

[app:applications/hbng:hbng[hbng_ins]]> display dry-run preview ### ipi-zba900-r-bn-01 ### <system xmlns="https://www.huawei.com/netconf/vrp/huawei-system"> <system xmlns= </system xmlns= </system xmlns= </system xmlns= </system xmlns= [app:applications/hbng:hbng[hbng_ins]]>

- If the displayed result meets expectations, commit the configuration. [NCE]>commit
- To delete the configuration, reset the configuration. [NCE]> reset
- ----End

7.3 Verifying Service Data Consistency

7.3.1 Performing Service Inconsistency Discovery

Procedure

Step 1 Choose **Service Management** from the main menu. On the **Service management** page that is displayed, select a service instance. Then click **Discover Inconsistencies** and select **Discover Inconsistencies**.

Figure 7-10 Triggering inconsistency discovery

Service Management		
Service Type Enter a model node	eas	Show data source: Dry-run Changed Content Commit Configuration Reset
eas		Restore Services Apply Template Discover Inconsistencies * Delete Add
	eas-id	Inconsistency Inconsistency Discover In-depth Incon In-depth Inconsistency Operation
	test	Not executed Edit Delete More *
	Total Records: 1	10 ~ 🛞 🔕

Step 2 After service inconsistency discovery is complete, the value of **Inconsistency Discovery Status** changes to **Succeeded (inconsistencies found)**.

Figure 7-11 Inconsistency discovery completed

Service Management		
Service Type Enter a model node Q	Bypn Show data source: Dry-run Changed Content Commit C	Ionfiguration Reset
L3vpn	Restore Services Apply Template Discover Inconsistenc	ies 🔻 Delete Add
	I3vpnID neName Inconsistency Dis Inconsistency Discovery In-depth Inconsistency Discovery In-depth Inconsistency Discovery	ncy D Operation (6)
	test deviceA testvrf Succeeded (no Inconsi 2020-07-17 15:48:33 Succeeded (inconsiste 2020-07-17 15:48:33	2:27 Edit Delete More •
	Total Records: 1	10 ~ 🔇 🚺 🕟

Step 3 The southbound device list is displayed on the left of the service inconsistency display page.

Select a service instance, click **More**, and select **View Inconsistencies**. The detailed inconsistent data is displayed on the right of the service inconsistency display page. The data in the **Old Data** column indicates the southbound device configurations saved in the NCE database and the data in the **New Data** column indicates the southbound device configurations generated after service instances are recomputed.

----End

7.3.2 Performing In-Depth Service Inconsistency Discovery

Procedure

Step 1 Choose Service Management from the main menu. On the Service management page that is displayed, select a service instance. Then click Discover Inconsistencies and select Discover Inconsistencies (In-depth).

vice Management			
Service Type ① Enter a model node Q	L3vpn		Show data source: Dry-run Changed Content Commit Configuration Reset
L3vpn			Restore Services Apply Template Discover Inconsistencies 🕶 Delete Add
	I3vpnID	neName vr	rfName Inconsistency Dis Inconsistency Discovery In-depth Inconsi Discover Inconsistencies Operation
	🗹 test	deviceA te	testvrf Succeeded (no inconsi 2020-07-17 15:48:33 Succeeded (inconsistencies (I Edit Delete More •
	Total Records: 1		10 - (3) 1

Figure 7-12 Triggering in-depth inconsistency discovery

Step 2 After service inconsistency discovery is complete, the value of **In-depth Inconsistency Discovery Status** changes to **Succeeded (inconsistencies found)**.

Figure 7-13 In-depth inconsistency discovery completed

L3vpnID	neName	vrfName	Inconsistency Dis Ø	Inconsistency Discovery	In-depth Inconsi @	In-depth Inconsistency D	Operation	۲
test	deviceA	testvrf	Succeeded (no inconsi	2020-07-17 15:48:33	Succeeded (inconsister	2020-07-17 15:42:27	Edit Delete More 🕶	

Step 3 Choose **Service Management** from the main menu. On the **Service Management** page that is displayed, click **More** and select **View In-depth Inconsistencies**. The southbound device list is displayed in the left pane of the in-depth service inconsistency display page.

Figure 7-14 In-depth inconsistency display page

Devices	Device IP: 192.168.3.127 S	ervice check start time: 2020-07-17 15:42:27	End time: 2020-07-17 15:42:28	📕 Add 📕 Modify 📕 Delete
Succeeded (inconsi	Attribute	Old Data	New Data	
deviceA	🗖 l3vpn			
	□ I3vpncomm			
	□ l3vpnInstances			
	□ l3vpnInstance			
	[vrfName=te	stvrf]		
	vrfName	testvrf	testvrf	
	vrfDescrip	tion heiheihei	hahahaha	

----End

7.3.3 Checking Southbound Configuration Records of Service Instances

Procedure

Step 1 Choose Service Management from the main menu. On the Service Management page that is displayed, click More and select View Device Configuration History. The Record View tab page is displayed.

Figure 7-15 Accessing the record view

ce Management		
Enter a model node Q	Show data source: Dry-run Changed Content Commit Configuration	Reset
l3vpn		
	Restore Services Apply Template Discover Inconsistencies • Delete	Add
	I3vpnID neName Inconsistency Dis Inconsistency Discovery In-depth Inconsist Operation	1
	test deviceA testvrf Succeeded (no inconsi 2020-07-17 15:48:33 Succeeded (inconsiste 2020-07-17 15:42:27 Edit Dele	te More •
	Total Records: 1 View Decomposed Da	ta 1 0
	Undeploy	
	View Inconsistencies	
	View In-depth Inconsi	5
	View Device Configure	

Step 2 On the **Record View** tab page, the configuration records of the service instance are automatically filtered and displayed.

Figure 7-16 Device configuration record management page

ice Configura Device Vie	ew Record View	on History										
1 Yo	ou can export up to 50,	,000 records.										
Feature:	Please input.			Start tim	e:				End	l time:		
Details 💮): Please input.			Processin	g result:	All	~		Sei	vice instance:	Please input.	
											Clear	Filter
												Export
	Device Name	Device IP Address	Feature	Operation Type	Configu	ration Time	Record Source	Transaction ID	Service Instance	Processing Re	sult Details	
	deviceA	192.168.3.127	l3vpn	merge	2020-0	7-17 15:50:	Normal configurat	G20200717155024	l3vpn:l3vpn/test	Succeed	View	
	deviceA	192.168.3.127	l3vpn	merge	2020-0	7-17 15:49:	Normal configurat	G20200717154954	l3vpn:l3vpn/test	Succeed	View	
	deviceA	192.168.3.127	l3vpn	create	2020-0	7-17 15:29:	Normal configurat	G20200717152945	l3vpn:l3vpn/test	Succeed	View	
Total Reco	ords: 3										20 ~	0 0 0

----End

8 Template Management

Scenario Description

Template management allows you to manage NE templates and service templates. To deliver configurations, select a template from available templates and orchestrate as well as deliver the template.

- 8.1 Managing NE Templates
- 8.2 Managing Service Templates
- 8.3 Managing Template Groups
- 8.4 Managing Parameter Sets

8.1 Managing NE Templates

Scenario Description

You can use the NE template management function to manage device-level templates.

8.1.1 Exporting an NE Template Based on a YANG File

Procedure

- **Step 1** Choose **Device Configuration** > **Device Configuration** from the main menu.
- **Step 2** On the **Device Configuration** page that is displayed, click **Edit** in the **Operation** column of a device to access the **Configuration Information** page.

Figure 8-1 Editing device information

NE Configuration / D	evice Management / <img c<="" src="1" th=""/> <th>onerror=alert(1)></th> <th></th> <th></th> <th></th> <th></th> <th></th>	onerror=alert(1)>					
	<img onerro<="" src="1" th=""/> <th>or=alert(1)> Normal</th> <th></th> <th></th> <th></th> <th></th> <th></th>	or=alert(1)> Normal					
HE	Hardware version NE40 Device model NE40E-X3	E-X3A(V8) Software version V800R010C10SPC500 3A(V8) IP address 192.168.20.101	Show data source:	Dry-run	Changed Content	Commit Configuration	Reset
			^				
Configuration Info	rmation						
쇼 Enter a	model node Q	Enter a model node path or no Q aaa:aaa/tasks/task					ŕ
huawei- huawei-	aaa î	aaa:aaa/taskGroups/taskGroup					
huawei- huawei- huawei-	btd bgp bmp	► aaa:aaa/userGroups/userGroup					
huawei- huawei-	brasbasicaccess brasdhcpaccess	aaa:aaa/taskGroupTaskMaps/taskGroupTaskM	Мар				
huawei- huawei-	brasdhcpv6access brasdhcpv6server	aaa:aaa/userGroupTaskGroupMaps/userGrou	pTaskGroupMap				

Step 3 On the **Configuration Information** page that is displayed, click in the upper left corner.

Export	\times
Enter a mod Q Select All Reset	
Available Selected	
🗌 huawei-aaa	
huawei-acl	
huawei-bfd	
huawei-bgp	
huawei-bmp	
huawei-brasbasicaccess	
huawei-brasdhcpaccess	
Merge template:	
Exported content: 🝳 Data only 🛛 Structure only 🔷 Structure and data	
Cancel OK	

Figure 8-2 Exporting the YANG file

Step 4 In the **Export** dialog box that is displayed, select the YANG file to be exported as a template, set **Merge template** and **Exported content**, and click **OK**.
D NOTE

- You can enable **Merge template** to merge the template content generated by multiple YANG files.
- Three modes are available for exporting a template: **Data only**, **Structure only**, and **Structure and data**.

The following example exports a template in **Structure only** mode.

Figure 8-3 Selecting files

Export	×
Enter a mod Q Select All	Reset
Available	Selected
 huawei-aaa huawei-acl huawei-bfd huawei-bgp huawei-bmp huawei-brasbasicaccess huawei-brasdhcpaccess 	huawei-aaa
Merge template: Exported content: Data only Structure Cancel	e only OK

Step 5 In the displayed window, you can view the exported template.

Figure 8-4 Exported template



----End

8.1.2 Importing an NE Template

Prerequisites

An NE template has been successfully exported according to **8.1.1 Exporting an NE Template Based on a YANG File**.

Procedure

Step 1 Edit the template exported based on a YANG file. The following example describes the SNMP configuration. Delete the unnecessary objects and define the objects that require parameter transfer as parameters.

NOTE

The defined parameter name must be enclosed in {{}}.

Figure 8-5 Edited template

😑 device	_huawei-snmp_snmp_20191205025806638.j2 🔀
1	<snmp xmlns="http://www.huawei.com/netconf/vrp/huawei-snmp"></snmp>
2	<agentcfg></agentcfg>
3	<agentenable>true</agentenable>
4	
5	<engine></engine>
6	<version>{{version}}</version>
7	
8	
9	

Step 2 Choose System Setting > Template Management > NE Template from the main menu. On the NE Template page that is displayed, click Import.

Figure 8-6 NE template import page

system second / rempare management / NC rempare				
Default templates cannot be deleted or modifie	d.			
Template N Y Please input. Q			Create	Import Export Delete
Template Name\$	Description	Driver ID\$	Template Attribute\$	Operation
		NE40E_V800R010C10SPC500_snd	Custom Template	View Edit More 🕶
vlantest		NE40E_V800R010C10SPC500_snd	Custom Template	View Edit More 👻
Total Records: 2				10 🗸 🔇 🚺 🔊

Step 3 In the displayed dialog box, set the template name and import a template file.

1. Set Template name, Driver ID, Description, and NE template.

Figure 8-7 Setting Template name, Driver ID, Description, and NE template

Import • Driver ID: NE40E_V800R010C105P_ ~ Description: • NE template: Select file Import	yacm second y remplate m	angement / ne remplate / mpart				
Template name: Liamx1 Driver ID: NE40E_V800R010C10SP_ Description: NE template: Select file Import	Import					
• NE template: Select file 🗇 Import	Template name:	lianx1	 Driver ID:	NE40E_V800R010C10SP ~	Description:	
	NE template:	Select file	Import			

2. Click 🚔 , select the edited template, and click **Open**.

Figure 8-8 Selecting a file

System Setting / Template M	Management / NE Template / Imp	ort									
Import • Template name:	lianx1	Driver ID:	NetEngine_8000_M14	 ✓ Desi 	cription:						
NE template:	Select file	E Import	I	 Image: A set of the set of th	ar - 17			× 8 ∥	C-12	× م	
Parameter Confà	guration			DataDisk (D)	Antice National 2000 Mt 4 June 2 Antice Justingine, 8000 Mt 4 June 2 Antice Justingine, 8000 Mt 4 June 2 Antice Justine for easy case 200000 Control of the state	2020/8/17 14-21 2020/8/7 12-30 2020/8/7 12-30 2020/8/7 12:05 2020/2/25 16-29 2020/2/25 16-29 2020/2/25 16-29 2020/2/25 16-25 2020/2/25 16-25 2020/8/6 11:19 2020/8/6 11:19 2020/8/6 11:19 2020/8/6 11:19 2020/8/6 11:19	22 12 12 Internet Internet Internet		Jan V		
					< [VNk device_NetEngine_8000_M14_vlan1_202	00807022135160,j2	>	-	12 (* j2) * († j2)	Cancel	ОК

3. Click Import.

Figure 8-9 Uploading an NE template

/st	em Setting / Template N	lanagement / NE Template / Import						
	Import							
	Template name:	lianxi	Driver ID:	NE40E_V800R010C10SP ~	Description:			
	NE template:	device_NE40E_V8 (156 B)	× 🗃 Import					
		1 file has been added.						
	Parameter Config	juration					(
							Cancel	OK

4. Click **OK** after the template is imported.

Step 4 View the template list. The imported template is displayed in the template list.

Figure 8-10 Viewing the imported template

Setting / Template Management / NE Template	0			
Default templates cannot be deleter	d or modified.			
Template N V Please input.			Create	Import Export Delete
Template Name\$	Description	Driver ID‡	Template Attribute\$	Operation
🗌 lian	lian	NE40E_V800R010C10SPC500_snd	Custom Template	View Edit More 🕶
lianx1		NE40E_V800R010C10SPC500_snd	Custom Template	View Edit More 🕶
vlantest		NE40E_V800R010C10SPC500_snd	Custom Template	View Edit More 🕶
otal Records: 3				10 🗸 🔇 🚺 🔊

----End

8.1.3 Creating an NE Template

Procedure

Step 1 Edit the template content. The following example describes the VLAN configuration. Define the objects that require parameter transfer as parameters.

NOTE

The defined parameter name must be enclosed in {{}}.

Figure 8-11 Edited template

😑 device	_huawei-vlan_vlan_20191205032816173.j2 🔀
1	<vlan xmlns="<u>http://www.huawei.com/netconf/vrp/huawei-vlan</u>"></vlan>
2	<vlans></vlans>
3	<vlan></vlan>
4	<vlanid>{{vlanId}}</vlanid>
5	<vlanname>{{vlanName}}</vlanname>
6	<vlandesc>{{vlanDesc}}</vlandesc>
7	<adminstatus>{{adminStatus}}</adminstatus>
8	
9	
10	

Step 2 Choose System Setting > Template Management > NE Template from the main menu.

Figure 8-12 Creating an NE Template

System Setting / Template Management / NE Template				
Default templates cannot be deleted or mod	ified.			
Template N V Please input. Q			Create	Import Export Delete
Template Name\$	Description	Driver ID \$	Template Attribute\$	Operation
TESTNE		NetEngine_8000_M14	Custom Template	View Edit More 🕶
Total Records: 1				10 🗸 🔇 🕽 🔊

Step 3 Click Create. In the displayed dialog box, set Template name, Description, Driver ID and Template content, and click OK.

Figure 8-13 Editing an NE template

System Setting / Template Management / NE Template / Create	
Create	
Template name: vlan2 Oriver ID: NetEngine_8000_M14 Description: 123	
Parameter: 1/28 characters, including one or a combination of numbers, letters, and special characters, and can't start with a number.	>
	Save
Parameter Configuration	
	Cancel OK

Step 4 View the template list. The created template is displayed in the template list.

Figure 8-14 Viewing the created template

Default templates cannot be deleted or model	lified.			
Template N Y Please input.			Create	Import Export De
Template Name\$	Description	Driver ID\$	Template Attribute\$	Operation
aaaa		NetEngine_8000_M14	Custom Template	View Edit More 🕶
🗌 vlan1	123	NetEngine_8000_M14	Custom Template	View Edit More •
vlan?	123	NetEngine 8000 M14	Custom Template	View Edit More •

----End

8.1.4 Deleting an NE Template

Procedure

- To delete a single template, click **More** in the **Operation** column and select **Delete**.
- To delete templates in batches, select them and click **Delete**.
- Step 1 Choose System Setting > Template Management > NE Template from the main menu. On the NE Template page that is displayed, select the templates to be deleted and click Delete.

Figure 8-15 Deleting NE templates in batches

ystem Setting / Template Management / NE Template							
Default templates cannot be deleted or modified.							
Template N Y Please input. Q			Create Import	Export Delete			
Template Name\$	Description	Driver ID\$	Template Attribute\$	Operation			
✓ LIAN		NE40E_V800R010C10SPC500_snd	Custom Template	View Edit More 👻			
☑ lian1		NE40E_V800R010C10SPC500_snd	Custom Template	View Edit More •			
vlantest		NE40E_V800R010C10SPC500_snd	Custom Template	View Edit More -			
Total Records: 3			1	io 🗸 🔇 🕽 📎			

Step 2 In the displayed dialog box, click **OK**.





Step 3 View the template list. The templates have been deleted.

Figure 8-17 Successful template deletion

System Setting / Template Management / NE Template				
Default templates cannot be deleted or	modified.			
Template N Y Please input. Q			Create	Import Export Delete
Template Name\$	Description	Driver ID\$	Template Attribute\$	Operation
□ vlantest		NE40E_V800R010C10SPC500_snd	Custom Template	View Edit More 👻
Total Records: 1				10 ~ @ 1 3

----End

8.1.5 Exporting an NE Template

Procedure

- Step 1 Choose System Setting > Template Management > NE Template from the main menu.
- **Step 2** On the **NE Template** page that is displayed, select the template to be exported and click **Export**.

Figure 8-18 Exporting an NE template

rstem Setting / Template Management / NE Template				
Default templates cannot be deleted	or modified.			
Template N Y Please input.			Create	Import Export Delete
Template Name\$	Description	Driver ID\$	Template Attribute\$	Operation
LIAN		NE40E_V800R010C10SPC500_snd	Custom Template	View Edit More 🕶
vlantest		NE40E_V800R010C10SPC500_snd	Custom Template	View Edit More 🕶
Total Records: 2				10 🗸 🔇 🕽 🌶

----End

8.2 Managing Service Templates

Scenario Description

You can use the service template management function to manage network-level templates.

8.2.1 Exporting a Service Template Based on a YANG File

Procedure

- **Step 1** Choose **Service Management** from the main menu. The **Service Management** page is displayed.
- **Step 2** On the **Service Management** page that is displayed, click \square and select the YANG file to be exported as a template.

Figure 8-19 Service Management page

Service Management					
	E	Export		×	
Service Type	aaamini			Content Commit Configuration	on Reset
습 Enter a model node 으		Enter a mod Q Select All	Reset		
aaamini	_	Available	Selected		
eas		🗌 aaamini		ate Discover Inconsistencies 🔻	Delete Add
eva	username	eas		depth Incon In-depth Inconsistency	Operation (6)
	%23%79@!	eva		Not executed	Edit Delete More -
	623%24%7			Failed 2020-07-16 15:28:25	Edit Delete More 🕶
	🗆 vlan			Failed 2020-07-17 14:48:52	Edit Delete More 🕶
	Total Records: 3			10	· () ()
		Merge template:			
		Exported content: • Data only · Structure	only O Structure and data		
		Cancel	ок		

Step 3 In the Export dialog box that is displayed, set Merge template and Exported content, and click OK.

NOTE

- You can enable **Merge template** to merge the template content generated by multiple YANG files.
- Three modes are available for exporting a template: **Data only**, **Structure only**, and **Structure and data**.

The following example exports a template in **Structure only** mode.

Step 4 In the displayed window, you can view the exported template.

File Commands Tools Favorites Options Help 2 Add Extract To View Delete Info VirusScan Comment SEX Test Find Wizard t ConfigTemplateExportByYang_20200717055505598.zip - ZIP archive, unpacked size 471 bytes Name Packed Size service_aaamini_aaamini_20200717055505598.j2 471 161

Figure 8-20 Exported template

----End

8.2.2 Importing a Service Template

Prerequisites

A service template has been exported according to **8.2.1 Exporting a Service Template Based on a YANG File**.

Procedure

Step 1 Edit the template exported based on a YANG file. The following example describes the VLAN mapping configuration. Delete the unnecessary objects and define the objects that require parameter transfer as parameters.

NOTE

The defined parameter name must be enclosed in {{}}.

Figure 8-21 Edited template

```
<vlan_mapping xmlns="http://example.com/vlan_mapping">
    <pe_id>{{pe_id}}</pe_id>
    <trunk_id>{{trunk_id}}</trunk_id>
    <mapping_id>{{mapping_id}}</mapping_id>
    </vlan mapping>
```

Step 2 Choose **System Setting > Template Management > Service Template** from the main menu. On the **Service Template** page that is displayed, click **Import**.

Figure 8-22 Clicking Import

System Setting / Template Management / Service Template			
Default templates cannot be deleted or modified.			
Template N Y Please input. Q			Create Import Export Delete
Template Name\$	Description	Template Attribute\$	Operation
test222		Custom Template	View Edit More 🔻
Total Records: 1			10 🗸 🔇 🕽 🔊

- **Step 3** In the displayed dialog box, set the template name and import a template file.
 - 1. Set Template name, Description, and Service template.

Figure 8-23 Setting Template name, Description, and Service template

System Setting / Template Ma	nagement / Service Template / Import	t.		
Import				
Template name:	lianxi		Description:	
Service template:	Select file		Import	

2. Click =, select the edited template, and click **Import**.

Figure 8-24 Importing a service template

System Setting / Template Ma	anagement / Service Template / Import	t		
Import				
Template name:	lianxi		Description:	
Service template:	service_aaamini_a (97 B)	× 🗄	Import	
	1 file has been added.			

3. Click **OK** after the template is imported.

Step 4 View the template list. The imported template is displayed in the template list.

Figure 8-25 Viewing the imported service template

m Setting / Template Management / Service Template			
Default templates cannot be deleted or modified.			
Template N V Please input.		Create	Import Export Delete
Template Name\$	Description	Template Attribute\$	Operation
aaaa	NetEngine_8000_M14	Custom Template	View Edit More 🕶

----End

8.2.3 Creating a Service Template

Procedure

Step 1 Edit the template content. The following example describes the configuration of bngVrfsPairs. Define the objects that require parameter transfer as parameters.

NOTE

The defined parameter name must be enclosed in {{}}.

Figure 8-26 Edited template

```
<br/>
```

- **Step 2** Choose **System Setting > Template Management > Service Template** from the main menu.
- Step 3 On the Service Template page that is displayed, click Create.

Figure 8-27 Creating a template

System Setting / Template Management / Service Template			
Default templates cannot be delated as medified			
U Default templates cannot de deleted of modified.			
Template N.,. V Please input.			Create Import Export Delete
The second second	Description .	Transform American A	Quantum (
Template Name⊋	Description	Temptate Attribute	Operation

Step 4 In the displayed dialog box, set Template name, Description, and Template content, and click OK.

Figure 8-28 Editing a template

Create								
Template	e name:	aaaa	Description:					
• Template	e content:							
Parameter 1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	-128 charac as xmlns=" (device-1 {{dena <port-11 {{nec (device-1 eas></port-11 	rs, including one or a combination of robust i young 'huwad-nci-ass' 25 25 25 25 25 25 25 25 25 25	numbers, letters, and spec	al characters _ , and can't start with	a number.			 8
								Save
Parame	ter Configu	ration						
	Parameter	lame‡				Description		
								-

Step 5 View the template list. The created template is displayed in the template list.

Figure 8-29 Viewing the created template

n Setting / Template Management / Service Template			
Default templates cannot be deleted or modified.			
Template N v Please input.			Create Import Export Delete
Template Name\$	Description	Template Attribute\$	Operation
аааа	NetEngine_8000_M14	Custom Template	View Edit More 👻

----End

8.2.4 Deleting a Service Template

Procedure

NOTE

- To delete a template, click **More** in the **Operation** column, and click **Delete**.
- To delete templates in batches, select them and click **Delete**.
- **Step 1** Choose **System Setting > Template Management > Service Template** from the main menu.
- **Step 2** On the **Service Template** page that is displayed, select the templates to be deleted and click **Delete**.

Figure 8-30 Deleting service templates in batches

Default templates cannot be deleted or modified			
emplate N Y Please input.			Create Import Export Dele
Template Name\$	Description	Template Attribute\$	Operation
lianxi		Custom Template	View Edit More 🕶
Ilanxi12		Custom Template	View Edit More 🕶

Step 3 In the displayed dialog box, click **OK**.

Figure 8-31 Warning message displayed after the deletion of templates

Warni	ng		\times
•	Cannot be restored after being deleted. Are you su continue?	re you want	to
		Cancel	ОК

Step 4 View the template list. The templates have been deleted.

Figure 8-32 Successful template deletion

Syst	em Setting / Template Management / Service Template			
	Default templates cannot be deleted or modified.			
	Template N V Please input.		[Create Import Export Delete
	Template Name\$	Description	Template Attribute¢	Operation
	test222		Custom Template	View Edit More 🕶
	Total Records: 1			10 ~ 🔇 1 🔊

----End

8.2.5 Exporting a Service Template

Procedure

- **Step 1** Choose **System Setting > Template Management > Service Template** from the main menu.
- **Step 2** On the **Service Template** page that is displayed, select the template to be exported and click **Export**.

Figure 8-33 Exporting a service template

System Setting / Template Management / Service Template			
Default templates cannot be deleted or modified	1.		
Template N Y Please input. Q.		Create	e Import Export Delete
✓ Template Name\$	Description	Template Attribute\$	Operation
✓ test222		Custom Template	View Edit More 🕶
Total Records: 1			10 🗸 🔇 🚺 📎

----End

8.3 Managing Template Groups

Scenario Description

A template group is a collection of service configurations. You can use template groups for preliminary service orchestration.

8.3.1 Creating a Template Group

Procedure

- Step 1 Choose System Setting > Template Management > Template Group Management from the main menu.
- **Step 2** On the **Template Group Management** page that is displayed, click **Create**.

Figure 8-34 Template Group Management page

ent / Template Group Ma

Template Gr Y Please input.				Create Export Delete
Template Group Name\$	Template Group Type\$	Description	Template Quantity	Operation
> 🗌 a123	Service template group		1	Edit Delete Export
> 🗌 t123	NE template group		1	Edit Delete Export
> _ t222	NE template group		0	Edit Delete Export
Total Records: 3				10 🗸 🔇 🚺 📎

There are two types of template groups: NE template group and service template group. The following example describes how to create a service template group.

Step 3 On the Create page that is displayed, set Template group name, Template group type, and Description, and click Create.

Figure 8-35 Creating a template group

Create	
1 • Template group name:	lianxi2
Template group type:	Service template group ~
Description:	

Create

Step 4 Under Add template, click Add.

Figure 8-36 Adding a template

ystem Setting / Template Management /	/ Template Group Management / Edit		
Edit			
1 • Template group name:	lianxi2		
Template group type:	Service template group ~		
Description:			
2 Add template			
Template N V Pleas	e input. Q		Add Delete
Template Name		Description	Operation

Step 5 Under Add template, select the template to be added and click OK.

E-+		0			
Ente	er the template name	Q			
	Template Name		Description		
~	CreateMibView		CreateMibV	iew	
Tota	l records: 1			(1) >>	1 • G

Figure 8-37 Adding a service template

Step 6 Under **Add template**, you can view the added template.

Figure 8-38 Viewing the added template

	pper: Service template group Please input: Q Add Detect ame Description Operation Detect 10 ~ @ 10 ~	Template group name:	lianxi2		
Description:	Please Input. Q Add Detect ame Description Operation Detect 10 ~ @ 1	Template group type:	Service template group 🛛 👻		
Add template	Please input: Q ame Description Operation Description Operation Description Operation Description	Description:			
Add template Template N. Please input Template N. Please input Description D	Pease input: Q ame Description Operation Detect IO IO				
Template N_ v Please input Add Implate Name Description Operation test222 Delete Delete stall Records: 1 10 v 0	Plesse input: Q ame Description Operation Detect 10 ~	Add template			
Template Name Description Operation text222 Delete total Records: 1 10 ~ (1)	ame Description Operation Deter 10 v (§ ()	Template N Y Plea	se input. Q		Add Delet
test222 Defete otal Records: 1 10 ~ (Delete 10 ~ (2) (1)	Template Name		Description	Operation
10 - (10 - 🛞 🕚				Delete
		test222			10 ~ 🔇 🚺
		otal Records: 1			
		otal Records: 1			

Step 7 Click **OK** to return to the **Template Group Management** page and view the created template group.

----End

8.3.2 Deleting a Template Group

Procedure

- To delete a template group, click **Delete** in the **Operation** column.
- To delete template groups in batches, select them and click **Delete**.

The following example deletes template groups in batches.

- Step 1 Choose System Setting > Template Management > Template Group Management from the main menu. The Template Group Management page is displayed.
- **Step 2** On the **Template Group Management** page that is displayed, select the template groups to be deleted and click **Delete**.

Figure 8-39 Deleting template groups

system setting / remplate management / remplate shoup management				
Template Gr × Please input. Q				Create Export Delete
Template Group Name\$	Template Group Type\$	Description	Template Quantity	Operation
> 🗌 a123	Service template group		1	Edit Delete Export
> 🗌 lianxi	Service template group		1	Edit Delete Export
> 🗌 lianxi2	Service template group		1	Edit Delete Export
> 🗌 t123	NE template group		1	Edit Delete Export
> 🗌 t222	NE template group		0	Edit Delete Export
Total Records: 5				10 🗸 🔇 🚺 🔊

Step 3 In the displayed dialog box, click OK.

Figure 8-40 Warning message displayed after the deletion of template groups



Step 4 View the template group list. The template groups have been deleted.

Figure 8-41	Successful	deletion	of tem	plate groups	;
-------------	------------	----------	--------	--------------	---

em Setting / Template Management / Template Group Management					
Template Gr V Please input.			Creat	e Export Delete	
Template Group Name	Template Group Type\$	Description	Template Quantity	Operation	
> 🗌 lianxi	Service template group		1	Edit Delete Export	
> 🗌 lianxi2	Service template group		1	Edit Delete Export	
> 🗆 t123	NE template group		1	Edit Delete Export	
> 🗌 t222	NE template group		0	Edit Delete Export	
Total Records: 4				10 ~ 🔇 🚺 🔊	

----End

8.3.3 Exporting a Template Group

Procedure

- Step 1 Choose System Setting > Template Management > Template Group Management from the main menu.
- **Step 2** On the **Template Group Management** page that is displayed, select the template group to be exported and click **Export**.

Figure 8-42 Exporting a template group

System Setting / Template Management / Template Group Management				
Template Gr V Please input.				Create Export Delete
Template Group Name\$	Template Group Type\$	Description	Template Quantity	Operation
> 🔛 lianxi	Service template group		1	Edit Delete Export
> 🗌 lianxi2	Service template group		1	Edit Delete Export
> 🗌 t123	NE template group		1	Edit Delete Export
> 🗆 t222	NE template group		0	Edit Delete Export
Total Records: 4				10 ~ (6) 1 (5)

----End

8.4 Managing Parameter Sets

Scenario Description

You can use the parameter set management function to manage parameters defined in templates. You can preconfigure parameter sets and directly select a template and the corresponding parameter set for delivery.

8.4.1 Creating a Parameter Set

Procedure

- Step 1 Choose System Setting > Template Management > Parameter Set Management from the main menu.
- **Step 2** On the **Parameter Set Management** page that is displayed, click **Create**.

Figure 8-43	Creating	а	parameter	set
-------------	----------	---	-----------	-----

System Setting / Template Management / Parameter Set Management				
Enter the parameter set name. Q			Create Import	Export Delete
Parameter Set Name\$	Description	Parameter Quantity¢	Parameter Set Attribute	Operation
> 🗌 lianSet\$	Default parameter set for lian	1	Default parameter set	Edit Delete Export
> 🗌 lianx1Set\$	Default parameter set for lianx1	1	Default parameter set	Edit Delete Export
> 🗌 lianxi		1	Custom parameter set	Edit Delete Export
> 🗆 t1		3	Custom parameter set	Edit Delete Export
> test2225et\$	Default parameter set for test222	1	Default parameter set	Edit Delete Export
> vlantestSet\$	Default parameter set for vlantest	1	Default parameter set	Edit Delete Export
Total Records: 6				10 ~ 🔇 🚺 🔊

Step 3 On the Create page that is displayed, set Parameter set name and click Add.

Figure 8-44 Setting Parameter set name

System Setting / Template Management / Parameter Set Management / Crea	ite			
Create				
Parameter set name: xiao	Description:			
Add Delete				
Encrypted	Parameter Name\$	Parameter Value\$	Description	Operation

Step 4 In the displayed list, set the parameters and click **OK**. On the **Parameter Set Management** page that is displayed, you can view the created parameter set.

Figure 8-45 Setting parameters

System Setting / Template Management / Parameter	Set Management / Create			
Create Parameter set name: xiao	Description:			
Add Delete				
Encrypted	Parameter Name\$	Parameter Value\$	Description	Operation
	asd			Delete
Total Records: 1				10 × C 1 2
				Cancel OK

----End

8.4.2 Importing a Parameter Set

Procedure

- Step 1Choose System Setting > Template Management > Parameter Set
Management from the main menu.
- Step 2 On the Parameter Set Management page that is displayed, click Import.

Figure	8-46	Parameter	Set	Management	page
				5	

em Setting / Template Management / Parameter Set Managemen	t			
Enter the parameter set name. Q			Create Impo	rt Export Delete
Parameter Set Name\$	Description	Parameter Quantity\$	Parameter Set Attribute	Operation
> 🗌 lianSet\$	Default parameter set for lian	1	Default parameter set	Edit Delete Export
> lianx1Set\$	Default parameter set for lianx1	1	Default parameter set	Edit Delete Export
> test2225et\$	Default parameter set for test222	1	Default parameter set	Edit Delete Export
> vlantestSet\$	Default parameter set for vlantest	1	Default parameter set	Edit Delete Export
Total Records: 4				10 × < 1 >



Figure 8-47 Setting Parameter set name

Import			\times
Parameter set name:	vlanSet		
Description:			
Download template:	Template.xls		
Upload parameter list:	Select file	∃ Upload	
Upload parameter list:	Select file	Upload	

NOTE

Two file sources are available for setting Upload parameter list:

1. In the **Import** dialog box, download the parameter template, then edit and save it as a new parameter template.

OK

2. Use the parameter template exported in **8.4.4 Exporting a Parameter Set**.

Cancel

Step 4 Click ^{The} and select the edited template.

Figure 8-48 Selecting a file

🌀 Open									×
Admin	istrator 👻	Downloads 👻		- [🏹 🛛 Sear	ch Downloads			2
Organize 🔻 New folde	r							•	0
🙀 Favorites	Na	me	Date modified 👻	Туре		Size			^
🧮 Desktop	×	Parameter Set_2019-06-15T19-0	9-25.400+08-00.	xlsx					
Downloads									
Kecent Places									
🥽 Libraries									
Documents									
Music									
Videos									
🜉 Computer									
🚢 Local Disk (C:)									
👝 New Volume (D:)									
👊 Network									
*									-
Fi	le name:	Parameter Set_2019-06-15t19-09-25.400+08-00).xlsx	•	Para	meter Set , xlsx	(•
					0	pen 🗸		Cancel	
							_		

Step 5 Click **Upload**. Then click **OK** after the template is uploaded.



		>	<
Import			
* Parameter set name:	snmpSet		
Download template:	Template.xls		
* Upload parameter list:	Parameter Set_2019-06-15T19-09-25.4	Upload	
	OK Cancel		



8.4.3 Deleting a Parameter Set

Procedure

NOTE

- To delete a parameter set, click **Delete** in the **Operation** column.
- To delete parameter sets in batches, select them and click **Delete**.
- The following example deletes parameter sets in batches.
- Step 1 Choose System Setting > Template Management > Parameter Set Management from the main menu.

Figure 8-50 Parameter Set Management page

System Setting / Template Management / Parameter Set Management				
Enter the parameter set name.			Create Import	Export Delete
Parameter Set Name\$	Description	Parameter Quantity\$	Parameter Set Attribute	Operation
> 🗌 lianSet\$	Default parameter set for lian	1	Default parameter set	Edit Delete Export
> 🗌 lianx1Set\$	Default parameter set for lianx1	1	Default parameter set	Edit Delete Export
> 🖬 t1		3	Custom parameter set	Edit Delete Export
> test2225et\$	Default parameter set for test222	1	Default parameter set	Edit Delete Export
> vlantestSet\$	Default parameter set for vlantest	1	Default parameter set	Edit Delete Export
Total Records: 5				10 🗸 🔇 🚺 🔊



Import Export Parameter Set Name\$ Attribute > 🗌 lianSet\$ Default parameter set for liar Default parameter set >
lianx1Set\$ Default parameter set for lianx1 Default parameter set > ☑ t1 om parameter set Warning >
test222Set\$ Cannot be restored after being deleted. Are you sure you want to continue? >
 vlantestSet\$ Default l Records: 5 () () () Cancel OK

Figure 8-51 Warning message displayed after the deletion of parameter sets



Figure 8-52 Successful deletion of parameter sets

System Setting / Template Management / Parameter Set Management				
Enter the parameter set name. Q			Create Import	Export Delete
Parameter Set Name\$	Description	Parameter Quantity\$	Parameter Set Attribute	Operation
> 🗌 lianSet\$	Default parameter set for lian	1	Default parameter set	Edit Delete Export
> 🗌 lianx1Set\$	Default parameter set for lianx1	1	Default parameter set	Edit Delete Export
> test2225et\$	Default parameter set for test222	1	Default parameter set	Edit Delete Export
> vlantestSet\$	Default parameter set for vlantest	1	Default parameter set	Edit Delete Export
Total Records: 4				10 🗸 🔇 🕽 🔊

----End

8.4.4 Exporting a Parameter Set

Procedure

- Step 1 Choose System Setting > Template Management > Parameter Set Management from the main menu.
- **Step 2** On the **Parameter Set Management** page that is displayed, select the parameter set to be exported and click **Export**.

Figure 8-53 Exporting a parameter set

System Setting / Template Management / Parameter Set Management				
Enter the parameter set name. Q			Create Import	Export Delete
Parameter Set Name\$	Description	Parameter Quantity\$	Parameter Set Attribute	Operation
> 🗌 lianSet\$	Default parameter set for lian	1	Default parameter set	Edit Delete Export
> 🗹 lianx1Set\$	Default parameter set for lianx1	1	Default parameter set	Edit Delete Export
> test2225et\$	Default parameter set for test222	1	Default parameter set	Edit Delete Export
> 🗌 vlantestSet\$	Default parameter set for vlantest	1	Default parameter set	Edit Delete Export
Total Records: 4				10 ~ (1)

----End

9 Configuration Management

9.1 Task Management

9.2 Commit History

The **Commit History** page records the commitment history of service management, NE management, CLI, and consistency management during synchronization based on forwarder data. On this page, you can view historical commitment records and roll back specific commitment points.

9.1 Task Management

Scenario Description

Task management allows you to view the execution progress and result of a configuration task. Currently, only NE configuration tasks can be viewed.

Procedure

Step 1 Choose **Config Management** > **Task Management** from the main menu. On the **Task Management** page that is displayed, filter and view tasks by task status.

Figure 9-1 Filtering tasks by task status

Config Management / Task Management					
Task Type: NE task ~ Task Status:	All ^			Refr	esh
Task Type	All Successful	End Time\$	Task Progress	Task Status	
	Ongoing				
	Failed				
	To be performed				

Step 2 View the task status and execution result based on the filtering result.

Figure 9-2 Task details display

Task Type: NE task v Task Status: All v Task Type Isak Type Isak Time‡ End Time‡ Task Progress Task Status	Task Type: NE task v Task Status: All v Task Type Isan Time 2 End Time 2 Task Progress Task Status	Config Manager	ment /	Task Manag	ement							
Task Type Start Time‡ End Time‡ Task Progress Task Status	Task Type Start Time\$ End Time\$ Task Progress Task Status	Task Type	e:	NE task	~	Task Status:	All	~				Refresh
		Та	ask Typ	e			Start Time‡		End Time\$	Task Progress	Task Status	

NOTE

Tasks that have been completed for more than half an hour are periodically cleared and are not displayed on the page.

----End

9.2 Commit History

The **Commit History** page records the commitment history of service management, NE management, CLI, and consistency management during synchronization based on forwarder data. On this page, you can view historical commitment records and roll back specific commitment points.

Step 1 Choose Config Management > Commit History from the main menu. On the Commit History page, commitment records are displayed in order of time. You can click > on the left to view the detailed configurations.

Figure 9-3 Viewing the committed information

Service v Please input. Q.								
Sequence	Date	Transaction ID	Service	Device	Operation			
🗸 🗌 з	2020-07-09 11:32:17	3dfb2d70-fe7a-446d-957e-1fd3f24601d1	eva		Rollback Revert			
# sequence: 3 # date: 2020-07-09 11:32 # transaction id: 3dfb2d7/	:17 0-fe7a-446d-957e-1fd3f24601d1							

D NOTE

Config Management / Commit History

The OPS framework tunes the committed information to facilitate storage and computation.

- **Step 2** Roll back specific commitment points. The following rollback methods are available:
 - Roll back a single commitment point: Click **Rollback** in the **Operation** column. Then click **OK**.
 - Roll back all configurations between the current time and a specified commitment point: Click **Revert** in the **Operation** column. Then click **OK**.
 - Roll back multiple commitment points: Select commitment points, click Rollback, and click OK.

Figure 9-4 Selecting multiple commitment points for rollback

•	The	configuration rollback	operation rolls back only the trans	action data.	Dry-run Ch	anged Content Commit	Configuration	Reset
S	iervice	✓ Please input	it. Q					Rollback
		Sequence	Date	Transaction ID	Service	Device	Operation	
	> 🗹	25	2020-07-15 10:01:12	e5dc7260-7267-49bc-83e3-9fdfc924f2f5			Rollback Revert	
	> 🗹	24	2020-07-15 10:00:27	757fc827-aa0f-42a5-90d0-46bedcb5d10e			Rollback Revert	
		23	2020-07-13 20:47:37	e276e454-e5f7-4594-8ef8-624c73dacf82			Rollback Revert	
	> 🗹	22	2020-07-13 16:11:16	933f855b-6907-499f-a885-a174dd3e66dd			Rollback Revert	
		21	2020-07-13 16:06:03	71148309-bed2-4ce2-9f76-0f3631c2a620			Rollback Revert	
		20	2020-07-13 16:02:17	e7da75d0-c8ae-4e8d-9c58-0acc8289899b			Rollback Revert	

NOTE

- 1. You are advised to check whether the configurations meet expectations before performing a rollback.
- 2. When a single commitment point is rolled back, only this specific point will be rolled back if its configuration is not associated with that of the next commitment point. Otherwise, the next commitment point is also rolled back.

For example:

Commitment point 1: An instance (instance 1) is delivered.

Commitment point 2: An attribute of instance 1 is delivered.

When commitment point 1 is rolled back, commitment point 2 is also rolled back.

----End

10 CLI

This chapter describes the CLIs provided by the OPS and provides examples to facilitate user operations.

- 10.1 General Guidelines
- 10.2 applications
- 10.3 commit
- 10.4 display Commands
- 10.5 dry-run
- 10.6 nes Commands
- 10.7 quit
- 10.8 reset
- 10.9 return
- 10.10 clear Command
- 10.11 undo
- 10.12 rpc Command
- 10.13 recompute

10.1 General Guidelines

 Entering a question mark (?): Display the help information. A question mark (?) can be entered following other commands, such as preset executable commands (including clear, dry-run, reset, and display) and node names (such as applications and bngBngPairs) in the current view, or entered separately.

[NCE]> applications ? bngBngPairs bngSystemNes isp ispPairs bngRoutingPairs bngAaaPairs hbng bngVrfPairs [NCE]>

- 2. Completing a command: After entering a correct prefix character, you can press **Tab** to complete the character string. If there are multiple strings with the same prefix, all the strings are displayed.
- Command output: The information enclosed in square brackets ([]) is the prompt information, and the directly displayed strings are configurable. [app:applications]> hbng abc [app:applications/hbng:hbng[abc]]> domains [Valid length:[1..64] description:Name of a domain, it is not case sensitive.] [app:applications/hbng:hbng[abc]]>

NOTE

A maximum of 3,500 lines can be displayed on the CLI.

10.2 applications

Run the **applications** command to enter the service view.

Welcome to NCE CLI [NCE] > applications [app:applications]> ? bngBngPairs bngSystemNes isp ispPairs bngRoutingPairs bngAaaPairs hbng bngVrfPairs clear commit display dry-run quit return undo [app:applications]>

10.3 commit

Welcome to NCE CLI [NCE]> applications [app:applications]> hbng abc [app:applications/hbng:hbng[abc]]> commit [OK] [app:applications]>

Run the **commit** command to deliver configurations. This command cannot be used to set parameters.

10.4 display Commands

Run the display commands to query information.

10.4.1 display this

Run the **display this** command to query data in the RDB and CDB. In this example, "**domainName**":"**bbb**" is the data in the CDB, as shown in the following figure.

```
[app:applications/hbng:hbng[hbng_ins]]> display this
 "hbng":
 [
  {
   "bng_service_name":"hbng_ins",
   "domains":
   E
     ł
      "domainName":"aaa"
    },
    {
      "domainName":"bbb"
    }
   1
  }
1
```

[app:applications/hbng:hbng[hbng_ins]]>

10.4.2 display this-configuration

Run the **display this-configuration** command to query data in the RDB. (In this example, the data "**domainName**":"bbb" in the CDB is not displayed.)

[app:applications/hbng:hbng[hbng_ins]]> display this-configuration

```
{
    "hbng":
    [
    {
        "bng_service_name":"hbng_ins",
        "domains":
        [
        {
            "domainName":"aaa"
        }
    ]
    }
   [app:applications/hbng:hbng[hbng_ins]]>
```

10.4.3 display inconsistency-discovery

Run the **display inconsistency-discovery** command to query NE configuration inconsistencies (in the NE view). Before running this command, you need to run the command for comparing NE configuration inconsistencies described in **10.6.2 nes inconsistency-discovery** [A] [B]....

[nes:nes/ne[ipi-zba900-r-bn-04]]> display inconsistency-discovery ### huawei-rsa ###

```
rsa
+ rsaLocalKeys
+ rsaLocalKey
+ keySize: 2048
+ rsaPeerKeys
+ rsaPeerKey
+ [keyName=******]
+ keyName:******
```

10.4.4 display dry-run preview

Run the **display dry-run preview** command to query configuration comparison information. This command provides the same function as the **Delivered Device Data** tab page in the dry-run view on the GUI. You need to run the **dry-run** command before running this command.

10.4.5 display dry-run compare

Run the **display dry-run compare** command to query the comparison result. This command provides the same function as the **Inconsistent Data** tab page in the dry-run view on the GUI. You need to run the **dry-run** command before running this command.

[nes:nes/ne[ipi-zba900-r-bn-04]/huawei-system/system:system/systemInfo]> display dry-run compare ### ipi-zba900-r-bn-04/(http://www.huawei.com/netconf/vrp/huawei-system)system ### system systemInfo +sysName: abc

[nes:nes/ne[ipi-zba900-r-bn-04]/huawei-system/system:system/systemInfo]>

10.5 dry-run

Run the **dry-run** command to perform comparison. The preview and comparison commands in **10.4.4 display dry-run preview** and **10.4.5 display dry-run compare** can be executed only after the **dry-run** command is executed successfully.

```
Welcome to NCE CLI

[NCE]> nes ne ipi-zba900-r-bn-04

[nes:nes/ne[ipi-zba900-r-bn-04]]> system systemInfo sysName abc

[nes:nes/ne[ipi-zba900-r-bn-04]/huawei-system/system:system/systemInfo]> dry-run

[OK]

[nes:nes/ne[ipi-zba900-r-bn-04]/huawei-system/system:system/systemInfo]>
```

10.6 nes Commands

Run the nes command to enter the NE management view.

10 CLI

10.6.1 nes ne [xxx]

Run the **nes ne** *[xxx]* command to enter the view of a single NE. *[xxx]* indicates the NE name.

[NCE]> nes ne ? [ipi-zba900-r-bn-04 ipi-zba900-r-bn-17] [NCE]> nes ne ipi-zba900-r-bn-04 [nes:nes/ne[ipi-zba900-r-bn-04]]>

10.6.2 nes inconsistency-discovery [A] [B]...

Run the **nes inconsistency-discovery** [A] [B]... command to compare NE configuration inconsistencies. [A] [B]... indicates the NE names. One or more NE names can be entered.

```
[NCE]> nes inconsistency-discovery ipi-zba900-r-bn-04
[OK]
[NCE]>
```

10.6.3 nes sync-to [A] [B]...

Run the **nes sync-to** [A] [B]... command to synchronize data from the NMS to NEs. [A] [B]... indicates the NE names. One or more NE names can be entered.

10.6.4 nes sync-from [A] [B]...

Run the **nes sync-from** [A] [B]... command to synchronize data from NEs to the NMS. [A] [B]... indicates the NE names. One or more NE names can be entered.

10.7 quit

Run the **quit** command to return to the upper-level view.

[NCE]> applications hbng abc domains bbb [app:applications/hbng:hbng[abc]/domains[bbb]]> quit [app:applications/hbng:hbng[abc]]>

10.8 reset

Run the **reset** command to reset configured data. This command must be executed in the top-level view. After this command is executed, the transaction IDs are deleted on the CLI side.

```
[app:applications/hbng:hbng[abc]]> return
[NCE]> reset
[OK]
[NCE]>
```

10.9 return

Run the return command to return to the top-level view.

[app:applications/hbng:hbng[abc]/environment[bbb]/vrfs[abc]]> return [NCE]>

10.10 clear Command

Run the **clear** command to clear all contents on the screen. This function is the same as the **clear** command on Linux.

10.11 undo

This command is used to perform a deletion operation, for example, deleting a list, leaf list, leaf, or presence container node. [app:applications]> display this

```
"applications":
 {
  "hbng:hbng":
  [
    {
      "bng_service_name":"hbng1"
    },
{
      "bng_service_name":"abc"
    }
  1
 }
[app:applications]> undo hbng abc
[app:applications] > display this
 "applications":
 {
   "hbng:hbng":
  [
    {
      "bng_service_name":"hbng1"
    }
  ]
 }
[app:applications]>
```

10.12 rpc Command

The **rpc** command can be executed when the YANG file of a service or NE contains an RPC structure.

10.13 recompute

Run the **recompute** command based on the **hbng** service point to perform recomputing. For details about the application scenarios of recomputing, see **Figure 7-2**.

The recomputing function can be used only on the points under the **applications** level.

```
[app:applications]> hbng hbng1
[app:applications/hbng:hbng[hbng1]]> recompute
[OK]
[app:applications/hbng:hbng[hbng1]]>
```