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- Huawei Learning Website
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- Huawei e-Learning
  - <https://ilearningx.huawei.com/portal/#/portal/ebg/51>
- Huawei Certification
  - [http://support.huawei.com/learning/NavigationAction!createNavi?navId=\\_31&lang=en](http://support.huawei.com/learning/NavigationAction!createNavi?navId=_31&lang=en)
- Find Training
  - [http://support.huawei.com/learning/NavigationAction!createNavi?navId=\\_trainingsearch&lang=en](http://support.huawei.com/learning/NavigationAction!createNavi?navId=_trainingsearch&lang=en)



## More Information

- Huawei learning APP



Huawei Transmission Certification Training

# HCIA-Transmission V2.0

## Lab Guide

ISSUE:2.0



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Huawei Certified ICT Associate-Transmission (HCIA-Transmission) is designed for Huawei local offices, online engineers in representative offices, and readers who want to understand Huawei Transmission products and technology. HCIA-Transmission covers the SDH/WDM/OTN basics, SDH product features, SDH Networking, Ethernet basic principle and service introduction, U2000 system structure and basic operation, and SDH service configuration.

The HCIA-Transmission certificate system introduces you to the industry and market, helps you in innovation, and enables you to stand atop the Transmission frontiers.

# About This Document

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## Overview

This document is applicable to the candidates who are preparing for the HCIA-Transmission exam and the readers who want to understand the SDH/WDM/OTN basics, SDH product features, SDH Networking, Ethernet basic principle and service introduction, U2000 system structure and basic operation, and SDH service configuration.

## Description

This lab guide introduces SDH service configuration and EoS (Ethernet over SDH) service configuration, including 8 experiments. SDH service configuration includes Configuring Services on the Non-Protection Ring, Configuring Linear MSP Services, Configuring Two-Fiber Bidirectional MSP Services and Configuring Services on the SNCP Ring. EoS service configuration includes EPL, EVPL, EPLAN and EVPLAN service configuration.

- Experiment 1-4: SDH service configuration.
- These experiments involve basis operations and configurations based on the different application scenarios, helping you know how to configure SDH service and protection.
- Experiment 5-8: EoS service configuration.
- These experiments mainly introduce EPL, EVPL, EPLAN and EVPLAN service scenarios, you will understand these four Ethernet service configuration methods after finishing these tasks.

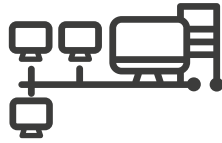
## Background Knowledge Required

- The intended audience should know basic SDH knowledge, Huawei MSTP devices (OSN 1500/2500/3500/7500/500/550/580), and basic U2000 operation.

## Common Icons



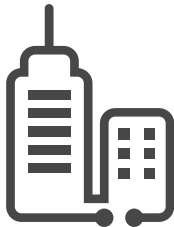
OSN 550



U2000



PC



User A



User B

## Experiment Environment Overview

### Networking Introduction

This experiment environment is prepared for transmission engineers who are preparing for the HCIA-Transmission exam.

Each suite of experiment environment includes 3 OSN 550s, 1 U2000 server, 3~6 PC (for U2000 client). Each suite of experiment environment is applicable to 1 to 6 candidates.

### Device Introduction

The following table lists devices recommended for HCIA-Transmission experiments and the corresponding of the device name, model, and software version.

Device name	Model	Software Version
OSN 550	TNM1PCXLX1601 TNM1AUX TNH2EFS8 TNH2SP3D	OSN550: V100R007 and above
NMS	U2000	V200R16C50 and above
PC	PC	Windows 7

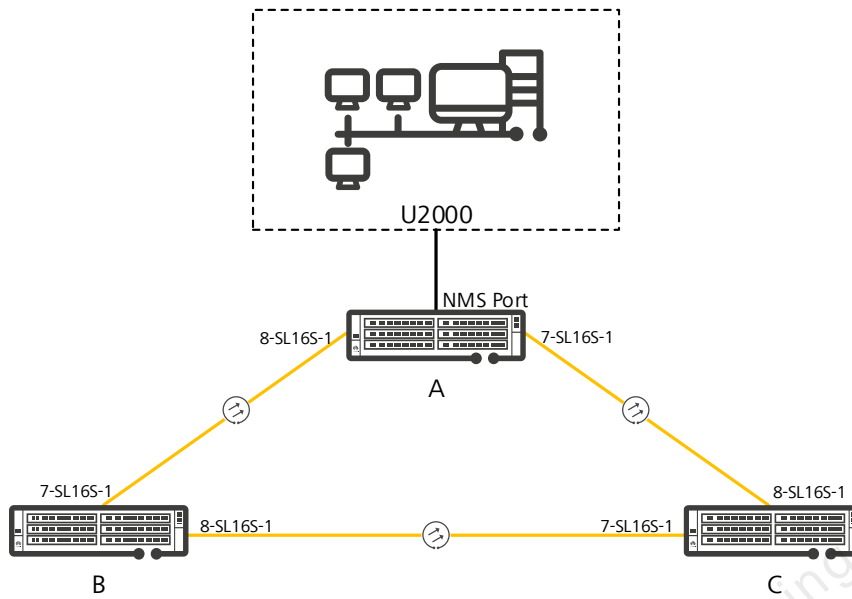
## Experiment Environment Preparation

### Checking Whether All Devices Are Available

Before starting the experiment, check whether all required devices are ready. The following table lists the required devices.

Device	Quantity	Remarks
MSTP (OSN 550)	3	Shared by all groups
PC (U2000 server)	1	Shared by all groups
PC (U2000 client)	3 for each group	
Twisted-pair	4 for each group	The twisted pair must be at least 2 meters long
Optical Fiber	20 for each group	The optical fiber must be at least 3 meters long

## Experiment topology



Key points of topology establishment:

This course uses a ring topology. Devices are connected as figure.

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# 1 SDH Service Configuration

## 1.1 Experiment Introduction

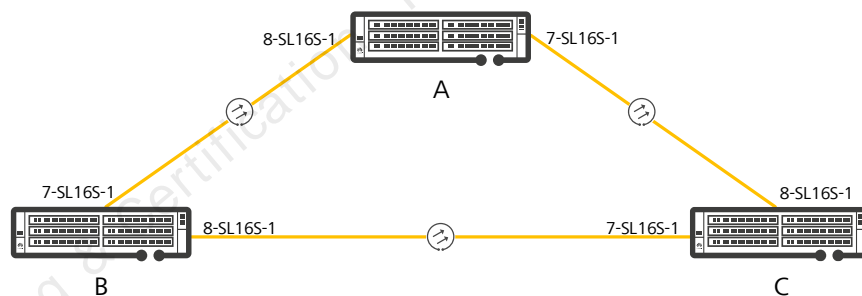
### 1.1.1 Objectives

Upon completion of this task, you will be able to:

- Configuring Services on the Non-Protection Ring. (End-to-End)
- Configuring 1+1 Linear MSP Services. (End-to-End)
- Configuring the Two-Fiber Bidirectional MSP Services. (End-to-End)
- Configuring Services on the SNCP Ring. (End-to-End)

### 1.1.2 Networking and Service Description

**Figure 1-1 Network Topology**



### 1.1.3 Experiment Planning

The ring topology is composed by 3 OSN 550s in this experiment. NE A, NE B and NE C are connected with each other by one pair fibers. All the NEs use SP3D board as a tributary unit to add and drop E1 services and use SL16S as a line unit to transmit and receive SDH services.

**Table 1-1 NE Information**

NE Name	Device Type	Tributary Unit	Line Unit
NE A	OSN 550	2-SP3D	W:8-SL16S-1 E:7-SL16S-1
NE B	OSN 550	2-SP3D	W:8-SL16S-1 E:7-SL16S-1

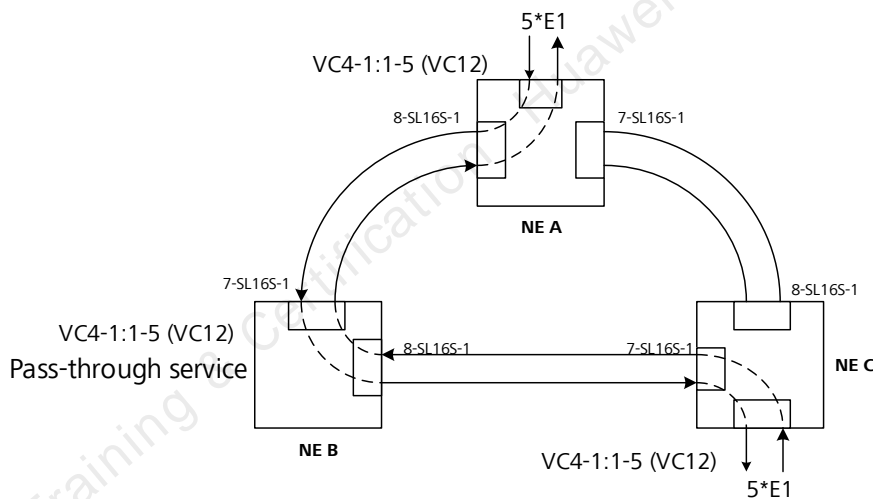
NE C	OSN 550	2-SP3D	W:8-SL16S-1 E:7-SL16S-1
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## 1.2 Configuring Services on the Non-Protection Ring. (End-to-End)

### 1.2.1 Signal Flow and Timeslot Allocation

To configure services on the non-protection ring, you need to plan the traffic direction and timeslot allocation for the services on the non-protection ring. Figure 1-2 shows the signal flow and timeslot allocation. In this example, 5 E1 services are added to or dropped from NE A and NE C, and they pass through NE B.

**Figure 1-2 Signal flow and Timeslot Allocation of the Services on the Non-protection Ring**



**Table 1-2 Timeslot Allocation**

Service Type	NE A			
	TU	Port	LU	Timeslot
5*E1	2-SP3D	1-5	8-SL16S-1	VC4-1:1-5(VC12)

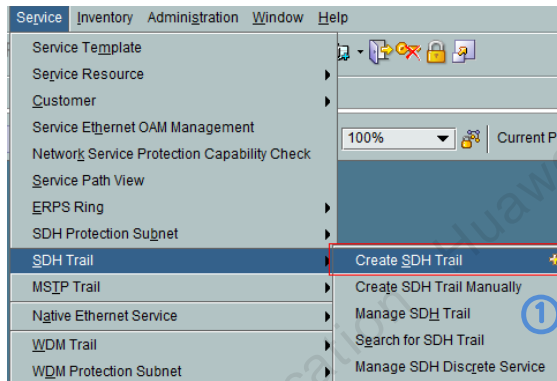
Service Type	NE B			
	LU	Timeslot	LU	Timeslot

5*E1	7-SL16S-1	VC4-1:1-5(VC12)	8-SL16S-1	VC4-1:1-5(VC12)
------	-----------	-----------------	-----------	-----------------

Service Type	NE C			
	LU	Timeslot	TU	Port
5*E1	7-SL16S-1	VC4-1:1-5(VC12)	2-SP3D	1-5

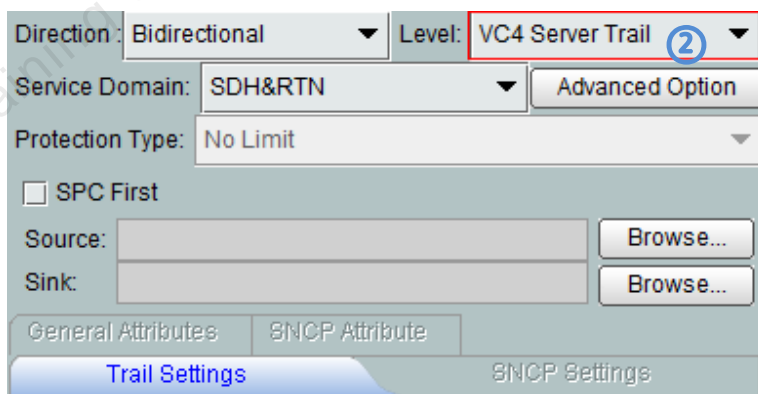
### 1.2.2 Configuration Procedure

Step 1 Choose **Service > SDH Trail > Create SDH Trail** from the Main Menu.

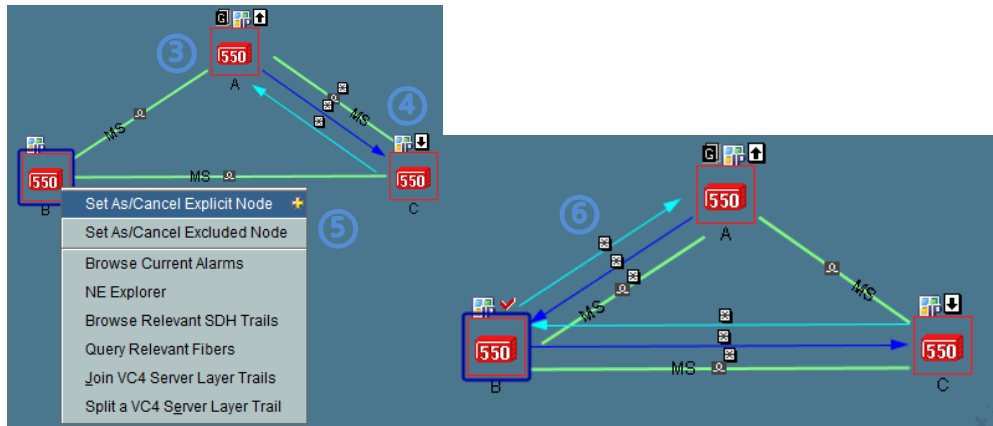


Step 2 Create the VC-4 service-layer trail.

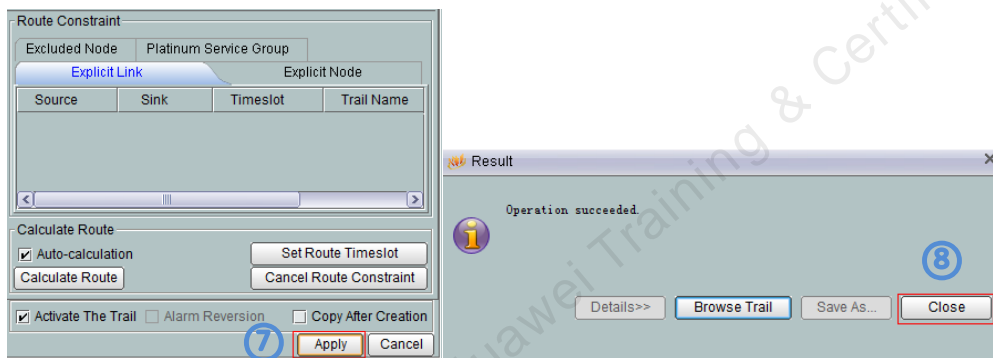
a. Configure the parameters as follows. Set **Level** to **VC4 Server Trail**. The other parameters take default values.



b. Double-click the source NE (NE A) and sink NE (NE C) on the right of the main topology. Right-click the NE B (pass-through) and select **Set As/Cancel Explicit Node**.



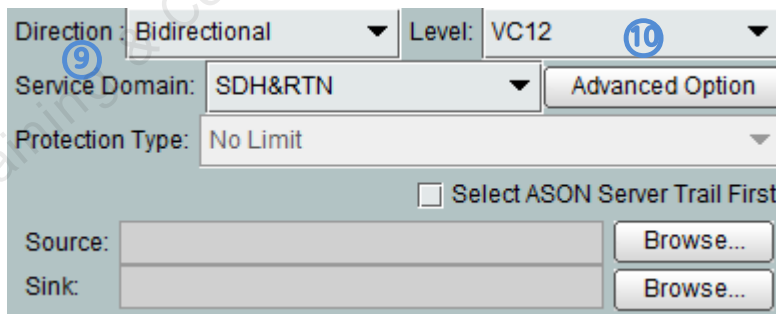
c. Click **Apply**. In the **Operation Result** dialog box that is displayed, click **Close**.



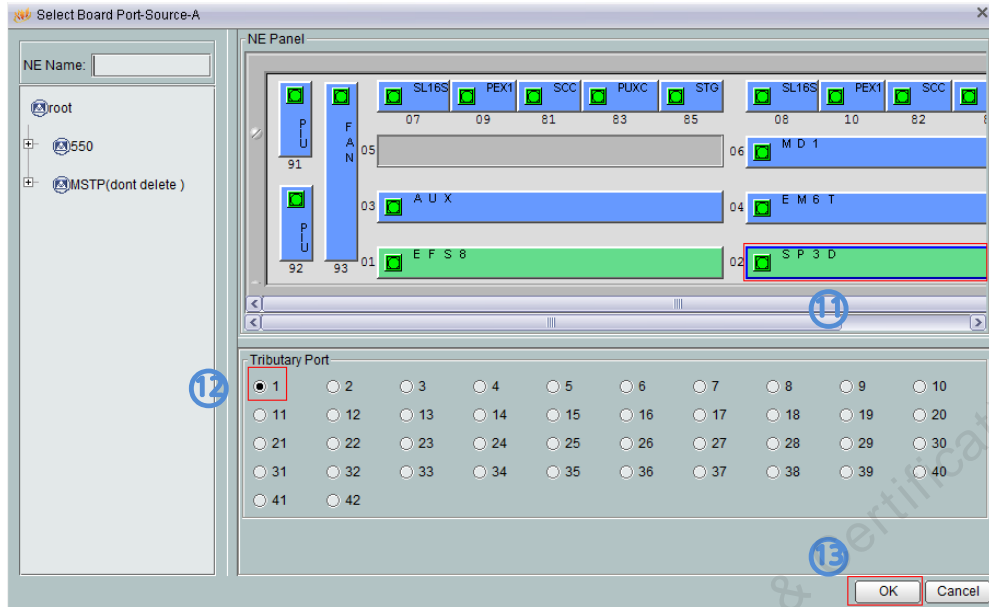
d. **Optional:** In the **Operation Result** dialog box that is displayed, you can also click **Browse Trail** to query the created VC4 service-layer trail.

**Step 3** Create VC12 services.

a. In **Create SDH Tail**, configure the parameters as follows. Set **Level** to **VC12** and set **Direction** to **Bidirectional**. The other parameters take default values.

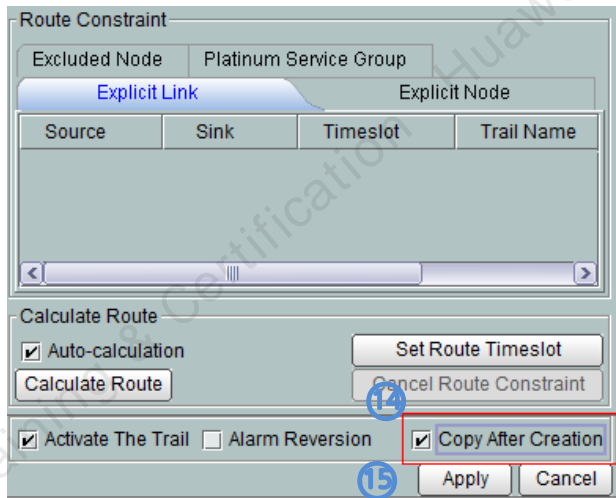


b. Double-click the source NE (NE A) on the right of the Main Topology. The **Select Board Port-Source** dialog box is displayed. Select the required PDH board and **Tributary Port**. Click **OK**.

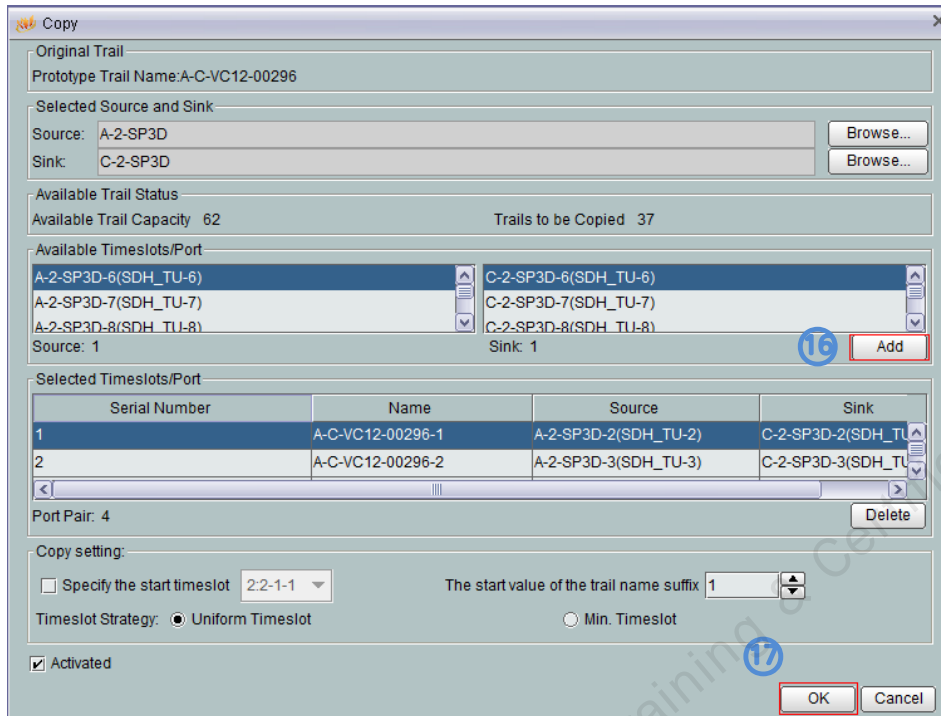


c. Double-click the sink NE (NE C) on the right of the main topology. Configure NE C in the same manner.

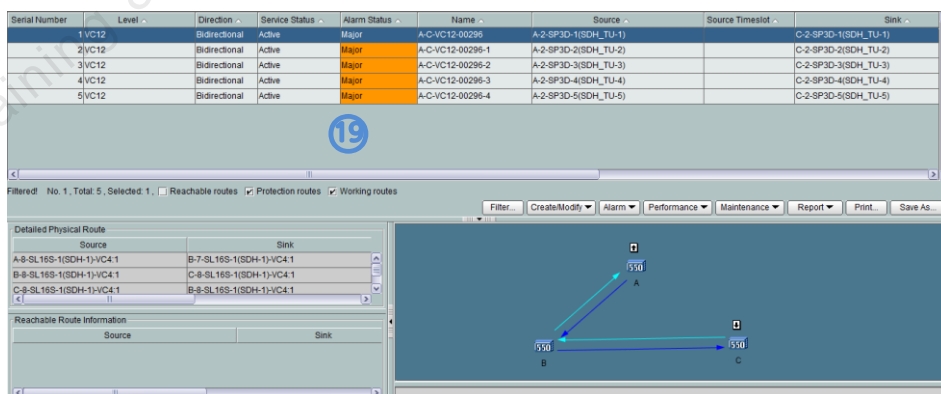
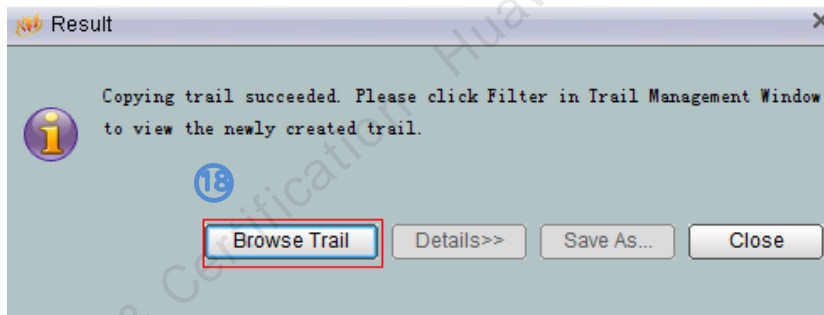
d. Select **Copy after Creation** and click **Apply**. In the **Operation Result** dialog box that is displayed, click **Close**. Then, the **Copy** dialog box is displayed.



e. In **Available Timeslots/Port**, select the ports from A-2-SP3D-2(SDH\_TU-2) to C-2-SP3D-5(SDH\_TU-5), and click **Add**, and then click **OK**.



e. In the **Operation Result** dialog box that is displayed, click **Browse Trail** to query the created VC12 services.

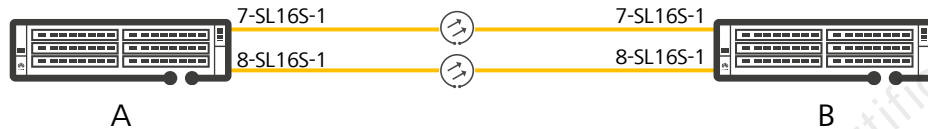


## 1.3 Configuring 1+1 Linear MSP Services

### 1.3.1 Network Diagram

There are two types of LMSP, 1+1 LMSP and 1:1 LMSP. Here 1+1 LMSP is used as an example to show the configuration method of LMSP. Ring topology needs to be changed to chain topology because of LMSP, as shown in Figure 1-3.

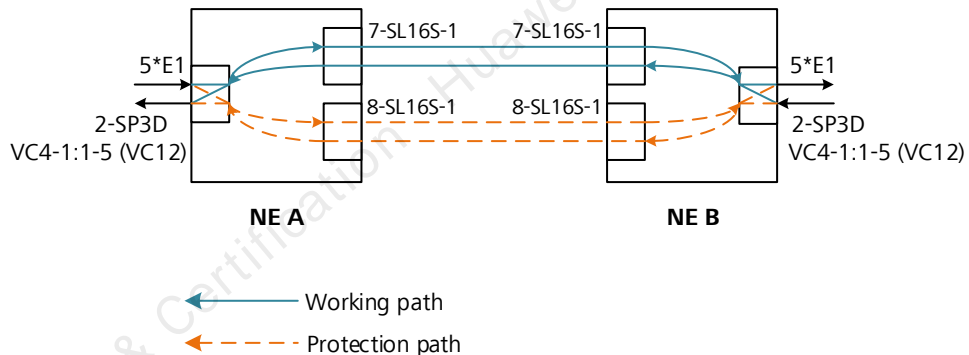
**Figure 1-3 Networking Diagram of the 1+1 Linear MSP Services**



### 1.3.2 Signal Flow and Timeslot Allocation

As shown in Figure 1-4, 1+1 LMSP is deployed between NE A and NE B. 2-SP3Ds are used to add and drop 5 E1s on the both sites. In normal status, the working path is between two 7-SL16S-1s, and the protection path is between two 8-SL16S-1s.

**Figure 1-4 Signal Flow of the 1+1 Linear MSP Services**



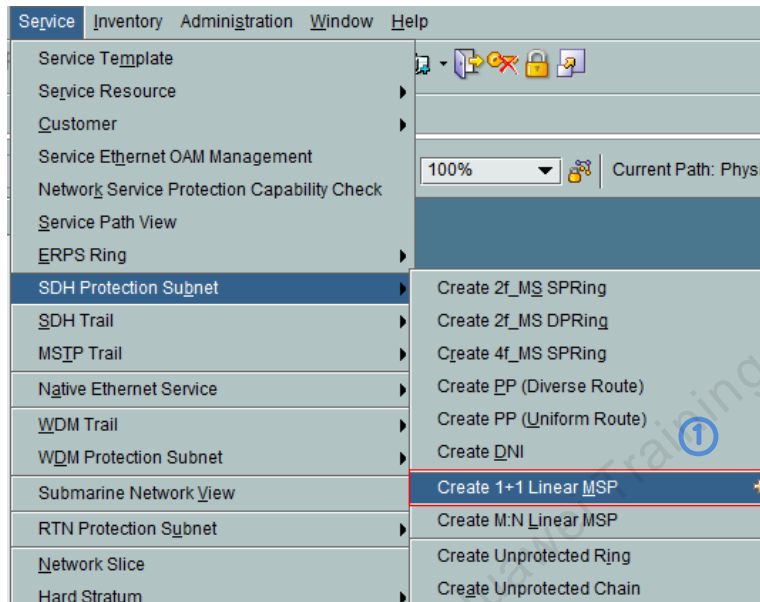
**Table 1-3 Timeslot Allocation**

Service Type	NE A				NE B			
	TU	Port	LU	Timeslot	LU	Timeslot	TU	Port
5*E1 (Working)	2-SP3D	1-5	7-SL16S-1	VC4-1:1-5(VC12)	7-SL16S-1	VC4-1:1-5(VC12)	2-SP3D	1-5
5*E1 (Protection)	—	—	8-SL16S-1	VC4-1:1-5(VC12)	8-SL16S-1	VC4-1:1-5(VC12)	—	—

### 1.3.3 Configuration Procedure

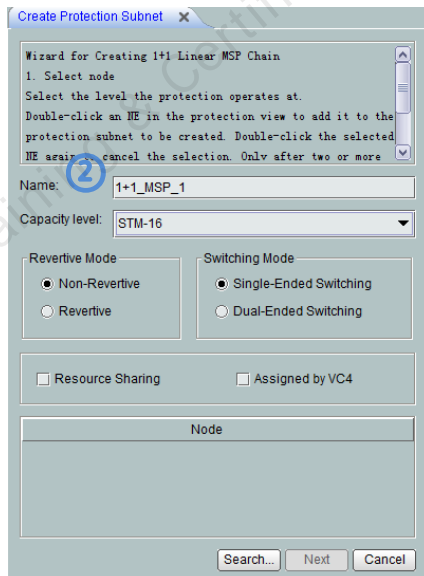
#### 1.3.3.1 Creating a Linear MS Protection Subnet

Step 1 Choose **Service > SDH Protection Subnet > Create 1+1 linear MSP** from the Main Menu. Then, the **Create Protection Subnet** window is displayed.

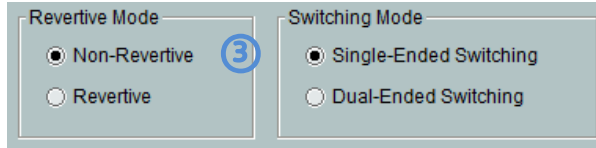


Step 2 Enter the name of the protection subnet. Generally, the default name is used, for example, 1+1\_MSP\_1.

Step 3 Select the capacity level of the protection subnet, STM-16.



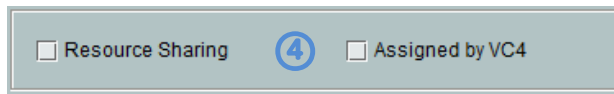
Step 4 Set **Revertive Mode** and **Switching Mode** according to the protection type and related requirements.



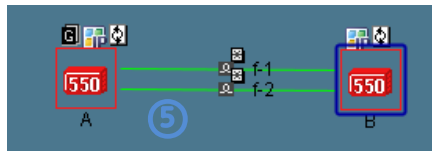
Step 5 Select **Resource Sharing** and **Assigned by VC4** as required. (Optional)

**(Resource Sharing** indicates that a port is mapped into multiple protection subnets. When multiple protection subnets occupy the same port of a board, **Resource Sharing** must be selected. When different protection subnets occupy different ports of a board, **Resource Sharing** is not required.

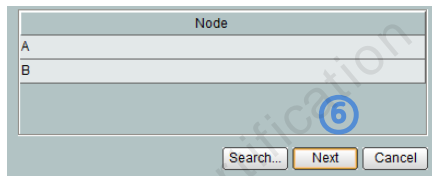
**Assigned by VC4** indicates that different VC-4s belong to different protection subnets in order to achieve MSP in some channels at a port.)



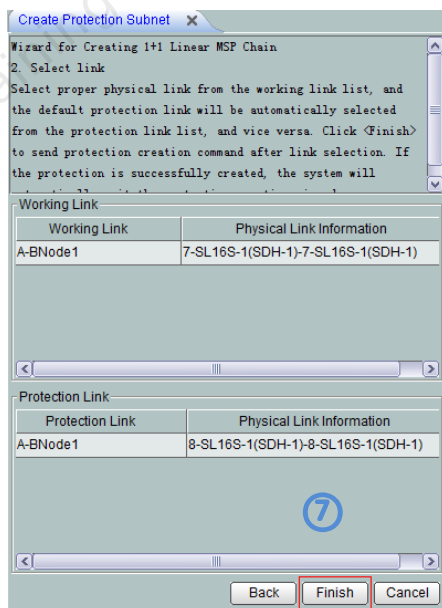
Step 6 Select the nodes that belong to the protection subnet that needs to be created. Double-click the selected NE in the Main Topology to add the NE to the NE list on the left.



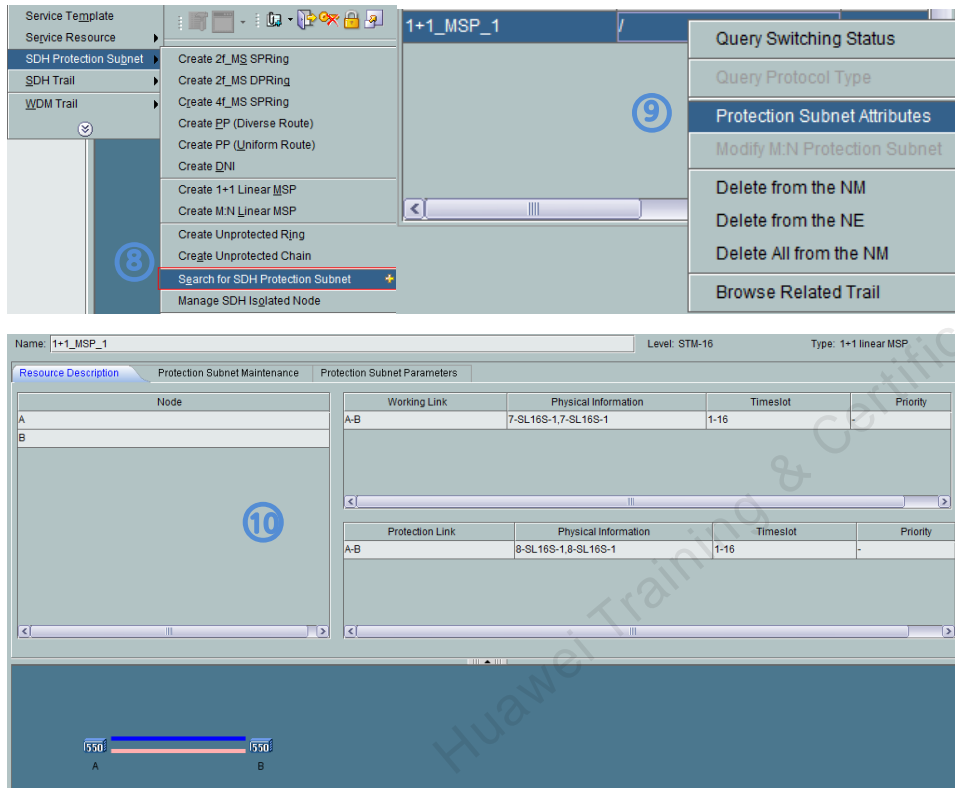
Step 7 Click **Next**. Set **Physical Link Information** of **Working Link** and **Protection Link**.



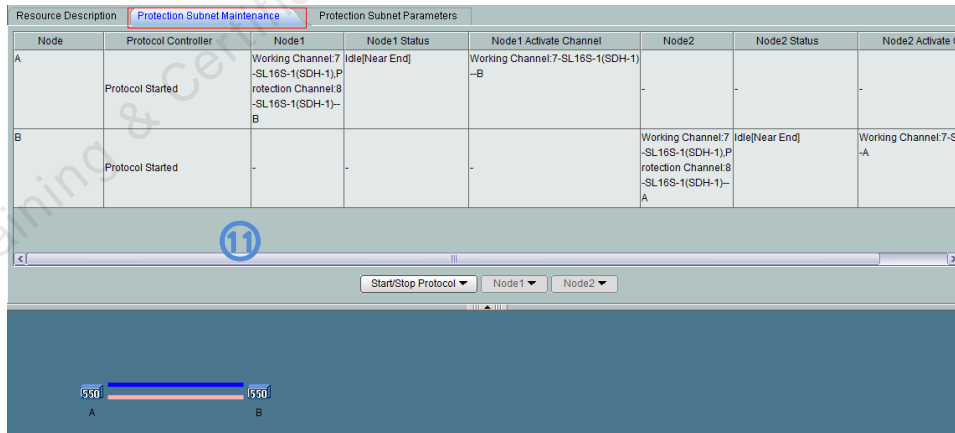
Step 8 Click **Finish** to deliver the configuration data. Then, click **Close** in the **Operation Result** dialog box indicating that the operation succeeded.



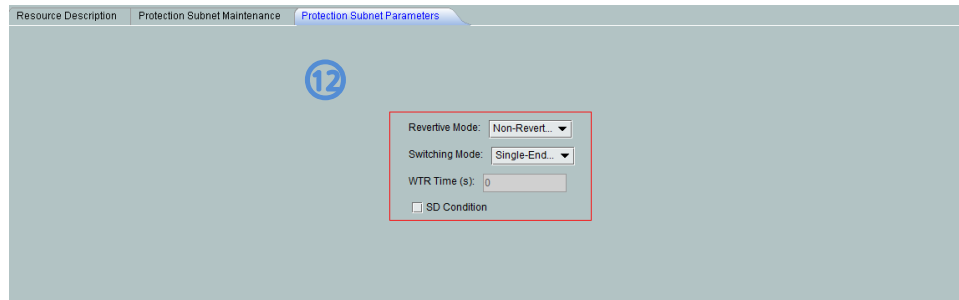
Step 9 Choose **Service > SDH Protection Subnet > Search for SDH Protection Subnet** from the Main Menu. Select the created protection subnet, right-click and choose **Protection Subnet Attributes** from the shortcut menu.



Step 10 Click the **Protection Subnet Maintenance** tab to check whether the protocol controller is started.



Step 11 Click the **Protection Subnet Parameters** tab. Set **WTR time** and **SD Condition** according to the requirement. Click **Apply** to deliver the configuration data.



### 1.3.3.2 Configuring E1 Services

The steps of configuring E1 services is the same with Chapter 1.2.2. The parameters can follow the planning in Chapter 1.3.2.

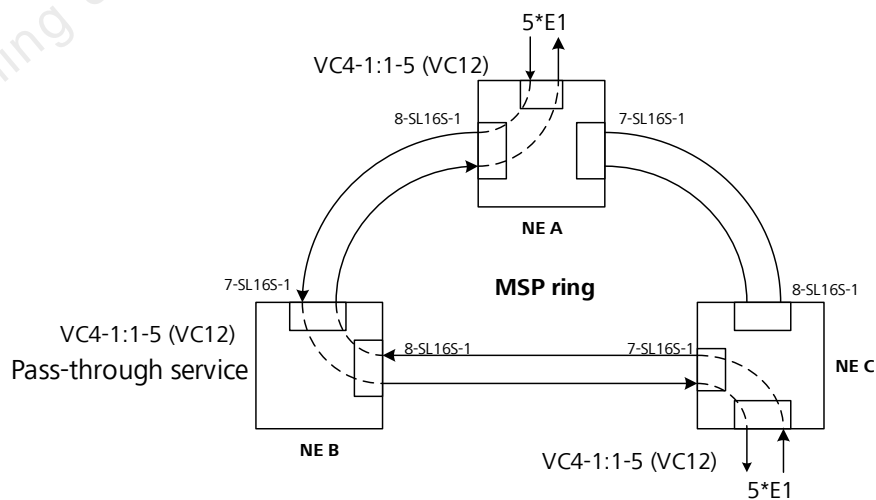
## 1.4 Configuring the Two-Fiber Bidirectional MSP Services

### 1.4.1 Signal Flow and Timeslot Allocation

To configure the two-fiber bidirectional MSP service on a ring network, configure the services that need to be added to the ring network on the source NE, to pass through the intermediate nodes, and to be dropped from the sink NE, if the MSP protection subnet is already created. In the case of the ring network, more than one route is available from the source NE to the sink NE. In actual application scenarios, not all the routes need to be configured. Hence, you need to properly plan and configure the service directions and timeslots before the configuration.

Figure 1-5 shows the service signal flow and timeslot allocation. In this example, 5 E1 services are configured so that the services enter the ring network from NE A, pass through NE B, and then are dropped on the sink NE (NE C).

**Figure 1-5 Signal Flow of 2f Bidirectional MSP Services**



**Table 1-4 Timeslot Allocation**

NE A:

TU	Port	LU (Working)	Timeslot
2-SP3D	1-5	8-SL16S-1	VC4-1:1-5

NE B:

LU (Working)	Timeslot	LU (Working)	Timeslot
7-SL16S-1	VC4-1:1-5	8-SL16S-1	VC4-1:1-5

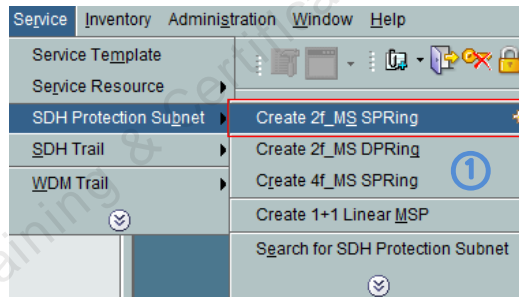
NE C:

TU	Port	LU (Working)	Timeslot
2-SP3D	1-5	7-SL16S-1	VC4-1:1-5

## 1.4.2 Configuration Procedure

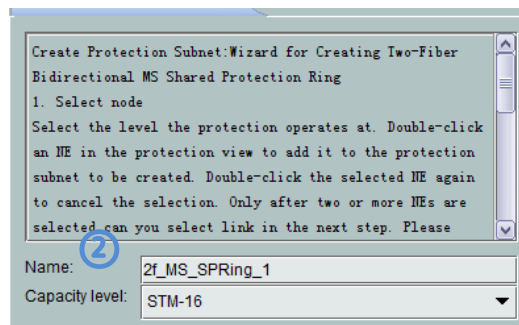
### 1.4.2.1 Creating an MS Ring Protection Subnet

- Step 1 Choose **Service > SDH Protection Subnet > Create 2f\_MS\_SPRing** from the Main Menu. Click **OK** in the dialog box that is displayed. Then, the **Create Protection Subnet** window is displayed.

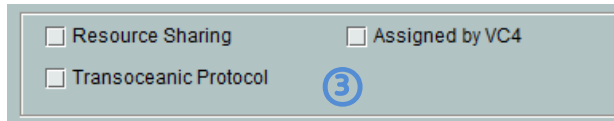


- Step 2 Enter the name of the protection subnet. Generally, the default name is used, for example, 2f\_MS\_SPRing\_1.

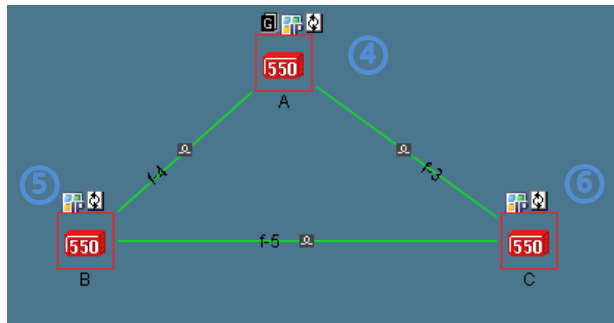
- Step 3 Select the capacity level of the protection subnet, STM-16.



Step 4 Choose **Resource Sharing** and **Assigned by VC4** according to the requirement. (Optional)



Step 5 Select the nodes that belong to the protection subnet that needs to be created. Double-click the selected NE in the Main Topology to add the NE to the NE list on the left.

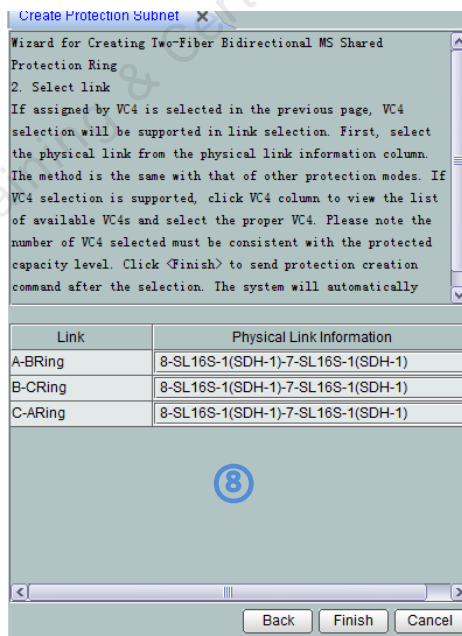


Step 6 Set the attribute of each node to **MSP Node**.

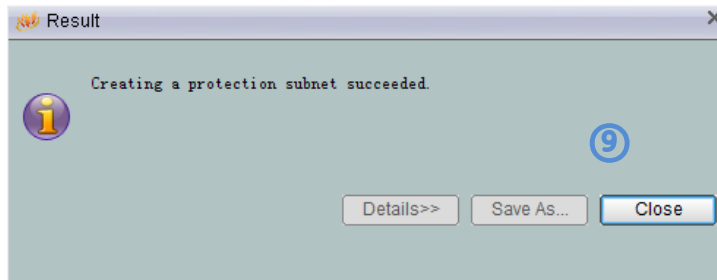
Node	Node Attributes
A	MSP Node
B	MSP Node
C	MSP Node

7

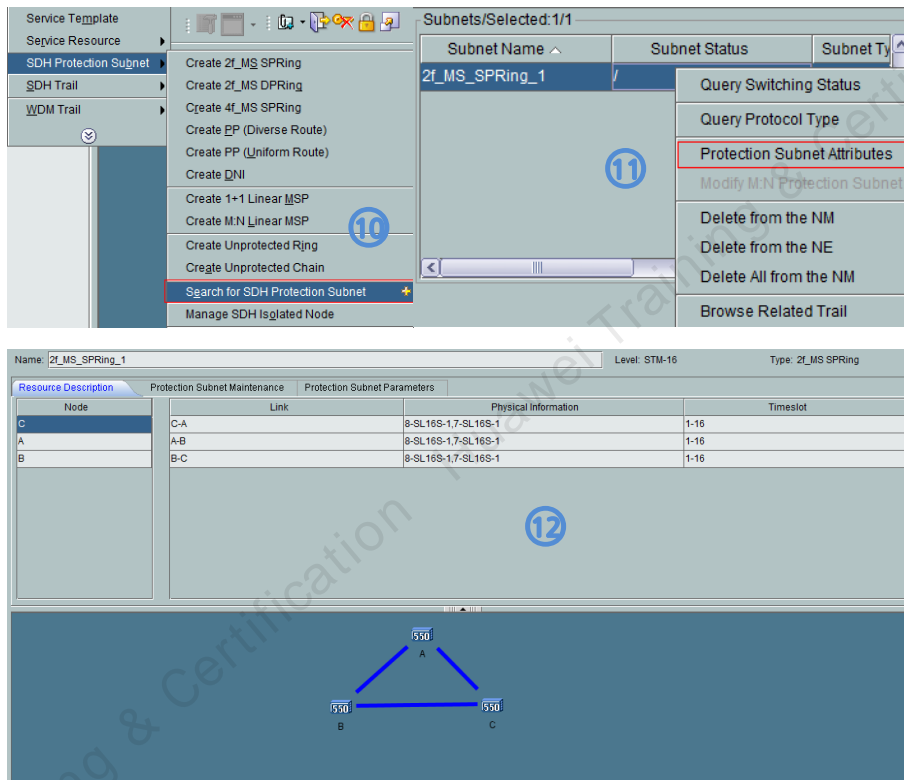
Step 7 Click **Next**. Set the parameters such as **Physical Link Information** in the window.



Step 8 Click **Finish** to deliver the configuration data. Then, the **Operation Result** dialog box is displayed. Click **Close**.



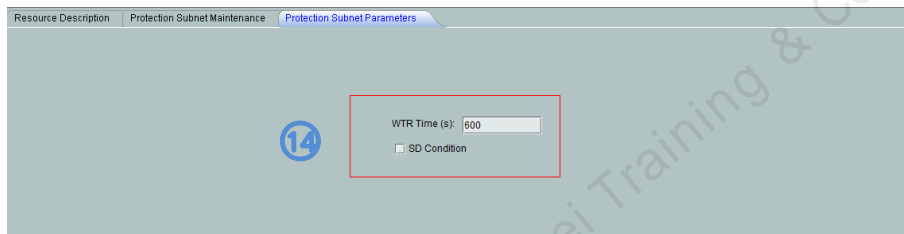
Step 9 Choose **Service > SDH Protection Subnet > Search for SDH Protection Subnet** from the Main Menu. Select the created protection subnet, right-click and choose **Protection Subnet Attributes** from the shortcut menu.



Step 10 Click the **Protection Subnet Maintenance** tab to check whether the protocol controller is started. If the protocol controller is not started, select all the nodes of the protection subnet. Right-click and choose **Start/Stop Protocol > Start** from the shortcut menu. Click **Yes** in the dialog box that is displayed twice. Ensure that the status of all the values in the **Protocol Controller** column is **Protocol Started**.

Resource Description		Protection Subnet Parameters					
Node	Protocol Controller	East	East Status	East Service Switching Status	West	West Status	West Service Switching Status
C	Protocol Started	8-SL16S-1(SDH-1) ->A	Idle(Near End)	Off	7-SL16S-1(SDH-1) ->B	Idle(Near End)	Off
A	Protocol Started	8-SL16S-1(SDH-1) ->B	Idle(Near End)	Off	7-SL16S-1(SDH-1) ->C	Idle(Near End)	Off
B	Protocol Started	8-SL16S-1(SDH-1) ->C	Idle(Near End)	Off	7-SL16S-1(SDH-1) ->A	Idle(Near End)	Off

Step 11 Click the **Protection Subnet Parameters** tab. Set **WTR time** and **SD Condition** according to the requirement. Click **Apply** to deliver the configuration data. The **WTR time** of all NEs in the same protection subnet should be the same.



### 1.4.2.2 Configuring E1 Services

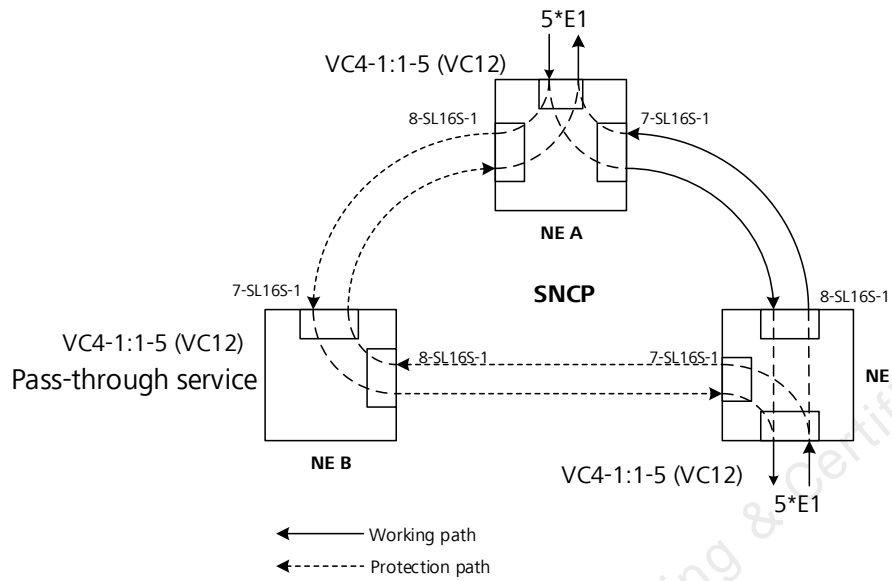
The steps of configuring E1 services are the same with Chapter 1.2.2. The parameters can follow the planning in Chapter 1.4.1.

## 1.5 Configuring Services on the SNCP Ring

### 1.5.1 Signal and Timeslot Allocation

Figure 1-6 shows the signal of the services on the SNCP ring and the timeslot allocation to the services on the SNCP ring. The working service route is NE A – NE C and the protection service route is NE A – NE B – NE C. There are five E1 services.

**Figure 1-6 Signal Flow of SNCP Ring**



**Table 1-5 Timeslot Allocation**

NE A:

SNCP Protection Group	Working Source	Timeslot	Protection Source	Timeslot	Service Sink	Port
	7-SL16S-1	VC4-1:1-5	8-SL16S-1	VC4-1:1-5	2-SP3D	1-5

NE B:

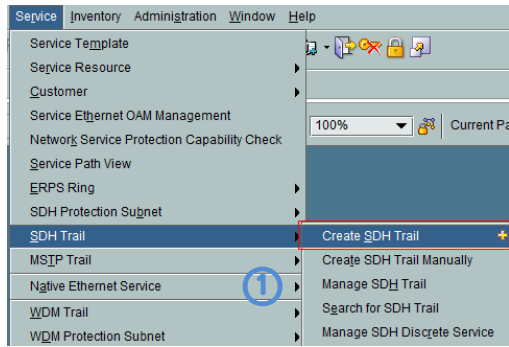
Service Type	Service Source	Timeslot	Service Sink	Timeslot
VC12	7-SL16S-1	VC4-1:1-5	8-SL16S-1	VC4-1:1-5

NE C:

SNCP Protection Group	Working Source	Timeslot	Protection Source	Timeslot	Service Sink	Port
	8-SL16S-1	VC4-1:1-5	7-SL16S-1	VC4-1:1-5	2-SP3D	1-5

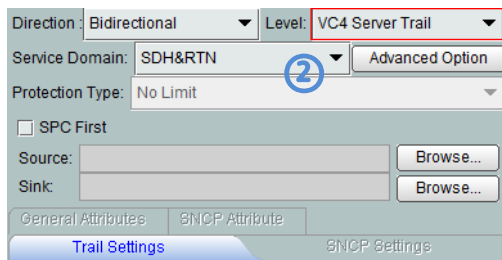
## 1.5.2 Configuration Procedure

Step 1 Choose **Service > SDH Trail > Create SDH Trail** from the Main Menu.



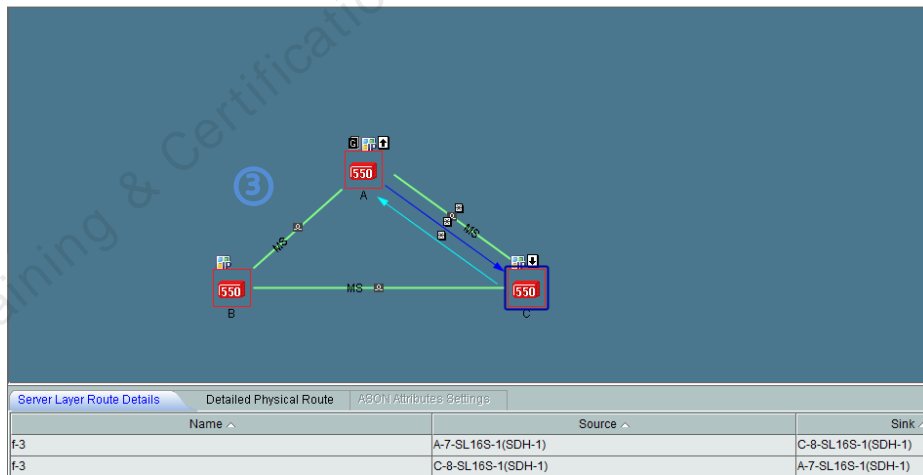
**Step 2** Create a VC4 server trail.

a. Set associated parameters as follows. Set **Level** to **VC4 Server Trail**, and take default values for other parameters.

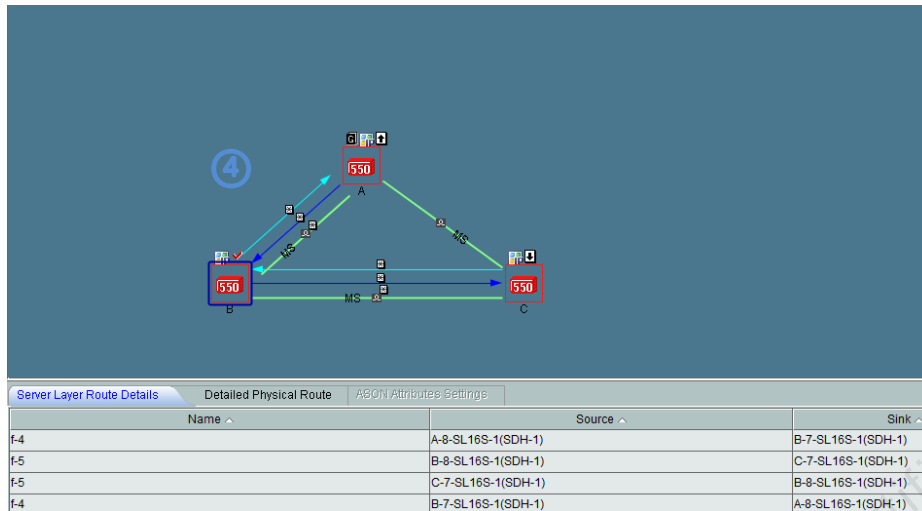


b. Double-click the source NE (NE A) and sink NE (NE C) on the right of the Main Topology, and set up two VC4 server trails, one is from NE A to NE C (working VC4 server trail), and another is NE A to NE C via NE B (protection VC4 server trail).

NE A to NE C:



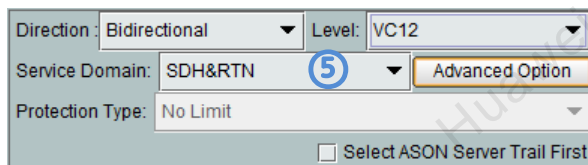
NE A to NE C via NE B:



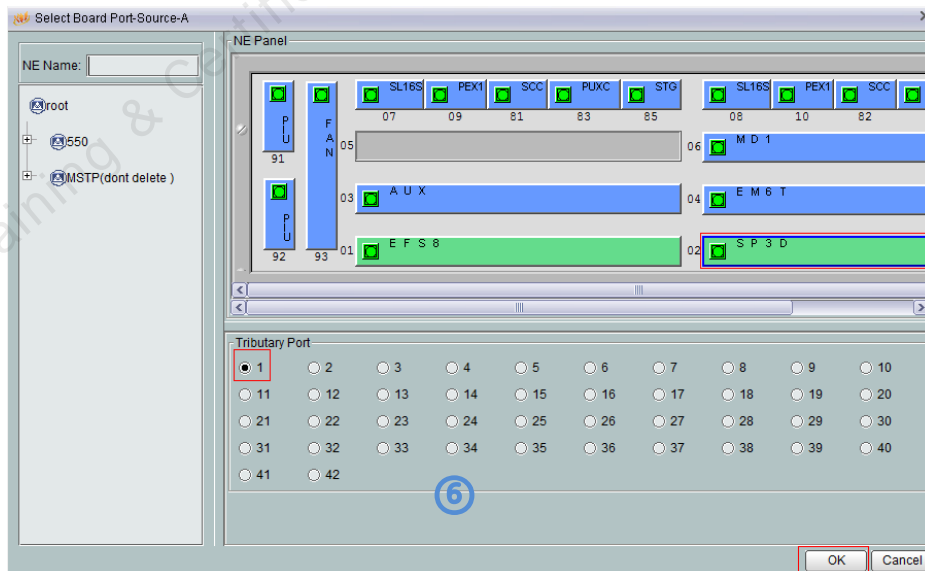
c. **Optional:** In the **Operation Result** dialog box indicating that the operation succeeded, click **Browse Trail** to query the created VC4 server trail.

**Step 3** Create VC12 services.

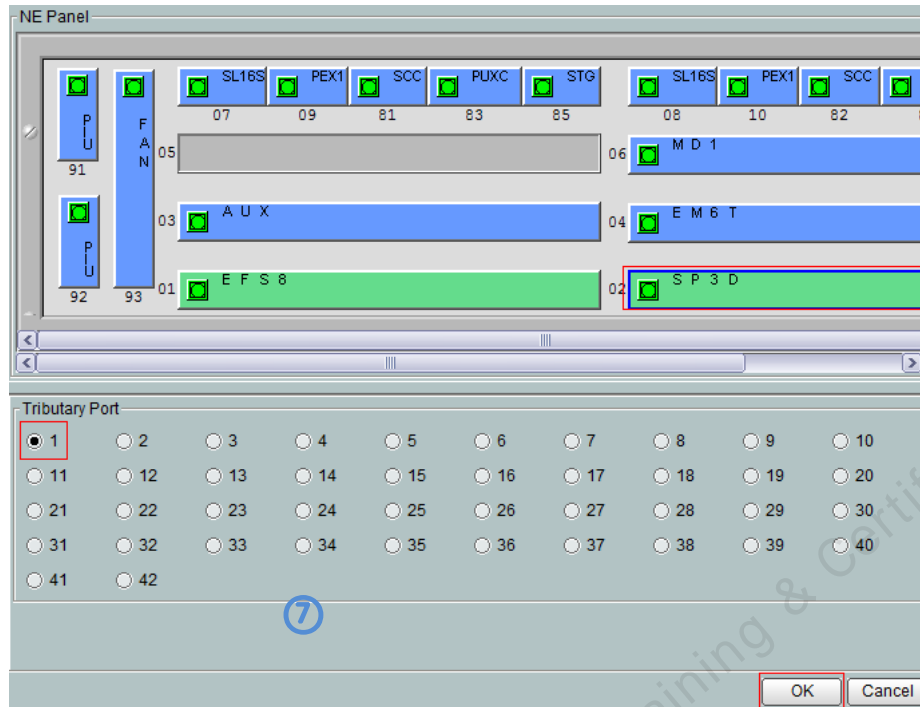
a. In **Create SDH Trail**, set associated parameters as follows. Set **Level** to **VC12**, and take default values for other parameters.



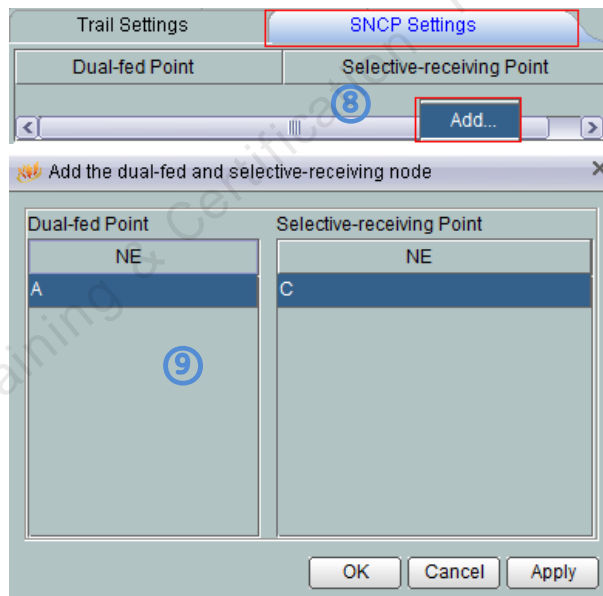
b. Double-click the source NE (NE A) on the right of the Main Topology. The **Select Board Port-Source** dialog box is displayed. Select the required SP3D board and **Tributary Port**, and then click **OK**.



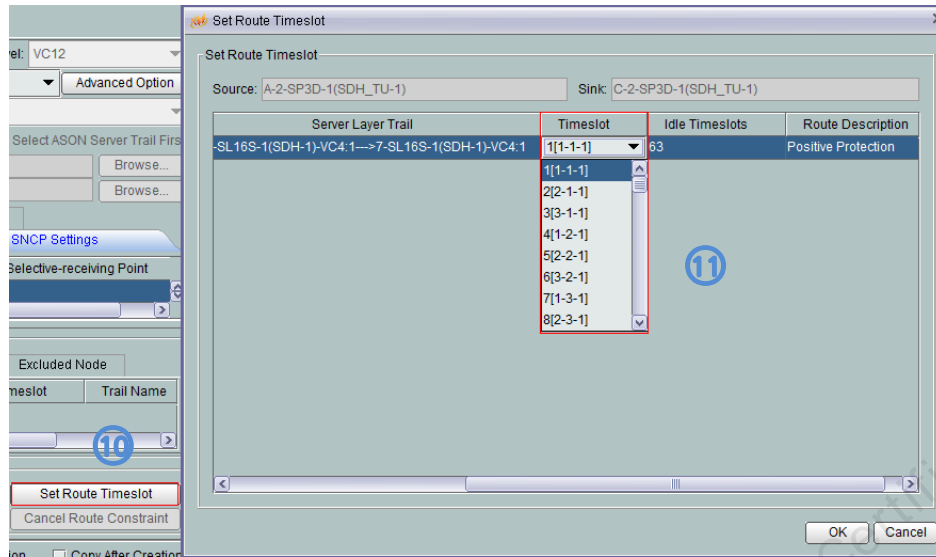
c. Double-click the sink NE (NE C) on the right of the Main Topology, and use the same method to Tributary Port of NE C.



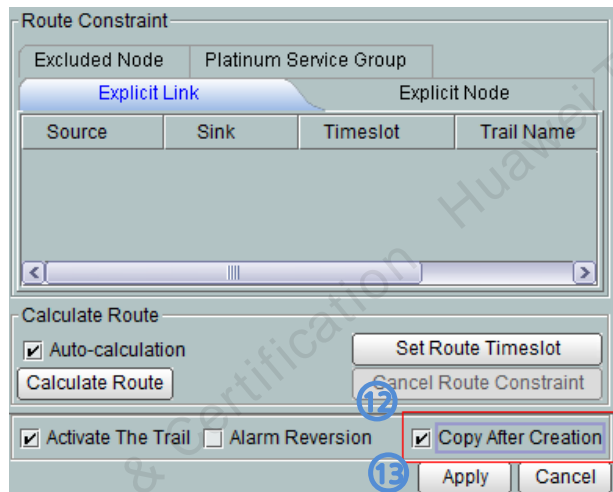
d. In **Create SDH Trail**, click the **SNCP Setting** tab, right-click in the blank pane, and choose **Add** from the shortcut menu. In the **Add the dual-fed and selective receiving node** dialog box that is displayed, select NE A as the dual-fed node and NE C as the selective receiving node, and then click **OK**. In the **Operation Result** dialog box indicating that the operation succeeded, click **Close**.



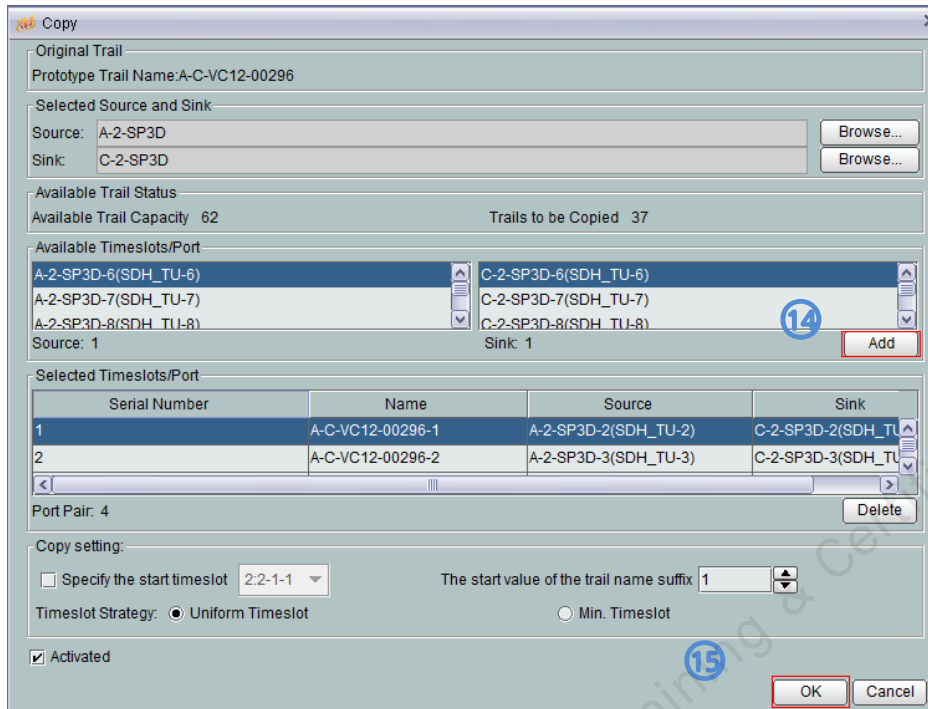
e. **Optional:** In the **Create SDH Trail** window, select **Set Route Timeslot**. In the dialog box that is displayed, you can modify the working server trail of VC12 services.



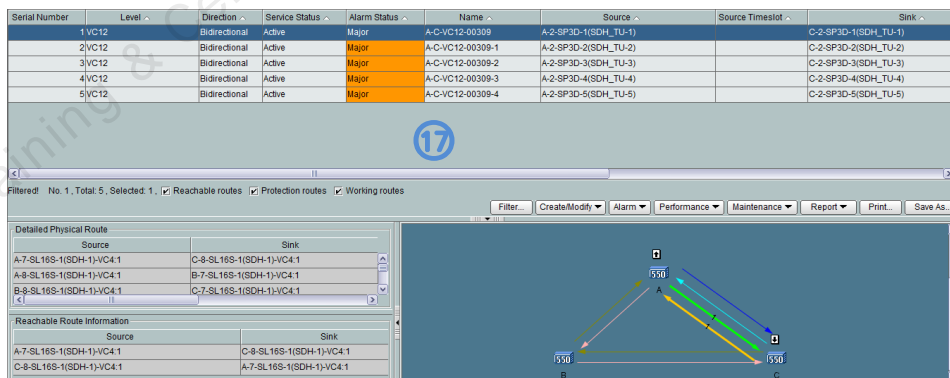
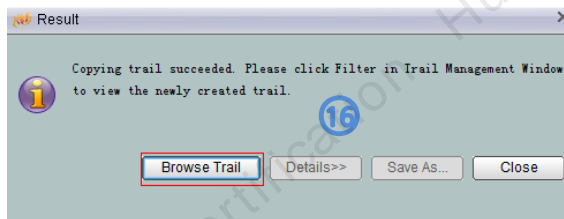
f. Select **Copy after Creation** and click **Apply**. In the **Operation Result** dialog box indicating that the operation succeeded, click **Close**. Then, the **Copy** dialog box is displayed.



g. In **Available Timeslots/Port**, select the ports from A-2-SP3D-2(SDH\_TU-2) to C-2-SP3D-5(SDH\_TU-5), and click **Add**, and then click **OK**.



h. In the **Operation Result** dialog box that is displayed, click **Browse Trail** to query the created VC12 services. (If you close the dialog and want to browse the created VC4 server trails and VC12 services again by choosing **Service > SDH Trail > Manage SDH Trail** from the Main Menu and specifying the filter conditions).



# 1.6 Verifying the Correctness of the SDH Service Configuration

## 1.6.1 PRBS Test

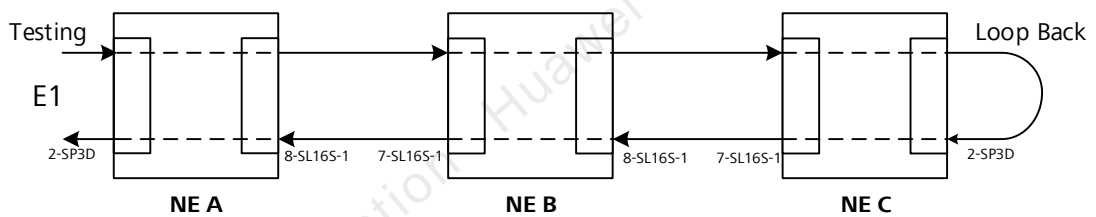
Boards with E1 ports provide the pseudo-random binary sequence (PRBS) functional module, which is used for network self-test and maintenance. You can determine whether the working channel on the UNI/NNI side is normal, depending on whether bit errors are detected in a PRBS test.

The PRBS functional module is equivalent to a simple instrument that transmits and receives unframed services.

Bit errors detected by the PRBS functional module help to diagnose the faults on service paths and locate the faults on fibers or boards. By using the PRBS function, you can analyze the local NE and the entire network. Therefore, you can perform a test without a real instrument during the deployment or fault locating.

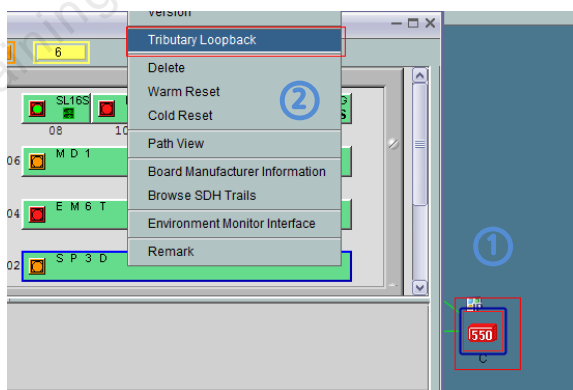
Using the Chapter 1.2 (Configuring Services on the Non-Protection Ring) as an example to show the configuring steps of PRBS.

**Figure 1-7 Signal Flow of PRBS Test**

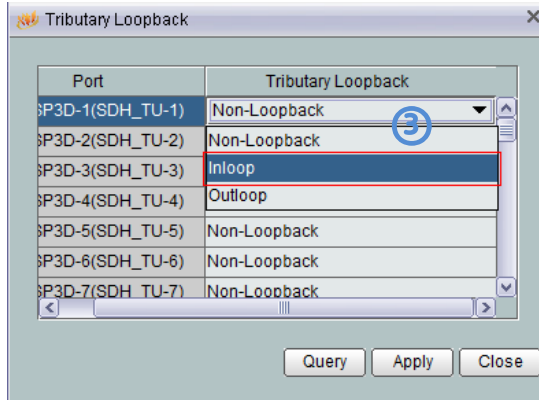


## 1.6.2 Configuration Procedure

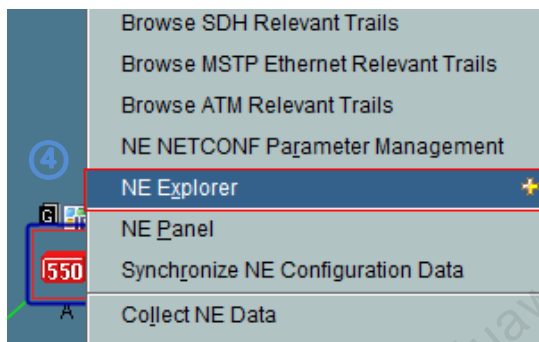
- Step 1 Double-click the sink NE (NE C) icon on the Main Topology to open the **Running Status**. Right-click the SP3D board and select **Tributary Loopback**.



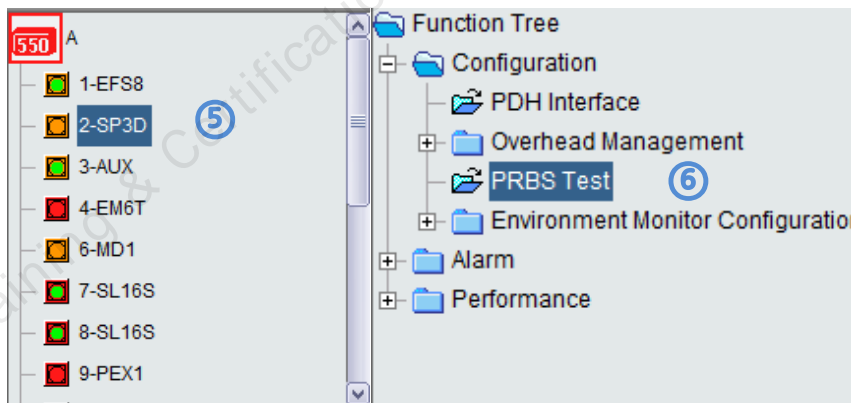
- Step 2 Select **Inloop** and Click **Apply**.



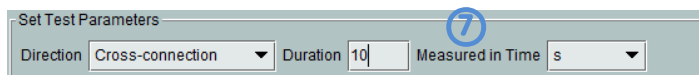
Step 3 Right-click the NE A icon on the Main Topology and choose **NE Explorer** from the shortcut menu.



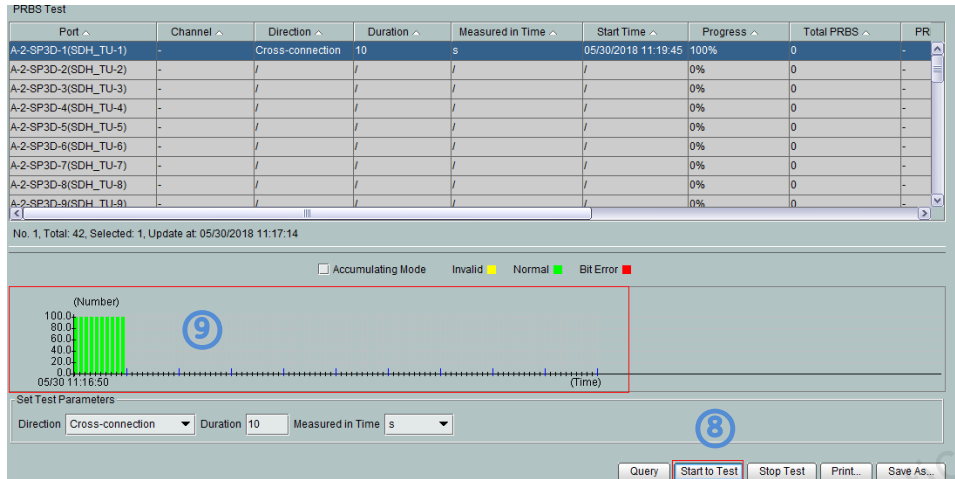
Step 4 Select the SP3D board in the Object Tree and choose **Configuration > PRBS Test** from the Function Tree.



Step 5 Select the A-2-SP3D-1(SDH\_TU-1) port, set the parameters in **Set Test Parameters**.

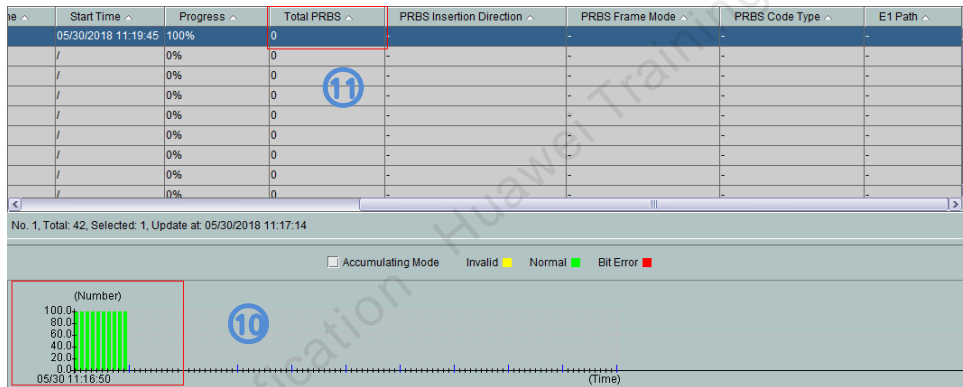


Step 6 Click **Start to Test**. In the **Confirm** dialog box, click **Yes**. When the **Result** dialog box is displayed, click **Close**.

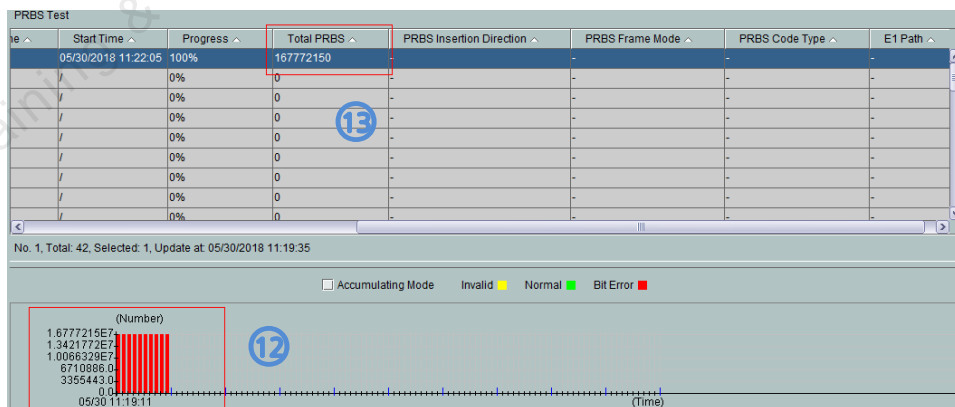


Step 7 When **Progress field** is displayed as **100%**, check the value in **Total PRBS**.

a. If the value is 0, it indicates that no bit error is detected in the test and the tested loop is normal.



b. If the value is not 0, the value indicates the number of bit errors detected in the test. In this case, you need to analyze the causes of bit errors and perform troubleshooting.



# 2 Ethernet Service Configuration

## 2.1 Experiment Introduction

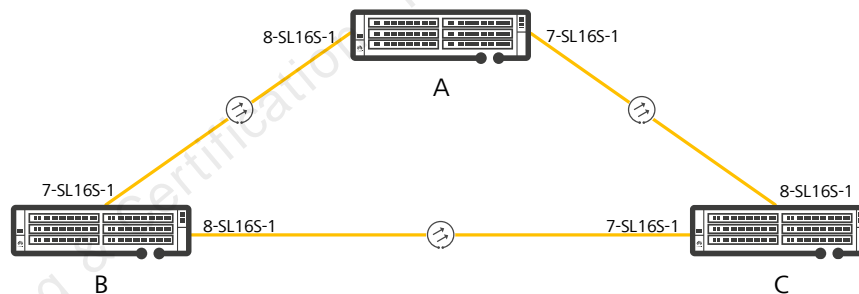
### 2.1.1 Objectives

Upon completion of this task, you will be able to:

- Configuring EPL Services. (End-to-End)
- Configuring EVPL (VCTRUNK-Shared) Services. (Configuration on a Per-NE Basis)
- Configuring EPLAN Services (IEEE 802.1d Bridge). (Configuration on a Per-NE Basis)
- Configuring EVPLAN Services (IEEE 802.1q Bridge). (Configuration on a Per-NE Basis)

### 2.1.2 Networking and Service Description

Figure 2-1 Network Topology



### 2.1.3 Experiment Planning

The ring topology is composed by 3 OSN 550s in this experiment. NE A, NE B and NE C are connected with each other by one pair fibers. All the NEs use EFS8 board as a tributary unit to transmit and receive Ethernet services and use SL16S as a line unit to transmit and receive SDH services.

Table 2-1 NE Information

NE Name	Device Type	Tributary Unit	Line Unit
NE A	OSN 550	1-EFS8	W:8-SL16S-1 E:7-SL16S-1
NE B	OSN 550	1-EFS8	W:8-SL16S-1 E:7-SL16S-1

NE C	OSN 550	1-EFS8	W:8-SL16S-1 E:7-SL16S-1
------	---------	--------	----------------------------

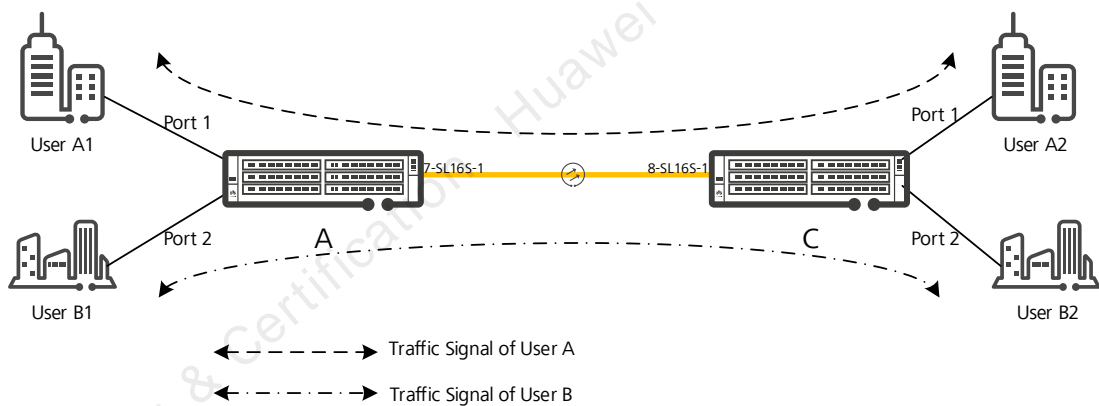
## 2.2 Configuring EPL Service

### 2.2.1 Service Requirement

In the network as shown in Figure 2-2, the service requirements are as follows:

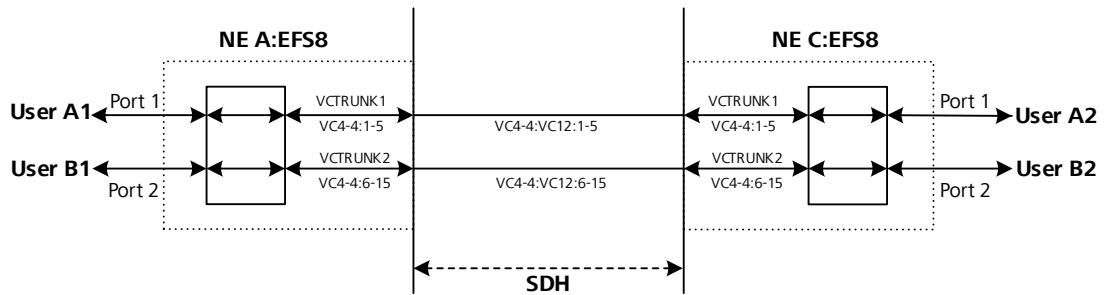
1. The two branches of user A that are located at NE A and NE C need to communicate with each other over Ethernet. User A 10 Mbit/s bandwidth is required.
2. The two branches of user B that are located at NE A and NE C need to communicate with each other over Ethernet. User B 20 Mbit/s bandwidth is required.
3. The services of user A must be isolated from the services of user B.
4. The Ethernet equipment of user A and user B provides 100 Mbit/s Ethernet ports of which the working mode is auto-negotiation, and does not support VLANs.

**Figure 2-2 Networking Diagram for the EPL Services**



### 2.2.2 Signal Flow and Timeslot Allocation

Based on the service requirement, the EPL services of user A occupy the first to fifth VC-12 timeslots of the first VC-4 (VC4-1:VC12:1-5) on the SDH link between NE A and NE C, and are added and dropped by using the first to fifth VC-12 timeslots of the fourth VC-4 (VC4-4:VC12:1-5) on the EFS8 board of NE A and the first to fifth VC-12 timeslots of the fourth VC-4 (VC4-4:VC12:1-5) on the EFS8 board of NE C. The EPL services of user B occupy the sixth to fifteenth VC-12 timeslots of the first VC-4 (VC4-1:VC12:6-15) on the SDH link between NE A and NE C, and are added and dropped by using the sixth to fifteenth VC-12 timeslots of the fourth VC-4 (VC4-4:VC12:6-15) on the EFS8 board of NE A and the sixth to fifteenth VC-12 timeslots of the fourth VC-4 (VC4-4:VC12:6-15) on the EFS8 board of NE C.

**Figure 2-3 Signal Flow of EPL Services**

**Table 2-2 Parameters of External Ports on the Ethernet Boards**

Parameter	NE A		NE C	
Board	EFS8		EFS8	
Port	PORT1	PORT2	PORT1	PORT2
Enabled/Disabled	Enabled	Enabled	Enabled	Enabled
Working Mode	Auto-Negotiation	Auto-Negotiation	Auto-Negotiation	Auto-Negotiation
Maximum Frame Length	1522	1522	1522	1522

**Table 2-3 Parameters of Internal Ports on the Ethernet Boards**

Parameter	NE A		NE C	
Board	EFS8		EFS8	
Internal Port	VCTRUNK1	VCTRUNK2	VCTRUNK1	VCTRUNK2
Mapping Protocol	GFP	GFP	GFP	GFP
Bound Path	VC4-4:VC12:1-5	VC4-4:VC12:6-15	VC4-4:VC12:1-5	VC4-4:VC12:6-15
Entry Detection	Disabled	Disabled	Disabled	Disabled
Port Type	UNI	UNI	UNI	UNI

**Table 2-4 Parameters of the EPL Services**

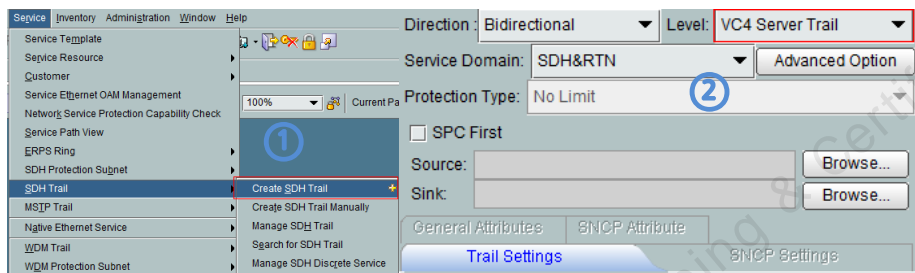
Parameter	EPL Services of User A	EPL Services of User B
Board	EFS8	EFS8
Service Type	EPL	
Service Direction	Bidirectional	
Source Port	PORT1	PORT2
Source C-VLAN	Null	Null

Sink Port	VCTRUNK1	VCTRUNK2
Sink C-VLAN	Null	Null

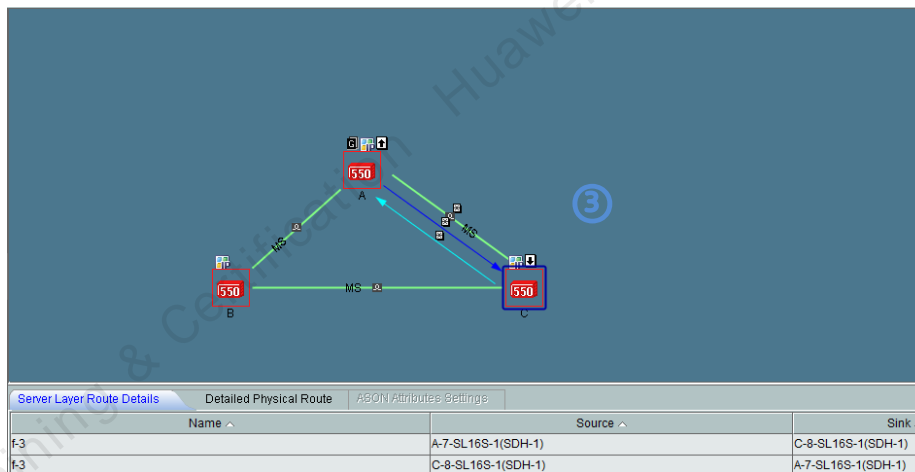
## 2.2.3 Configuration Procedure

### 2.2.3.1 Creating a VC-4 Server Trail between NE A and NE C

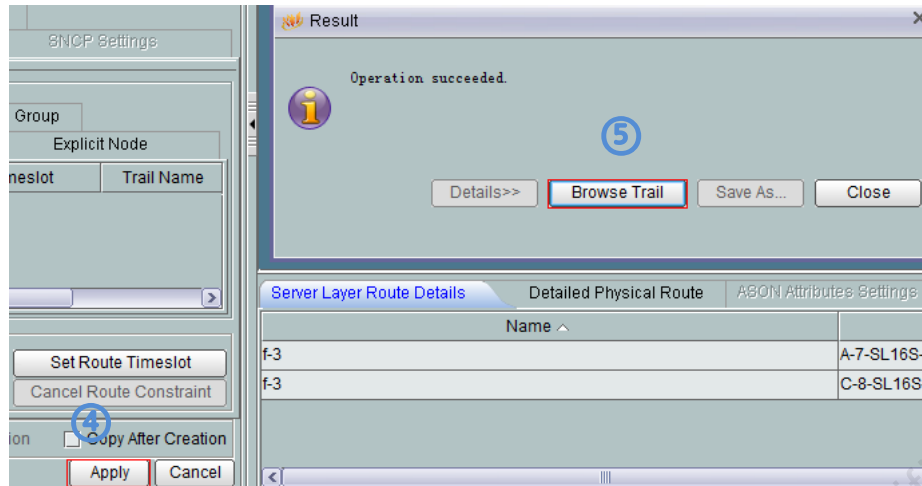
Step 1 Choose **Service > SDH Trail > Create SDH Trail** from the Main Menu and set parameters for the **VC-4 server trail**.



Step 2 Double-click NE A (source) and NE C (sink) on the main topology to configure the source and sink of the VC-4 server trail.



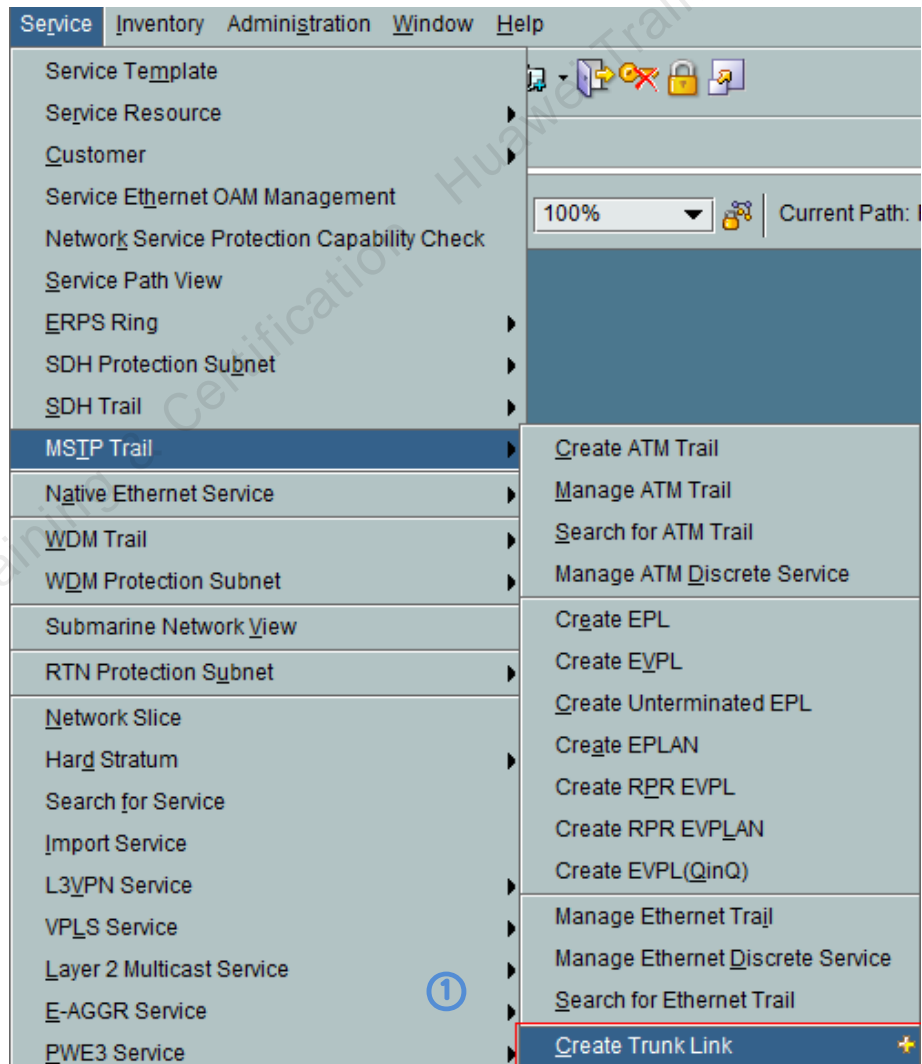
Step 3 Click **Apply**. The **Operation Result** dialog box is displayed indicating that the operation is successful. Click **Close** or **Browse Trail** to query the created VC-4 server trail.



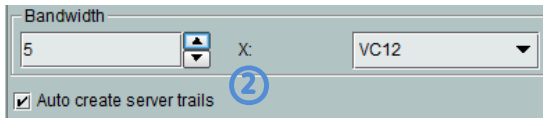
### 2.2.3.2 Configure the EPL Services between User A1 and User A2

Step 1 Create a trunk link

a. Choose **Service > MSTP Trail > Create Trunk Link** from the Main Menu.

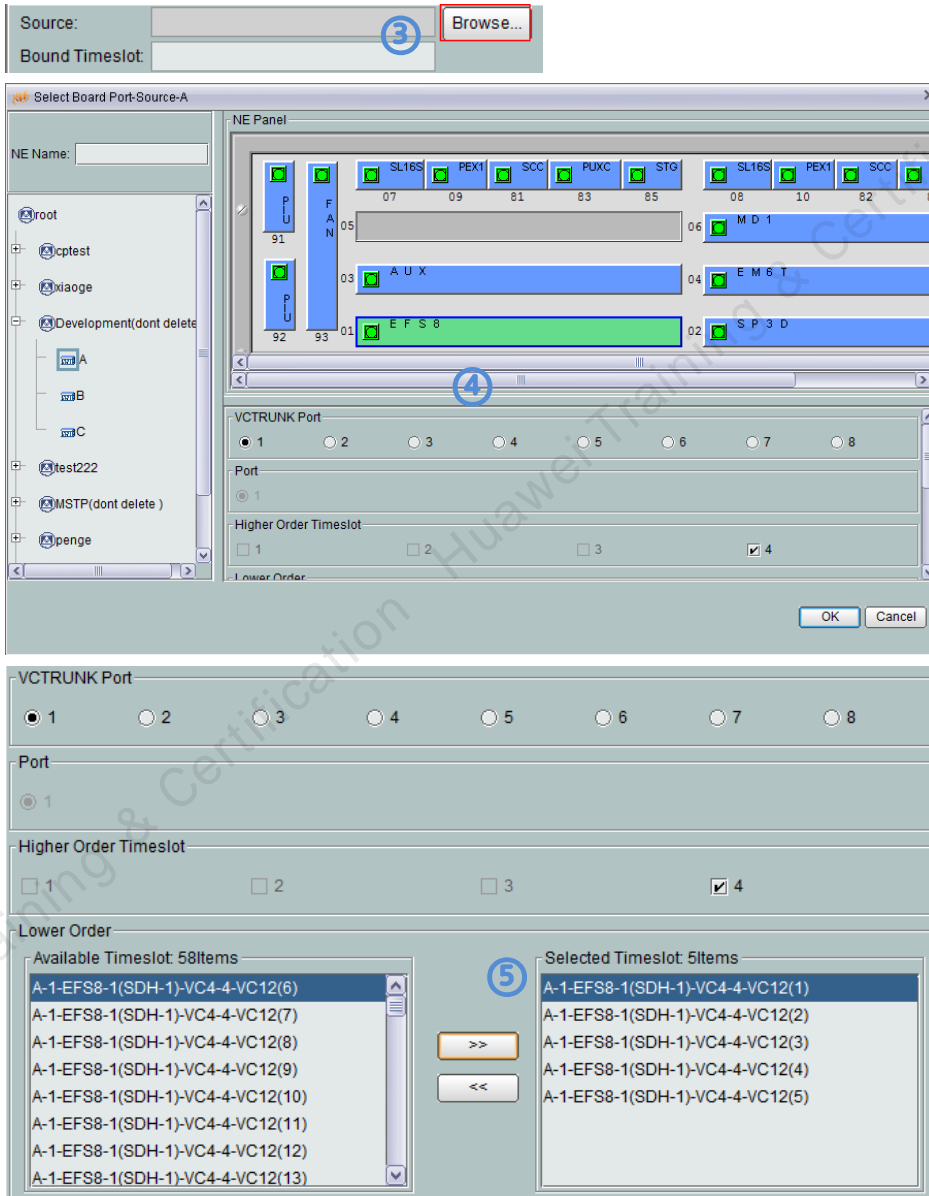


b. Set **Bandwidth** to **5 X: VC12**. Select **Auto Create Server Trails**.



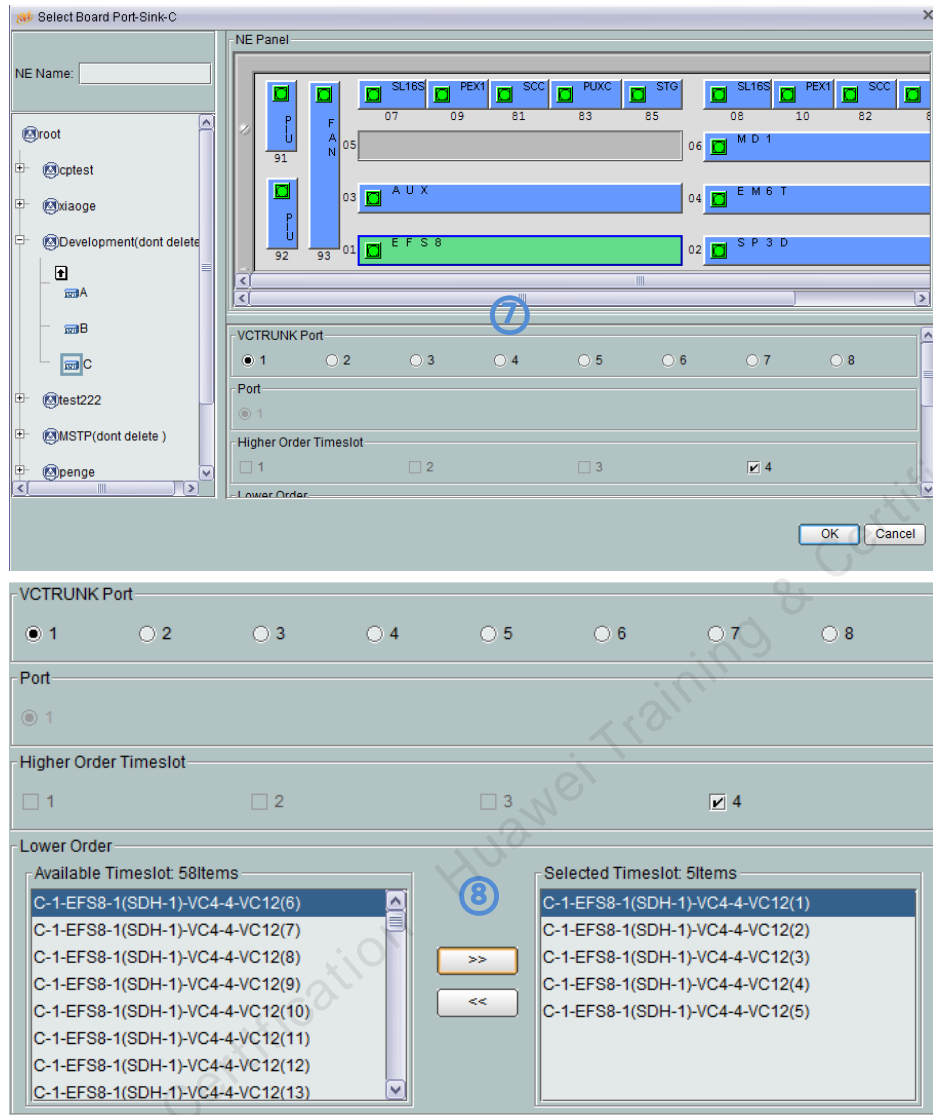
c. Configure bound timeslots for the source NE. Click **Browse**. In the dialog box that is displayed, select NE A and choose **EFS8**, **VCTRUNK Port** to **1**, and **Lower Order** to VC4:4-VC12:1 to VC4:4-VC12:5. Click **OK**.

Source (NE A):

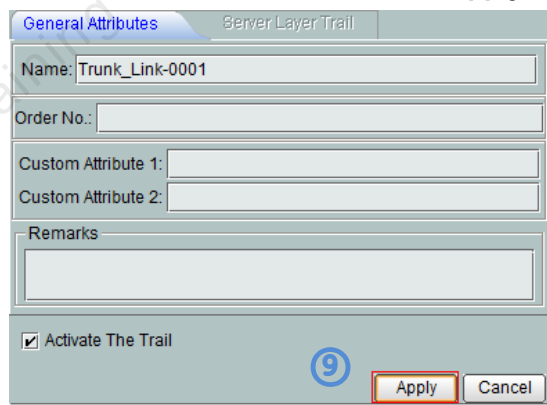


Sink (NE C):



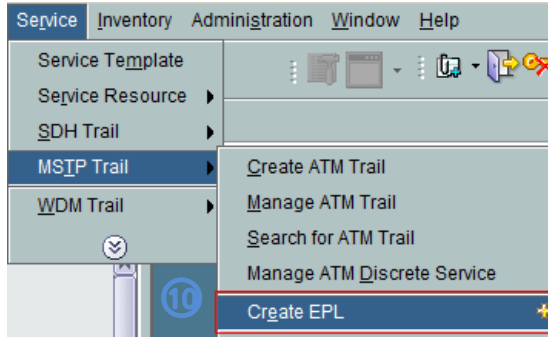


d. Select **Activate the trail** and click **Apply**.

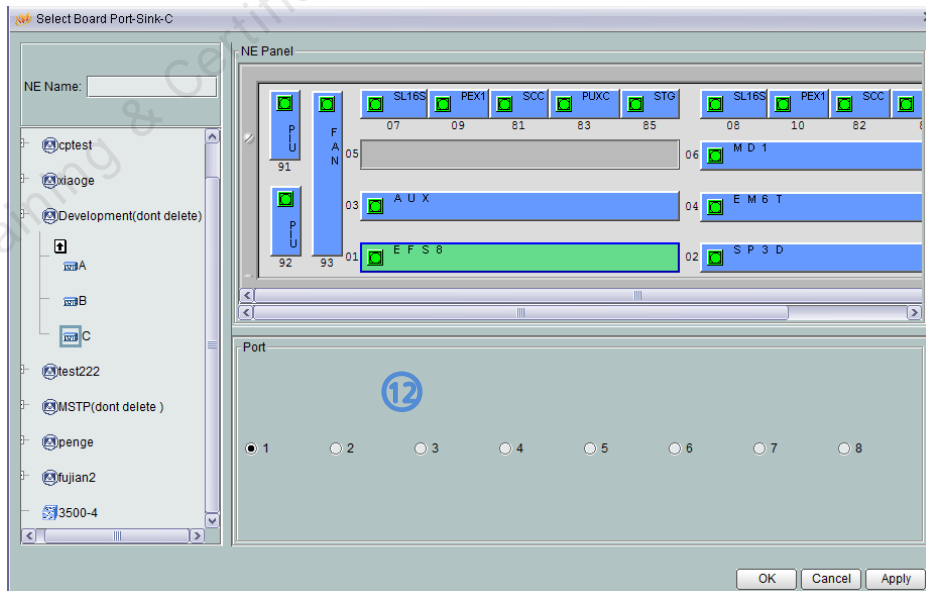
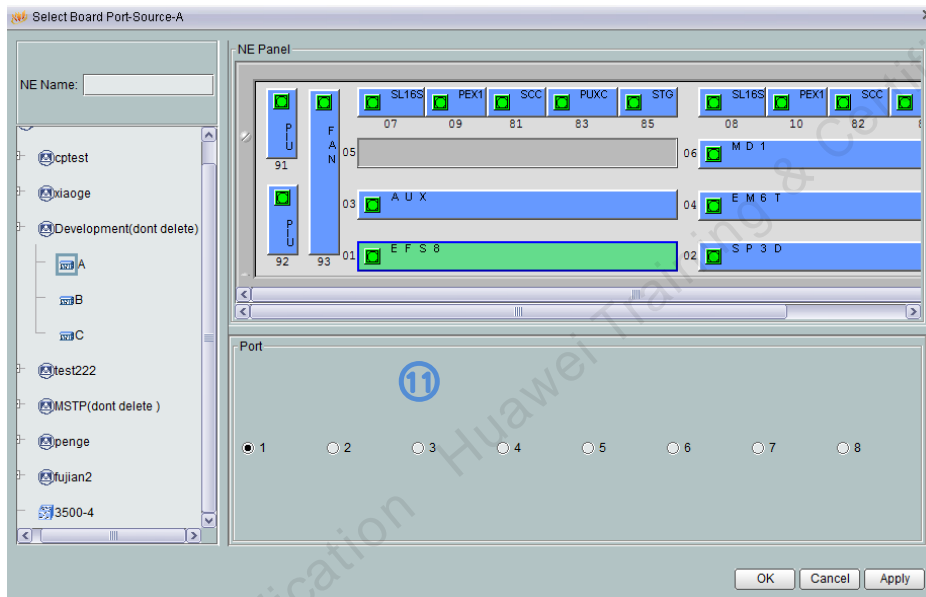


Step 2 Create EPL services.

a. Choose **Service > MSTP Trail > Create EPL** from the Main Menu.

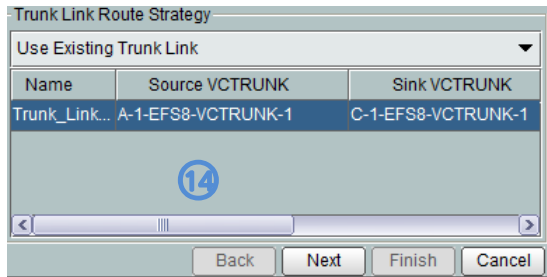


b. Double-click NE A (source) and NE C (sink) on the main topology to configure the source and sink of the EPL services.





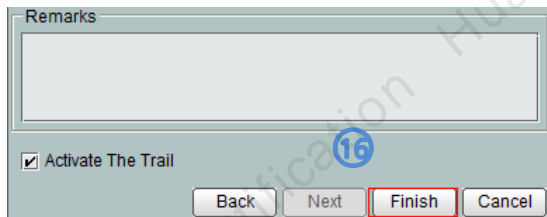
c. Set trunk link routing strategy using the existing trunk link. Click **Next**.



d. In the **Port Attribute Setting** dialog box, set port attributes.

Port	TAG	Default ...	VLAN P...	Port Type	Encaps...	Enabling LCAS	Hold Off Time (ms)	WTR Time (s)	Mapping Protocol	Port Enabled
A-1-EFS8-PORT-1	Tag Aware	-	-	UNI	-	-	-	-	-	Enabled
A-1-EFS8-VCTRUNK-1	Tag Aware	-	-	UNI	-	Disabled	2000	300	GFP	-
C-1-EFS8-PORT-1	Tag Aware	-	-	UNI	-	-	-	-	-	Enabled
C-1-EFS8-VCTRUNK-1	Tag Aware	-	-	UNI	-	Disabled	2000	300	GFP	-

e. Select **Activate the trail** and click **Finish**.



f. Browse the EPL service.

Name	Service Type	Service Type	Direction	Service Status	Alarm Status	Node	Order No.
EPL-0001	Trunk Link	EPL	Bidirectional	Active	Critical	[A-1-EFS8-PORT-1]-[C-1-EFS8-PORT-1]	

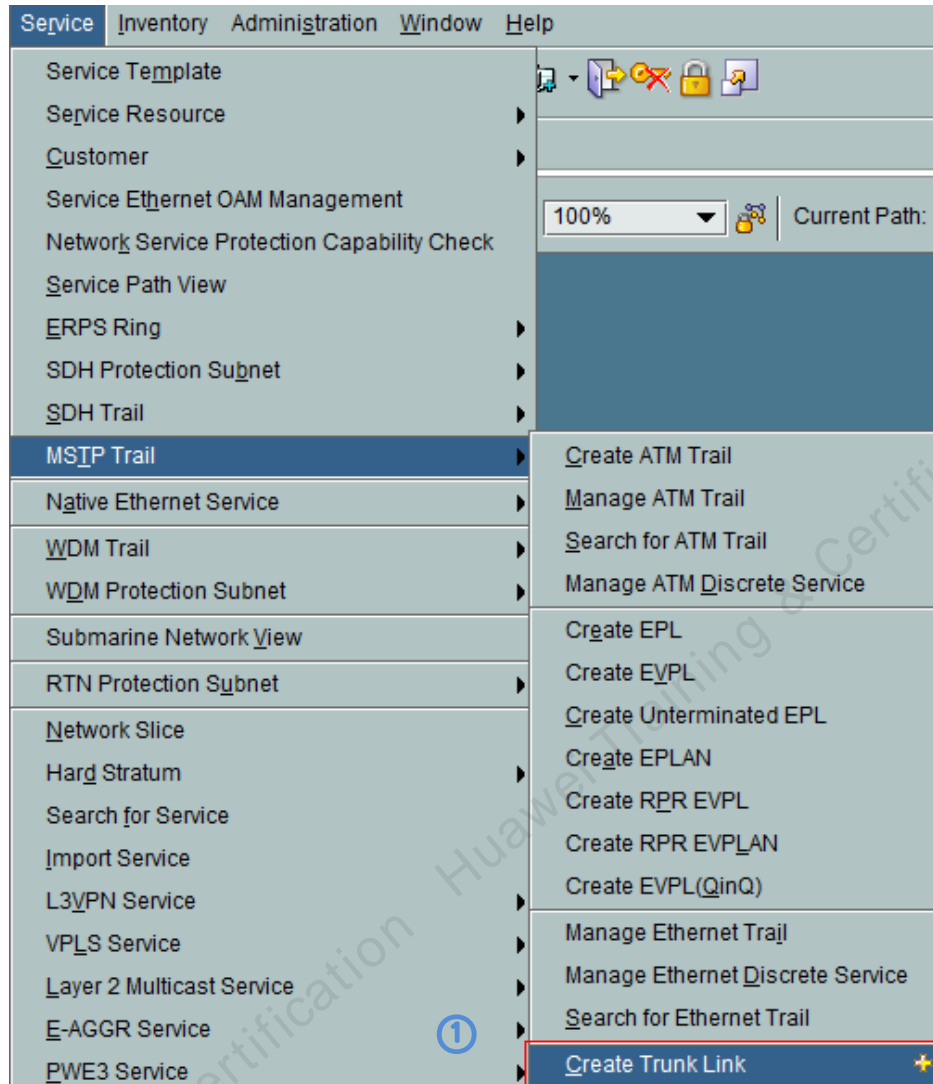
  

Node	Port	VLAN ID	VCTRUNK Port
A-1-EFS8	1		1
C-1-EFS8	1		1

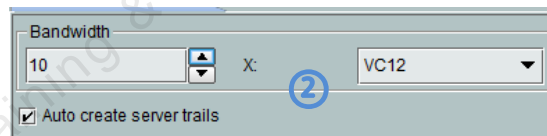
### 2.2.3.3 Configure the EPL Services between User B1 and User B2

Step 1 Create a trunk link

a. Choose **Service > MSTP Trail > Create Trunk Link** from the Main Menu.

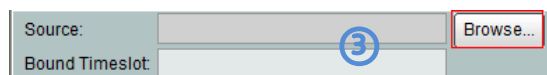


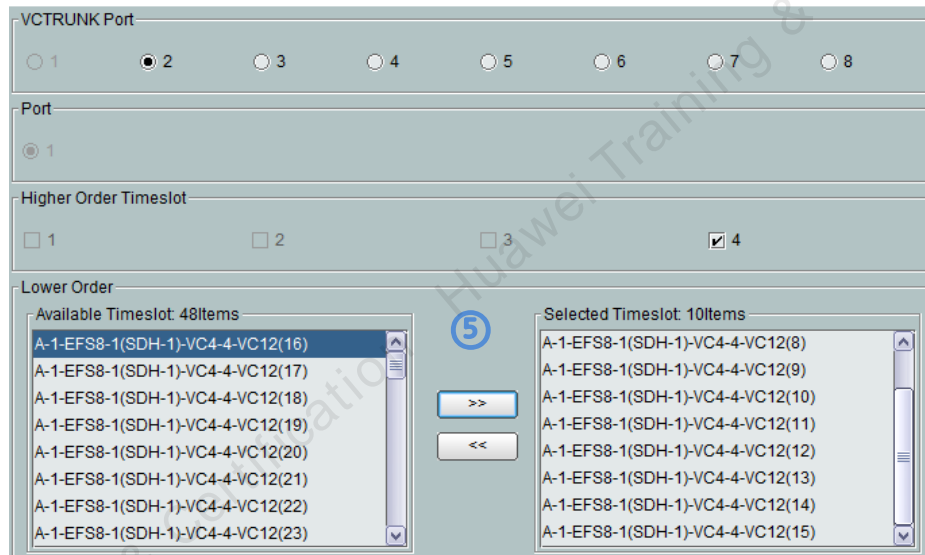
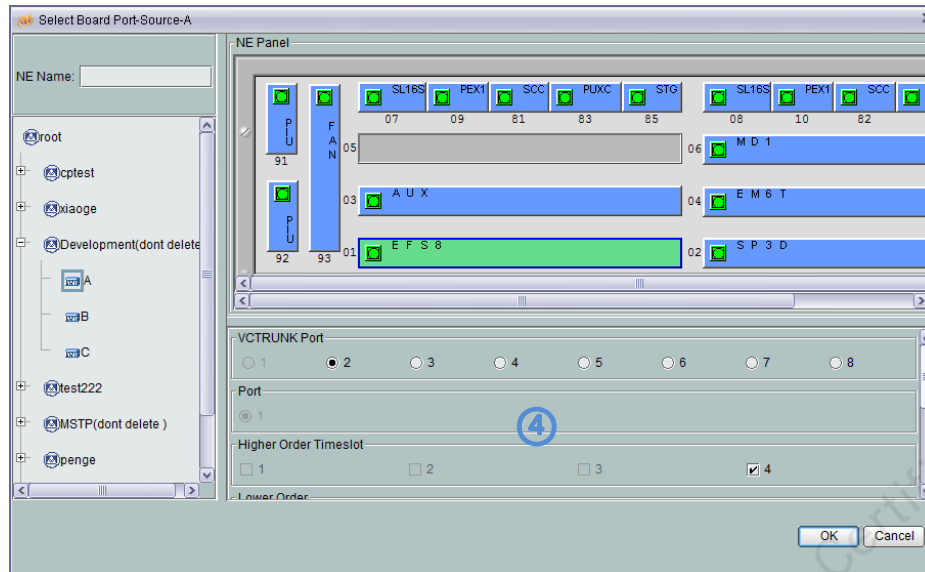
b. Set **Bandwidth** to **10 X: VC12**. Select **Auto Create Server Trails**.



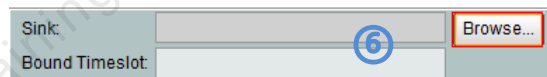
c. Configure bound timeslots for the source NE. Click **Browse**. In the dialog box that is displayed, select NE A and choose EFS8, **VCTRUNK Port** to **2**, and **Lower Order** to VC4:4-VC12:6 to VC4:4-VC12:15. Click **OK**.

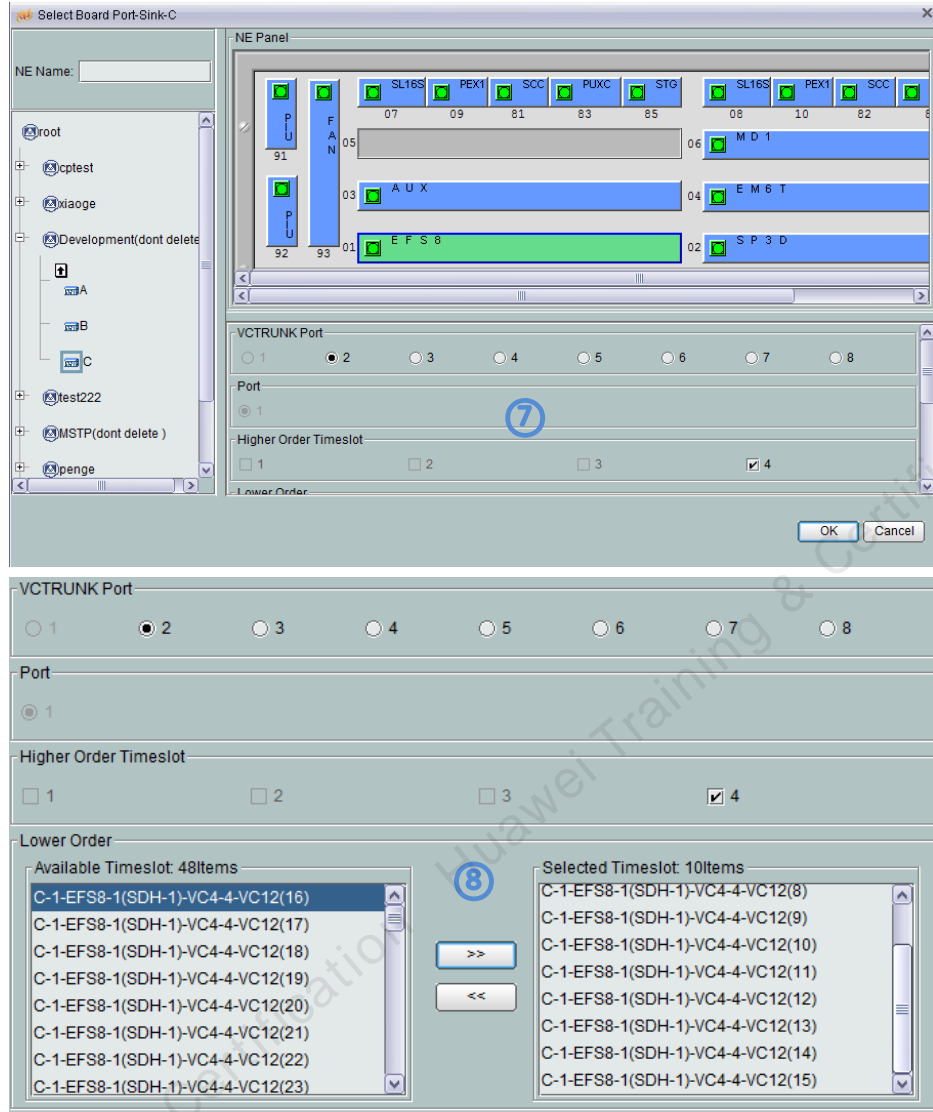
Source (NE A):



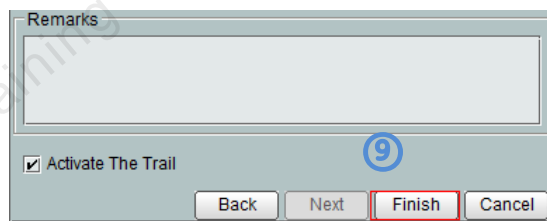


Source (NE C):



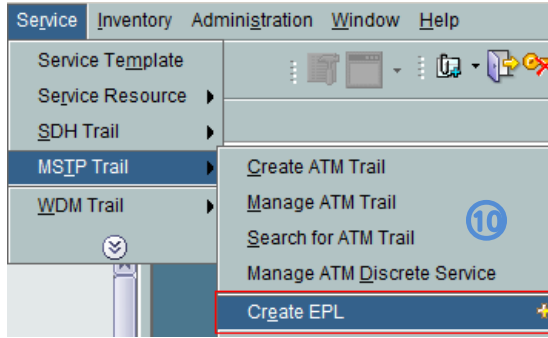


d. Select **Activate the trail** and click **Apply**.

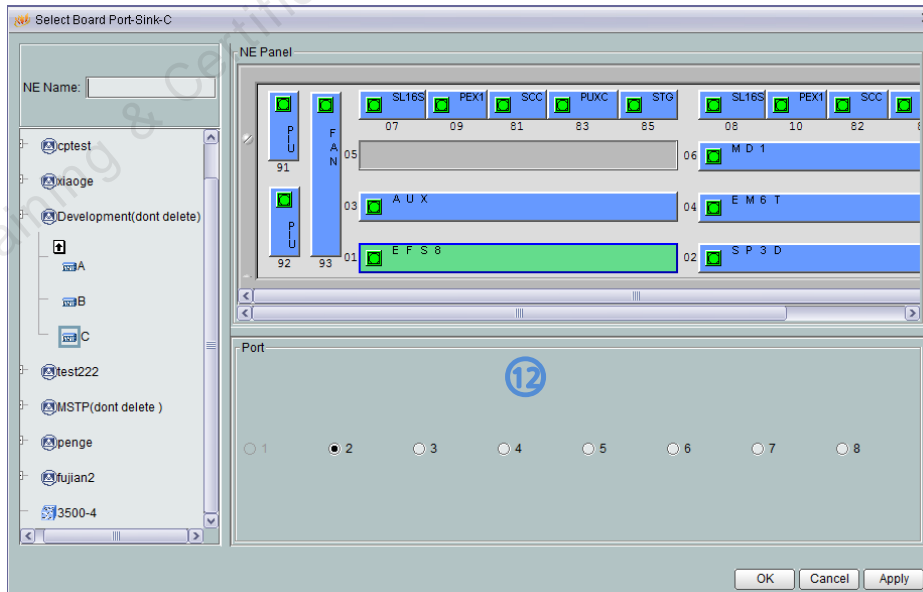
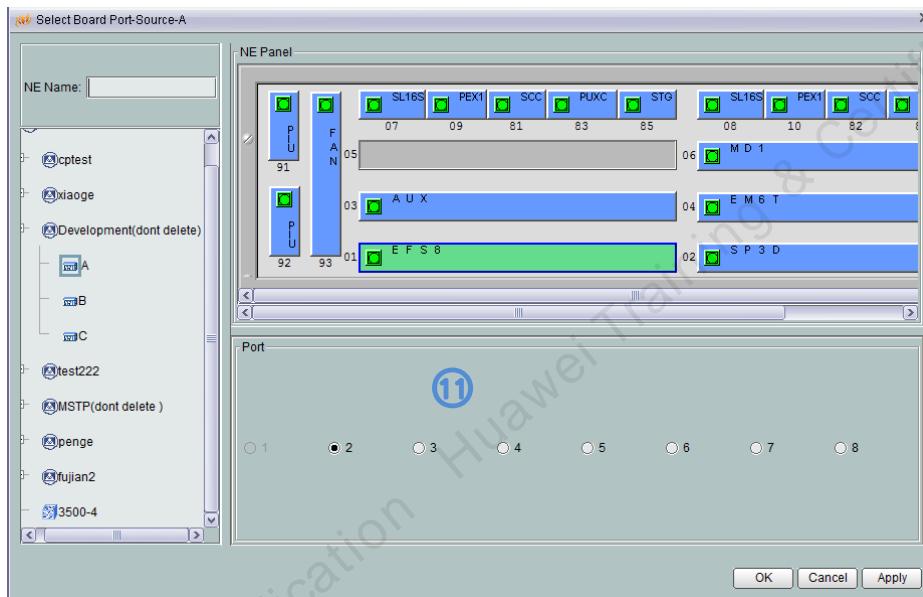


Step 2 Create EPL services.

a. Choose **Service > MSTP Trail > Create EPL** from the Main Menu.



b. Double-click NE A (source) and NE C (sink) on the main topology to configure the source and sink of the EPL services.



c. Set trunk link routing strategy using the existing trunk link. Click **Next**.

Name	Source VCTRUNK	Sink VCTRUNK
Trunk_Link...	A-1-EFS8-VCTRUNK-2	C-1-EFS8-VCTRUNK-2

d. In the **Port Attribute Setting** dialog box, set port attributes.

Port	TAG	Default	VLAN P.	Port Type	Encaps.	Enabling LCAS	Hold Off Time (ms)	WTR Time (s)	Mapping Protocol	Port Enabled	Working Mo
A-1-EFS8-PORT-2	Tag Aware	-	-	UNI	-	-	-	-	-	Enabled	Auto-Negotat
A-1-EFS8-VCTRUNK-2	Tag Aware	-	-	UNI	-	Disabled	2000	300	GFP	-	-
C-1-EFS8-PORT-2	Tag Aware	-	-	UNI	-	-	-	-	-	Enabled	Auto-Negotat
C-1-EFS8-VCTRUNK-2	Tag Aware	-	-	UNI	-	Disabled	2000	300	GFP	-	-

e. Select **Activate the trail** and click **Finish**.

f. Browse the EPL service.

Name	Server Type	Service Type	Direction	Service Status	Alarm Status	Node	Order No.
EPL-0001	Trunk Link	EPL	Bidirectional	Active	No Alarm	[A-1-EFS8-PORT-2]--[C-1-EFS8-PORT-2]	

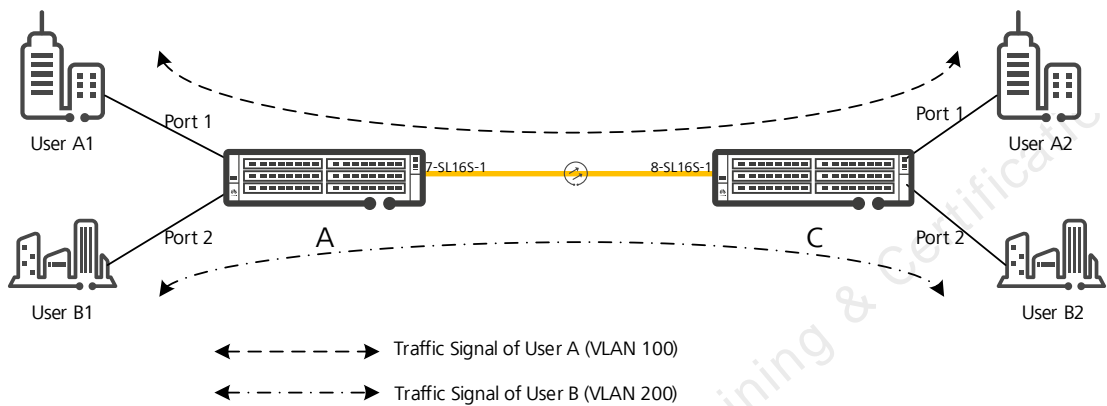
## 2.3 Configuring EVPL (VCTRUNK-Shared) Services

### 2.3.1 Service Requirement

In the network as shown in Figure 2-4, the service requirements are as follows:

1. Two branches of user A are located at NE A and NE C, and need to communicate with each other.
2. Two branches of user B are located at NE A and NE C, and need to communicate with each other.
3. The services of user A need to be isolated from the services of user B. The traffic of user A and user B, however, are complementary in terms of time and can share a 20 Mbit/s bandwidth.
4. The Ethernet equipment of user A and user B provides 100 Mbit/s Ethernet ports of which the working mode is auto-negotiation, and does not support VLAN tags.

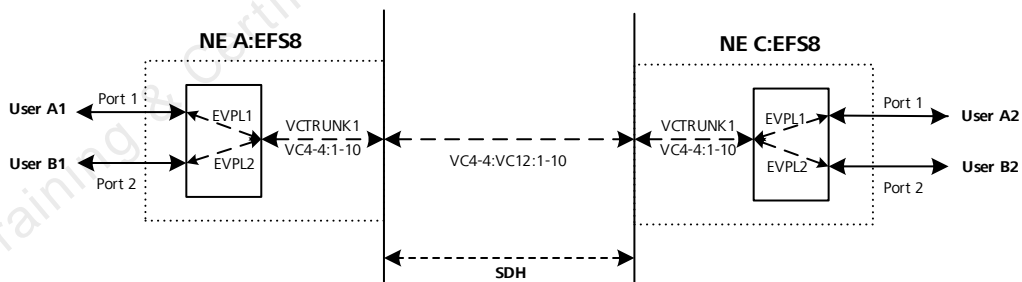
**Figure 2-4 Networking Diagram for EVPL Services**



### 2.3.2 Signal Flow and Timeslot Allocation

The EVPL services of user A and user B that share VCTRUNK1 occupy the first to tenth VC-12 timeslots of the fourth VC-4 (VC4-4:VC12:1-10) on the SDH link from NE A to NE C. The services are added and dropped by using the first to tenth VC-12 timeslots of the fourth VC-4 (VC4-4:VC12:1-10) on the EFS8 board of NE A and the first to tenth VC-12 timeslots of the fourth VC-4 (VC4-4:VC12:1-10) on the EFS8 board of NE C.

**Figure 2-5 Signal Flow**



**Table 2-5 Parameters of External Ports on the Ethernet Boards**

Parameter	NE A		NE C	
	PORT1	PORT2	PORT1	PORT2
Board	EFS4		EFS4	
Enabled/Disabled	Enabled	Enabled	Enabled	Enabled
Working Mode	Auto-Negotiation	Auto-Negotiation	Auto-Negotiation	Auto-Negotiation

Maximum Frame Length	1522	1522	1522	1522
TAG	Access	Access	Access	Access
Entry Detection	Enabled	Enabled	Enabled	Enabled
Default VLAN ID	100	200	100	200
VLAN Priority	0	0	0	0

**Table 2-6 Parameters of Internal Ports on the Ethernet Boards**

Parameter	NE A	NE C
Board	EFS8	EFS8
Port	VCTRUNK1	VCTRUNK1
Mapping Protocol	GFP	GFP
TAG	Tag Aware	Tag Aware
Entry Detection	Enabled	Enabled
Bound Path	VC4-4:VC12:1-10	VC4-4:VC12:1-10
Port Type	UNI	UNI

**Table 2-7 Parameters of the VCTRUNK-shared EVPL (VLAN) Services**

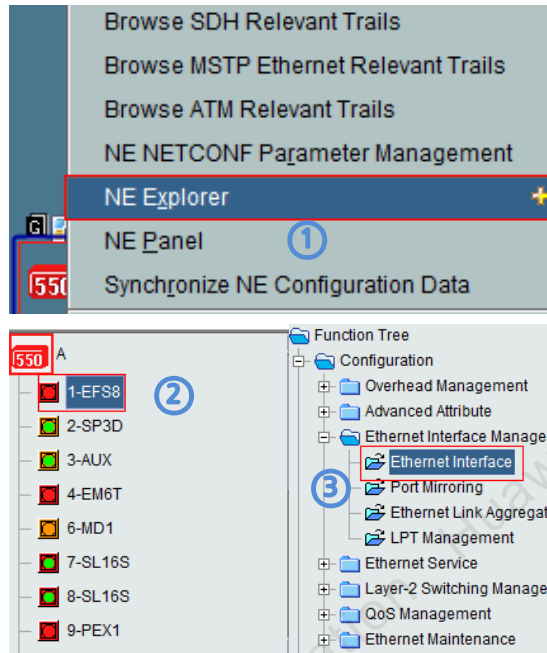
Parameter	NE A		NE C	
	EVPL1 PORT1↔VCTRUNK1	EVPL2 PORT2↔VCTRUNK1	EVPL1 PORT1↔VCTRUNK1	EVPL2 PORT2↔VCTRUNK1
Board	EFS8		EFS8	
Service Type	EVPL		EVPL	
Service Direction	Bidirectional		Bidirectional	
Source Port	PORT1	PORT2	PORT1	PORT2
Source C-VLAN	100	200	100	200
Sink Port	VCTRUNK1	VCTRUNK1	VCTRUNK1	VCTRUNK1
Sink C-VLAN	100	200	100	200

## 2.3.3 Configuration Procedure

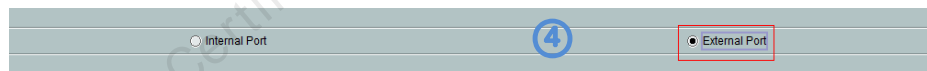
### 2.3.3.1 Configure the EVPL Services for users A1 and B1 on NE A.

Step 1 Set the attributes of the external ports (PORT1 and PORT2 of the EFS8 board) used by the service of user A1 and user B1.

a. In the **NE Explorer**, select the EFS8 board, and then choose **Configuration > Ethernet Interface Management > Ethernet Interface** from the Function Tree.



b. Select **External Port**.



c. Click the **Basic Attributes** tab. After setting the parameters based on **Table 2-5**, click **Apply**.

Basic Attributes									
Basic Attributes		Flow Control	TAG Attributes	Network Attributes	Advanced Attributes	Port Physical Parameters		MAC Loopback	PHY Loopback
Port	Name	Enabled/Disabled	Working Mode	Maximum Frame Length ...					
A-1-EFS8-PO...	PORT-1	Enabled	Auto-Negotiation	1522				Non-Loopback	Non-Loopback
A-1-EFS8-PO...	PORT-2	Enabled	Auto-Negotiation	1522				Non-Loopback	Non-Loopback
A-1-EFS8-PO...	PORT-3	Disabled	Auto-Negotiation	1522				Non-Loopback	Non-Loopback
A-1-EFS8-PO...	PORT-4	Disabled	Auto-Negotiation	1522				Non-Loopback	Non-Loopback
A-1-EFS8-PO...	PORT-5	Disabled	Auto-Negotiation	1522				Non-Loopback	Non-Loopback
A-1-EFS8-PO...	PORT-6	Disabled	Auto-Negotiation	1522				Non-Loopback	Non-Loopback
A-1-EFS8-PO...	PORT-7	Disabled	Auto-Negotiation	1522				Non-Loopback	Non-Loopback
A-1-EFS8-PO...	PORT-8	Disabled	Auto-Negotiation	1522				Non-Loopback	Non-Loopback

d. Click the **Flow Control** tab. The parameters in the **Flow Control** tab page adopt the default values.

Basic Attributes					
Basic Attributes		Flow Control	TAG Attributes	Network Attributes	Advanced Attributes
Port	Non-Autonegotiation Flow Control Mode				Autonegotiation Flow Control Mode
A-1-EFS8-PORT1					Disabled
A-1-EFS8-PORT2					Disabled
A-1-EFS8-PORT3					Disabled
A-1-EFS8-PORT4					Disabled
A-1-EFS8-PORT5					Disabled
A-1-EFS8-PORT6					Disabled
A-1-EFS8-PORT7					Disabled
A-1-EFS8-PORT8					Disabled

e. Click the **TAG Attributes** tab. Set the parameters based on **Table 2-5**, and click **Apply**.

Port	TAG	Default VLAN ID	VLAN Priority	Entry Detection
A-1-EFS8-PORT1	Access	100	0	Enabled
A-1-EFS8-PORT2	Access	200	0	Enabled
A-1-EFS8-PORT3	Tag Aware	-	-	Enabled
A-1-EFS8-PORT4	Tag Aware	-	-	Enabled
A-1-EFS8-PORT5	Tag Aware	-	-	Enabled
A-1-EFS8-PORT6	Tag Aware	-	-	Enabled
A-1-EFS8-PORT7	Tag Aware	-	-	Enabled
A-1-EFS8-PORT8	Tag Aware	-	-	Enabled

f. Click the **Advanced Attributes** tab. The parameters in the **Advanced Attributes** tab page adopt the default values.

Port	Broadcast Packet Suppression	Broadcast Packet Suppressio...	Traffic Threshold (...)	Port Traffi...	Loop Detection	Loop Port Shutdown
A-1-EFS8-PORT1	Disabled	30%	100	0	Disabled	Enabled
A-1-EFS8-PORT2	Disabled	30%	100	0	Disabled	Enabled
A-1-EFS8-PORT3	Disabled	30%	100	0	Disabled	Enabled
A-1-EFS8-PORT4	Disabled	30%	100	0	Disabled	Enabled
A-1-EFS8-PORT5	Disabled	30%	100	0	Disabled	Enabled
A-1-EFS8-PORT6	Disabled	30%	100	0	Disabled	Enabled
A-1-EFS8-PORT7	Disabled	30%	100	0	Disabled	Enabled
A-1-EFS8-PORT8	Disabled	30%	100	0	Disabled	Enabled

Step 2 Set the attributes of the internal port (VCTRUNK1 on the EFS8 board) used by the services between user A1 and user A2 and between B1 and user B2.

a. Select **Internal Port**.

Internal Port  External Port

b. Click the **TAG Attributes** tab. Set the parameters based on **Table 2-6**, click **Apply**.

Port	Name	TAG	Default VLAN ID	VLAN Priority	Entry Detection
A-1-EFS8-VCTRUNK1	VCTRUNK-1	Tag Aware	-	-	Enabled
A-1-EFS8-VCTRUNK2	VCTRUNK-2	Tag Aware	-	-	Enabled
A-1-EFS8-VCTRUNK3	VCTRUNK-3	Tag Aware	-	-	Enabled
A-1-EFS8-VCTRUNK4	VCTRUNK-4	Tag Aware	-	-	Enabled
A-1-EFS8-VCTRUNK5	VCTRUNK-5	Tag Aware	-	-	Enabled
A-1-EFS8-VCTRUNK6	VCTRUNK-6	Tag Aware	-	-	Enabled
A-1-EFS8-VCTRUNK7	VCTRUNK-7	Tag Aware	-	-	Enabled
A-1-EFS8-VCTRUNK8	VCTRUNK-8	Tag Aware	-	-	Enabled

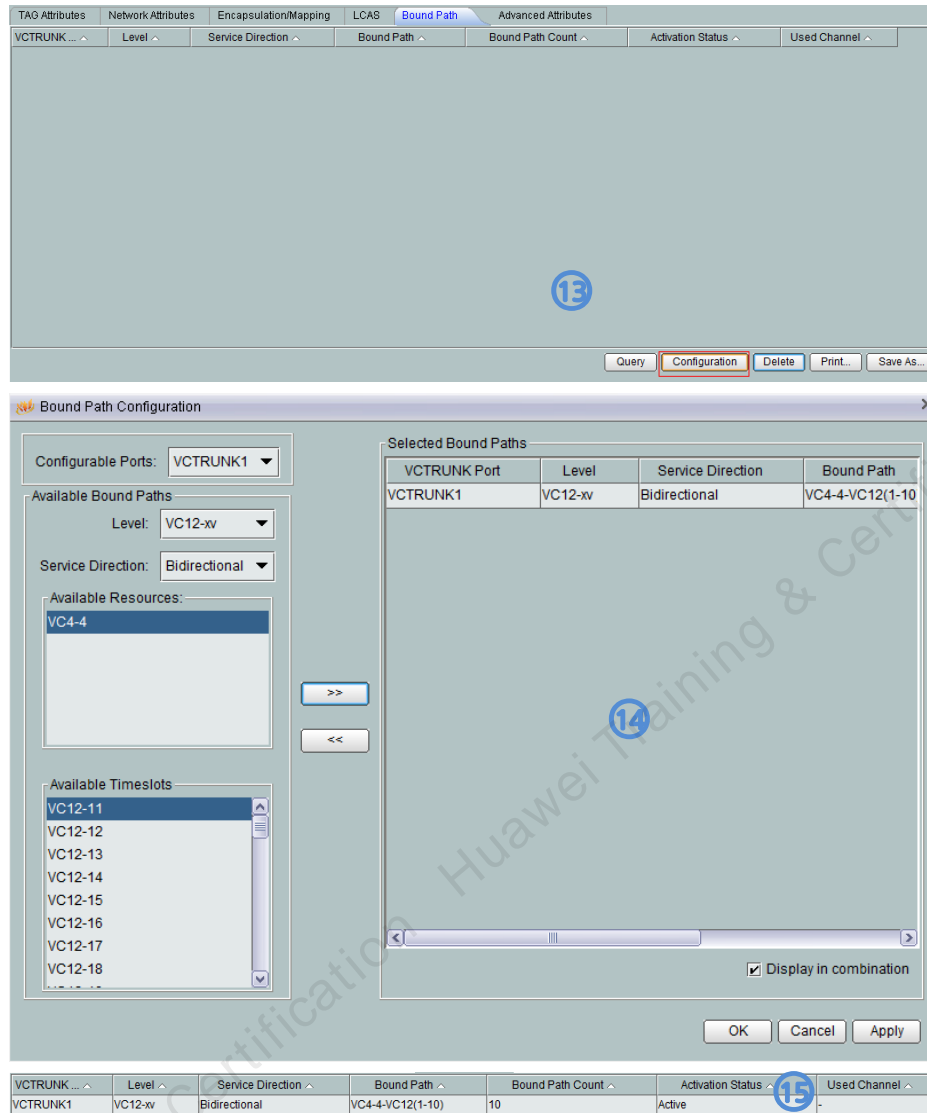
c. Click the **Network Attributes** tab. Set the parameters based on **Table 2-6**, click **Apply**.

Port	Port Attributes
A-1-EFS8-VCTRUNK1	UNI
A-1-EFS8-VCTRUNK2	UNI
A-1-EFS8-VCTRUNK3	UNI
A-1-EFS8-VCTRUNK4	UNI
A-1-EFS8-VCTRUNK5	UNI
A-1-EFS8-VCTRUNK6	UNI
A-1-EFS8-VCTRUNK7	UNI
A-1-EFS8-VCTRUNK8	UNI

d. Click the **Encapsulation/Mapping** tab. After setting the parameters, click **Apply**.

Port	Mapping Protocol	Scramble	Set Inverse Value for CRC	Check Field Length	FCS Calculated Bit Sequence
A-1-EFS8-VCTRUNK1	GFP	Scrambling mode{K43+1}	-	FCS32	Big endian
A-1-EFS8-VCTRUNK2	GFP	Scrambling mode{K43+1}	-	FCS32	Big endian
A-1-EFS8-VCTRUNK3	GFP	Scrambling mode{K43+1}	-	FCS32	Big endian
A-1-EFS8-VCTRUNK4	GFP	Scrambling mode{K43+1}	-	FCS32	Big endian
A-1-EFS8-VCTRUNK5	GFP	Scrambling mode{K43+1}	-	FCS32	Big endian
A-1-EFS8-VCTRUNK6	GFP	Scrambling mode{K43+1}	-	FCS32	Big endian
A-1-EFS8-VCTRUNK7	GFP	Scrambling mode{K43+1}	-	FCS32	Big endian
A-1-EFS8-VCTRUNK8	GFP	Scrambling mode{K43+1}	-	FCS32	Big endian

e. Click the **Bound Path** tab. Click the **Configuration** button. Set the parameters based on **Table 2-6** in the **Bound Path Configuration** dialog box. Then, click **Apply**.

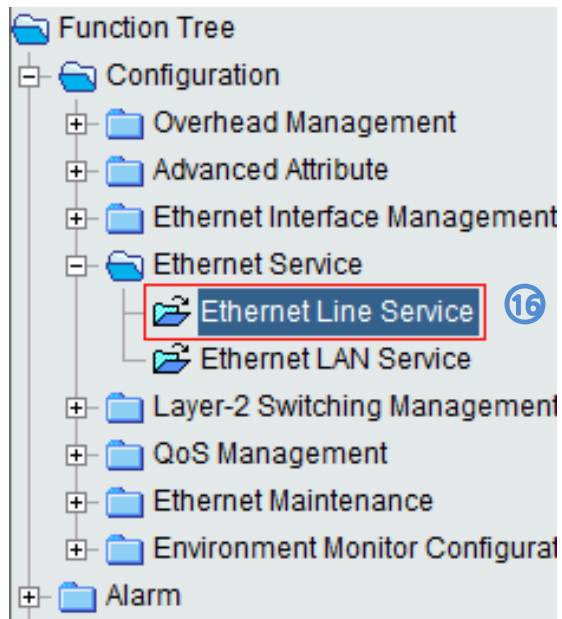


VCTRUNK Port	Level	Service Direction	Bound Path
VCTRUNK1	VC12-xv	Bidirectional	VC4-4-VC12(1-10)

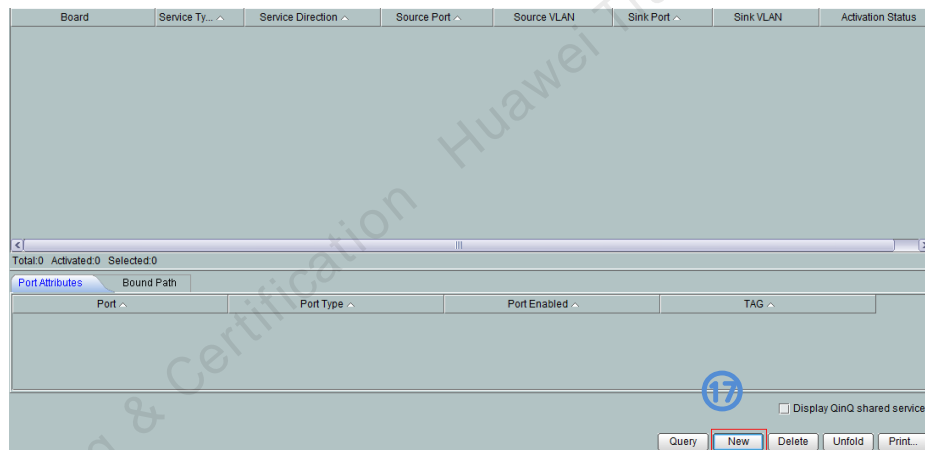
VCTRUNK ...	Level	Service Direction	Bound Path	Bound Path Count	Activation Status	Used Channel
VCTRUNK1	VC12-xv	Bidirectional	VC4-4-VC12(1-10)	10	Active	-

Step 3 Configure the Ethernet private line services between user A1 and user A2 and between user B1 and user B2.

- a. In the NE Explorer, select the EFS8 board, and then choose **Configuration > Ethernet Service > Ethernet Line Service** from the Function Tree.



b. Click **New** on the lower-right pane to display the **Create Ethernet Line Service** window. Set the parameters based on **Table 2.7** and then click **OK**. The **Operation Result** dialog box is displayed, indicating that the operation is successful. Click **Close**.



Create Ethernet Line Service

Attribute	Attribute Value
Board	A-1-EFS8
Service Type	EPL
Service Direction	Bidirectional
Source Port	PORT1
Source VLAN(e.g.1, 3-6)	100
Sink Port	VCTRUNK1
Sink VLAN(e.g.1, 3-6)	100

Port Attributes

Port	Port Type	Port Enabled	TAG
PORT1	UNI	Enabled	Access
VCTRUNK1	UNI	-	Tag Aware

Bound Path

VCTRUNK ... ^	Level ^	Service Direction ^	Bound Path ^	Bound Path Count ^
VCTRUNK1	VC12-xv	Bidirectional	VC4-4-VC12(1-10)	10

Configuration Print... Save As...

Active OK Cancel Apply

Create Ethernet Line Service

Attribute	Attribute Value
Board	A-1-EFS8
Service Type	EPL
Service Direction	Bidirectional
Source Port	PORT2
Source VLAN(e.g.1, 3-6)	200
Sink Port	VCTRUNK1
Sink VLAN(e.g.1, 3-6)	200

Port Attributes

Port	Port Type	Port Enabled	TAG
PORT2	UNI	Enabled	Access
VCTRUNK1	UNI	-	Tag Aware

Bound Path

VCTRUNK ... ^	Level ^	Service Direction ^	Bound Path ^	Bound Path Count ^
VCTRUNK1	VC12-xv	Bidirectional	VC4-4-VC12(1-10)	10

Configuration Print... Save As...

Active OK Cancel Apply

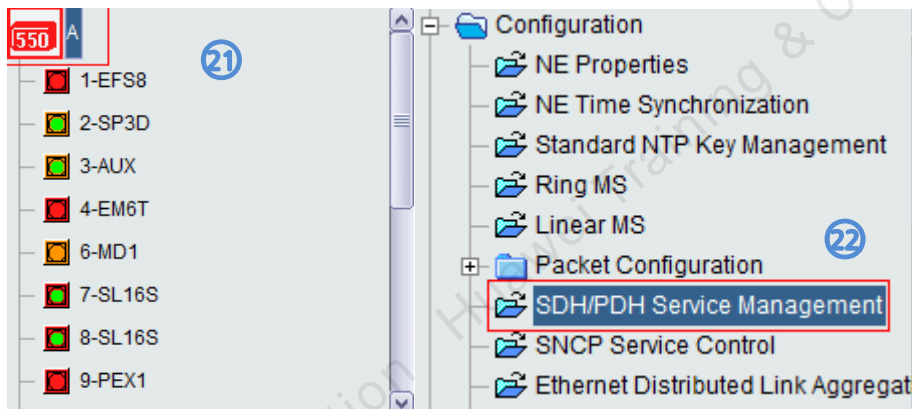
Board	Service Ty...	Service Direction	Source Port	Source VLAN	Sink Port	Sink VLAN	Activation Status
A-1-EFS8	EPL	Bidirectional	PORT1	100	VCTRUNK1	100	Active
A-1-EFS8	EPL	Bidirectional	PORT2	200	VCTRUNK1	200	Active

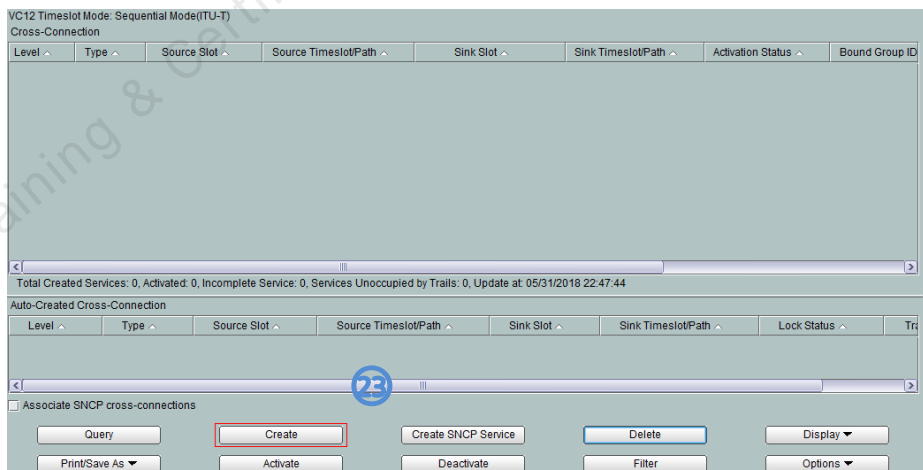
Port	Port Type	Port Enabled	TAG
PORT1	UNI	Enabled	Access
VCTRUNK1	UNI	-	Tag Aware

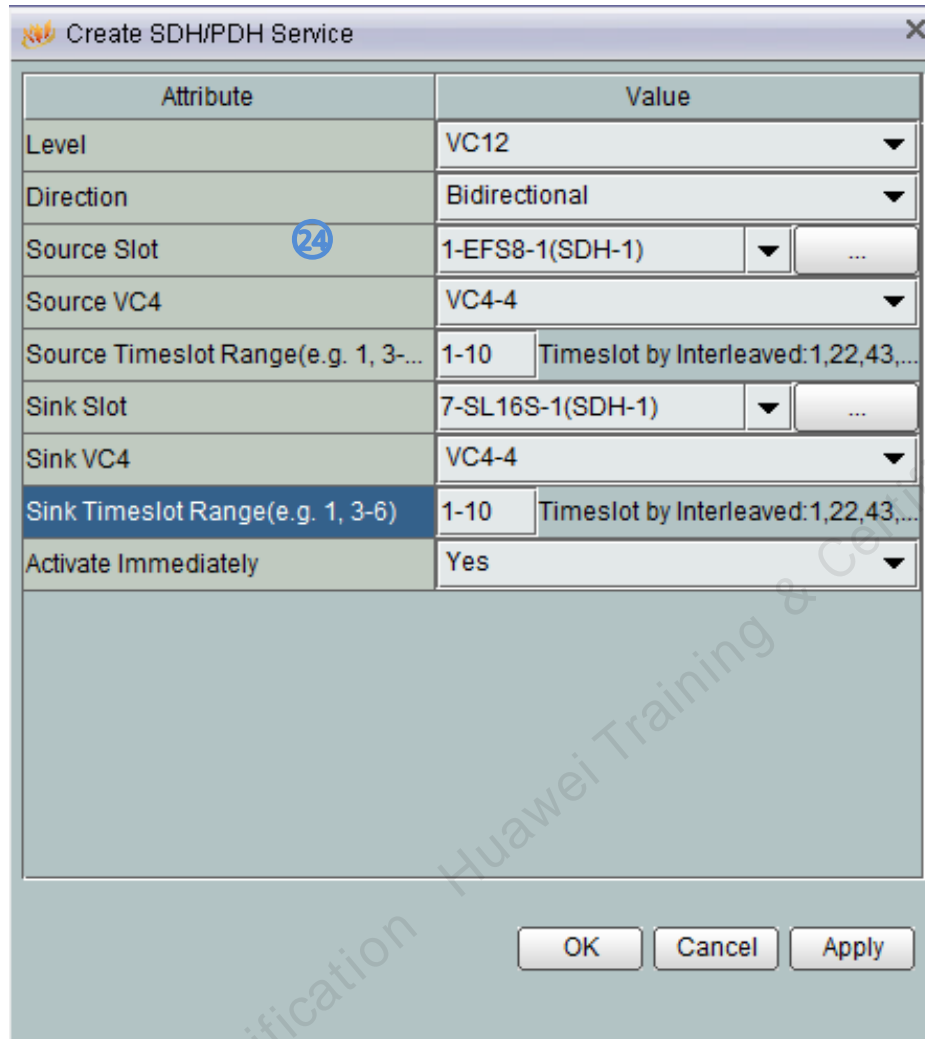
Step 4 Configure the cross-connections from the Ethernet services to the SDH links for user A1 and user B1.

a. In the NE Explorer, select NE A and then choose **Configuration > SDH/PDH Service Configuration** from the Function Tree.



b. Click **Create** on the lower-right pane to display the **Create SDH/PDH Service** dialog box. Set the parameters.





### 2.3.3.2 Configure the EVPL Service on NE C

Refer to the Chapter 2.3.3.1 and configure the EVPL service of NE C.

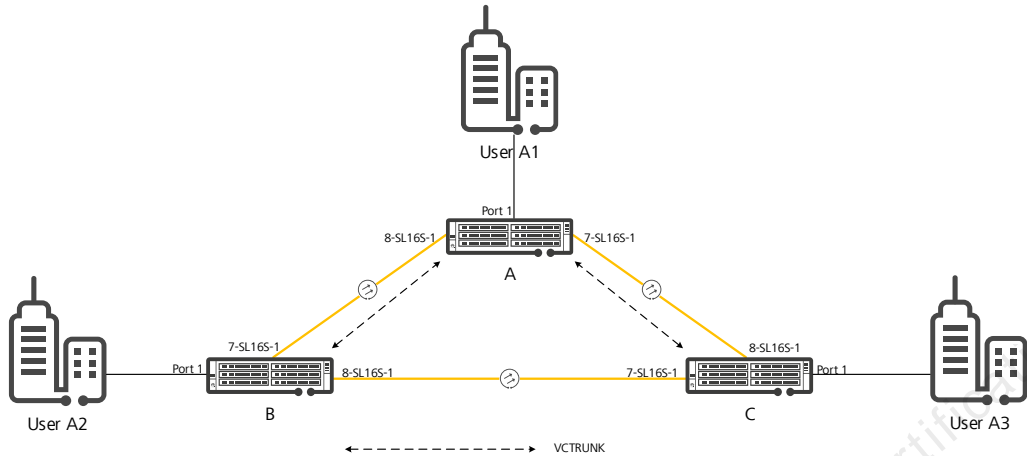
## 2.4 Configuring EPLAN Services (IEEE 802.1d Bridge)

### 2.4.1 Service Requirement

In the network as shown in Figure 2-6, the service requirements are as follows:

1. Three branches (user A1, user A2, and user A3) of user A are located at NE A, NE B, and NE C. User A1 needs to communicate with user A2 and user A3, and requires a 10 Mbit/s bandwidth for communication with each branch.
2. The Ethernet equipment of user A provides 100 Mbit/s Ethernet electrical interfaces that work in auto-negotiation mode and support VLANs. The VLAN IDs and the number of VLANs, however, are unknown and may change. Branch user A2 and user A3 belong to the separate departments and need not communicate with each other.

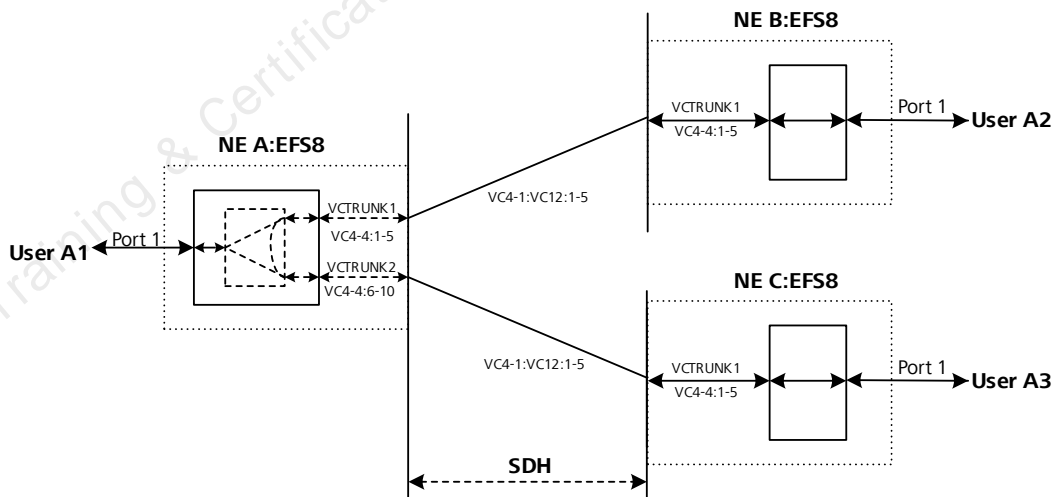
**Figure 2-6 Networking Diagram for Configuring EPLAN Services**



### 2.4.2 Signal Flow and Timeslot Allocation

Based on the services' requirement, the Ethernet LAN service of user A occupies the first to fifth VC-12 timeslots of the first VC-4 (VC4-1:VC12:1-5) on the SDH link from NE A to NE B and the first to fifth VC-12 timeslots of the first VC-4 (VC4-1:VC12:1-5) on the SDH link from NE A to NE C. The Ethernet LAN service from NE A to NE B is added and dropped by using the first to fifth VC-12 timeslots of the fourth VC-4 (VC4-4:VC12:1-5) on the EFS8 board of NE A and the first to fifth VC-12 timeslots of the fourth VC-4 (VC4-4:VC12:1-5) on the EFS8 board of NE B. The Ethernet LAN service from NE A to NE C is added and dropped by using the sixth to tenth VC-12 timeslots of the fourth VC-4 (VC4-4:VC12:6-10) on the EFS8 board of NE A and the first to fifth VC-12 timeslots of the fourth VC-4 (VC4-4:VC12:1-5) on the EFS8 board of NE C.

**Figure 2-7 Signal Flow**



**Table 2-8 Parameters of External Ports on the Ethernet Boards**

Parameter	NE A	NE B	NE C
Board	EFS8	EFS8	EFS8
Port	PORT1	PORT1	PORT1
Enabled/Disabled	Enable	Enable	Enable

Working Mode	Auto-Negotiation	Auto-Negotiation	Auto-Negotiation
Maximum Frame Length	1522	1522	1522
TAG	Tag Aware	Tag Aware	Tag Aware
Entry Detection	Enabled	Enabled	Enabled

**Table 2-9 Parameters of Internal Ports on the Ethernet Boards**

Parameter	NE A		NE B	NE C
Board	EFS8		EFS8	EFS8
Port	VCTRUNK1	VCTRUNK2	VCTRUNK1	VCTRUNK1
Mapping Protocol	GFP	GFP	GFP	GFP
TAG	Tag Aware	Tag Aware	Tag Aware	Tag Aware
Bound Path	VC4-4:VC12:1-5	VC4-4:VC12:6-10	VC4-4:VC12:1-5	VC4-4:VC12:1-5
Entry Detection	Enabled	Enabled	Enabled	Enabled
Port Type	UNI	UNI	UNI	UNI

**Table 2-10 Parameters of Ethernet LAN Services (IEEE 802.1d Bridge)**

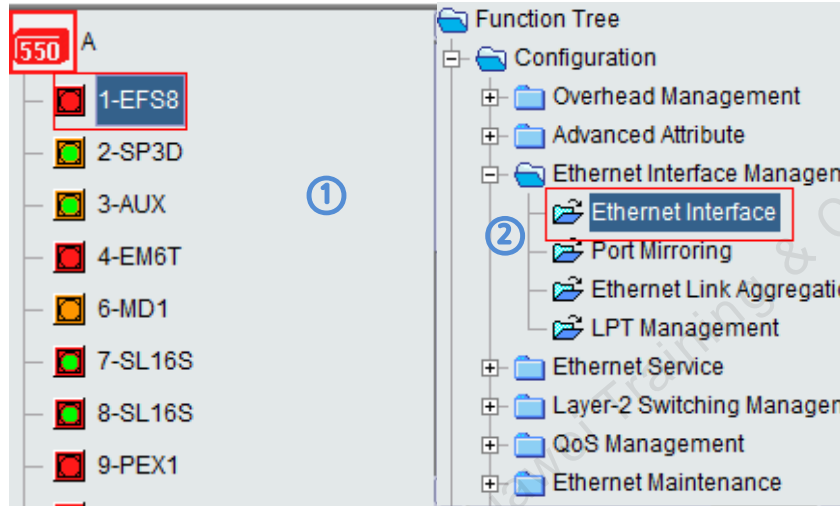
Parameter	Ethernet LAN Service of NE A	
Board	EFS8	
VB Name	VB1	
Bridge Type	IEEE 802.1d	
Bridge Switch Mode	SVL/Ingress Filter Disable	
Bridge Learning Mode	SVL	
Ingress Filter	Disabled	
VB Mount Port	Port 1, VCTRUNK1, VCTRUNK2	
Hub/Spoke	Port1	Hub
	VCTRUNK1	Spoke
	VCTRUNK2	Spoke

## 2.4.3 Configuration Procedure

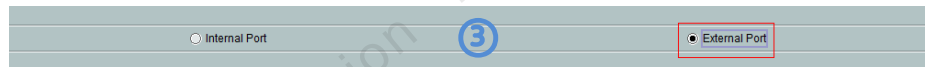
### 2.4.3.1 Configure the EPLAN Services for Users A1, A2 and A3 on NE A

Step 1 Set the attributes of the external ports (PORT1 of the EFS8 board) used by the service of user A1.

a. In the NE Explorer, select the EFS8 board, and then choose **Configuration > Ethernet Interface Management > Ethernet Interface** from the Function Tree.



b. Select **External Port**.



c. Click the **Basic Attributes** tab. Set the parameters based on **Table 2-8**, and click **Apply**.

Basic Attributes								
Port	Name	Enabled/Disabled	Working Mode	Maximum Frame Length (bytes)	Port Physical Parame...	MAC Loopback	PHY Loopback	
A-1-EFS8-PO...	PORT-1	Enabled	Auto-Negotiation	1522		Non-Loopback	Non-Loopback	
A-1-EFS8-PO...	PORT-2	Disabled	Auto-Negotiation	1522		Non-Loopback	Non-Loopback	
A-1-EFS8-PO...	PORT-3	Disabled	Auto-Negotiation	1522		Non-Loopback	Non-Loopback	
A-1-EFS8-PO...	PORT-4	Disabled	Auto-Negotiation	1522		Non-Loopback	Non-Loopback	
A-1-EFS8-PO...	PORT-5	Disabled	Auto-Negotiation	1522		Non-Loopback	Non-Loopback	
A-1-EFS8-PO...	PORT-6	Disabled	Auto-Negotiation	1522		Non-Loopback	Non-Loopback	
A-1-EFS8-PO...	PORT-7	Disabled	Auto-Negotiation	1522		Non-Loopback	Non-Loopback	
A-1-EFS8-PO...	PORT-8	Disabled	Auto-Negotiation	1522		Non-Loopback	Non-Loopback	

d. Click the **Flow Control** tab. The parameters in the **Flow Control** tab page adopt the default values.

Flow Control			
Port	Non-Autonegotiation Flow Control Mode	Autonegotiation Flow Control Mode	
A-1-EFS8-PORT1	Disabled	Disabled	
A-1-EFS8-PORT2	Disabled	Disabled	
A-1-EFS8-PORT3	Disabled	Disabled	
A-1-EFS8-PORT4	Disabled	Disabled	
A-1-EFS8-PORT5	Disabled	Disabled	
A-1-EFS8-PORT6	Disabled	Disabled	
A-1-EFS8-PORT7	Disabled	Disabled	
A-1-EFS8-PORT8	Disabled	Disabled	

e. Click the **TAG Attributes** tab. After setting the parameters, click **Apply**.

TAG Attributes				
Port	TAG	Default VLAN ID	VLAN Priority	Entry Detection
A-1-EFS8-PORT1	Tag Aware	-	-	Enabled
A-1-EFS8-PORT2	Tag Aware	-	-	Enabled
A-1-EFS8-PORT3	Tag Aware	-	-	Enabled
A-1-EFS8-PORT4	Tag Aware	-	-	Enabled
A-1-EFS8-PORT5	Tag Aware	-	-	Enabled
A-1-EFS8-PORT6	Tag Aware	-	-	Enabled
A-1-EFS8-PORT7	Tag Aware	-	-	Enabled
A-1-EFS8-PORT8	Tag Aware	-	-	Enabled

f. Click the **Advanced Attributes** tab. The parameters in the **Advanced Attributes** tab page adopt the default values.

Port	Broadcast Packet Suppression	Broadcast Packet Suppresso...	Traffic Threshold (...)	Port Traff...	Loop Detection	Loop Port Shutdown
A-1-EFS8-PORT1	Disabled	30%	100	0	Disabled	Enabled
A-1-EFS8-PORT2	Disabled	30%	100	0	Disabled	Enabled
A-1-EFS8-PORT3	Disabled	30%	100	0	Disabled	Enabled
A-1-EFS8-PORT4	Disabled	30%	100	0	Disabled	Enabled
A-1-EFS8-PORT5	Disabled	30%	100	0	Disabled	Enabled
A-1-EFS8-PORT6	Disabled	30%	100	0	Disabled	Enabled
A-1-EFS8-PORT7	Disabled	30%	100	0	Disabled	Enabled
A-1-EFS8-PORT8	Disabled	30%	100	0	Disabled	Enabled

Step 2 Set the attributes of the internal port (VCTRUNK1 and VCTRUNK2 of the EFS8 board) used by the services of user A2 and user A3 on NE A.

a. Select **Internal Port**.

Internal Port 8
 External Port

b. Click the **TAG Attributes** tab. Set the parameters based on **Table 2-9**, click **Apply**.

Port	Name	TAG	Default VLAN ID	VLAN Priority	Entry Detection
A-1-EFS8-VCTRUNK1	VCTRUNK-1	Tag Aware	-	-	Enabled
A-1-EFS8-VCTRUNK2	VCTRUNK-2	Tag Aware	-	-	Enabled
A-1-EFS8-VCTRUNK3	VCTRUNK-3	Tag Aware	-	-	Enabled
A-1-EFS8-VCTRUNK4	VCTRUNK-4	Tag Aware	-	-	Enabled
A-1-EFS8-VCTRUNK5	VCTRUNK-5	Tag Aware	-	-	Enabled
A-1-EFS8-VCTRUNK6	VCTRUNK-6	Tag Aware	-	-	Enabled
A-1-EFS8-VCTRUNK7	VCTRUNK-7	Tag Aware	-	-	Enabled
A-1-EFS8-VCTRUNK8	VCTRUNK-8	Tag Aware	-	-	Enabled

c. Click the **Network Attributes** tab. After setting the parameters, click **Apply**.

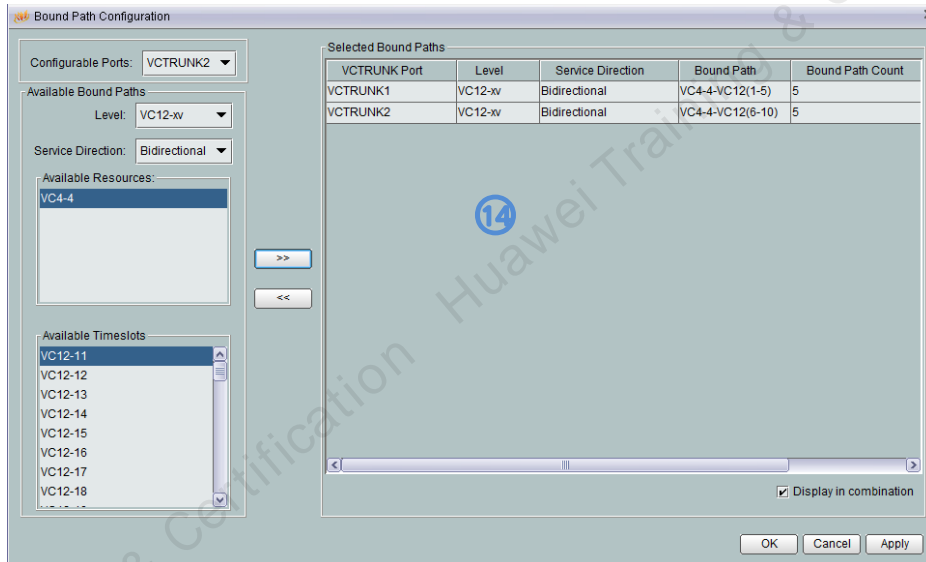
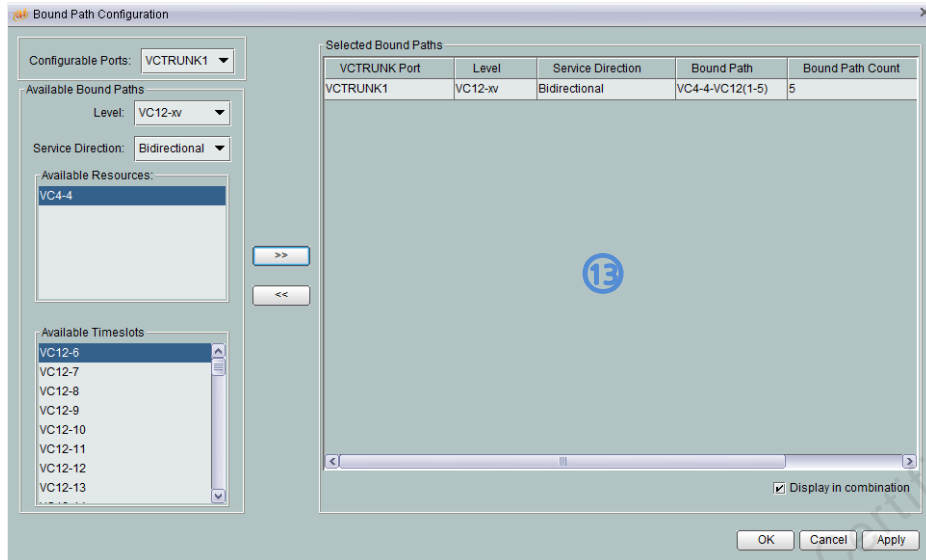
Port	Port Attributes
A-1-EFS8-VCTRUNK1	UNI
A-1-EFS8-VCTRUNK2	UNI
A-1-EFS8-VCTRUNK3	UNI
A-1-EFS8-VCTRUNK4	UNI
A-1-EFS8-VCTRUNK5	UNI
A-1-EFS8-VCTRUNK6	UNI
A-1-EFS8-VCTRUNK7	UNI
A-1-EFS8-VCTRUNK8	UNI

d. Click the **Encapsulation/Mapping** tab. After setting the parameters, click **Apply**.

Port	Mapping Protocol	Scramble	Set Inverse Value for CRC	Check Field Length	FCS Calculated Bit Sequence
A-1-EFS8-VCTRUNK1	GFP	Scrambling mode[X43+1]	-	FCS32	Big endian
A-1-EFS8-VCTRUNK2	GFP	Scrambling mode[X43+1]	-	FCS32	Big endian
A-1-EFS8-VCTRUNK3	GFP	Scrambling mode[X43+1]	-	FCS32	Big endian
A-1-EFS8-VCTRUNK4	GFP	Scrambling mode[X43+1]	-	FCS32	Big endian
A-1-EFS8-VCTRUNK5	GFP	Scrambling mode[X43+1]	-	FCS32	Big endian
A-1-EFS8-VCTRUNK6	GFP	Scrambling mode[X43+1]	-	FCS32	Big endian
A-1-EFS8-VCTRUNK7	GFP	Scrambling mode[X43+1]	-	FCS32	Big endian
A-1-EFS8-VCTRUNK8	GFP	Scrambling mode[X43+1]	-	FCS32	Big endian

e. Click the **Bound Path** tab. Click the **Configuration** button. Set the parameters based on **Table 2-9** in the **Bound Path Configuration** dialog box. Then, click **Apply**.

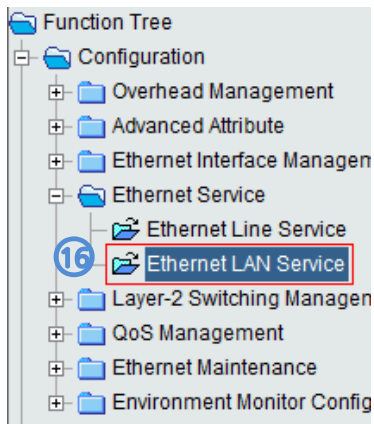
TAG Attributes	Network Attributes	Encapsulation/Mapping	LCAS	Bound Path	Advanced Attributes
VCTRUNK ...	Level ^	Service Direction ^	Bound Path ^	Bound Path Count ^	Activation Status ^
12					
<input type="button" value="Query"/> <input type="button" value="Configuration"/> <input type="button" value="Delete"/> <input type="button" value="Print..."/> <input type="button" value="Save As..."/>					



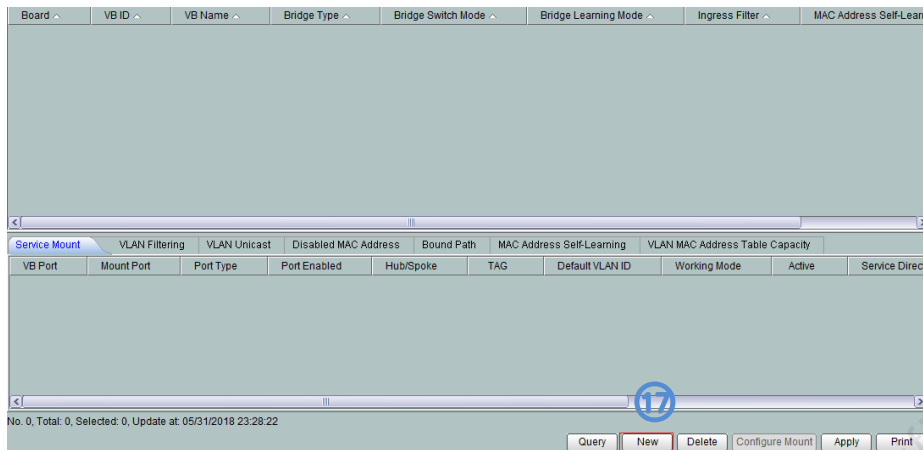
VCTRUNK ...	Level	Service Direction	Bound Path	Bound Path Count	Activation Status	Used Channel
VCTRUNK1	VC12-xv	Bidirectional	VC4-4-VC12(1-5)	5	Active	-
VCTRUNK2	VC12-xv	Bidirectional	VC4-4-VC12(6-10)	5	Active	-

**Step 3** Create a bridge for the EFS8 board on NE A

- a. In the NE Explorer, select the EFS8 board, and then choose **Configuration > Ethernet Service > Ethernet LAN Service** from the Function Tree.



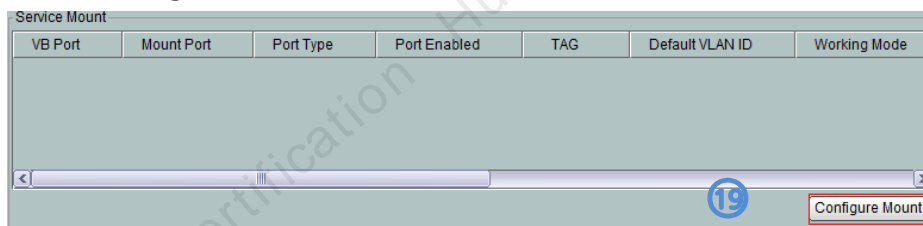
b. Click **New**.



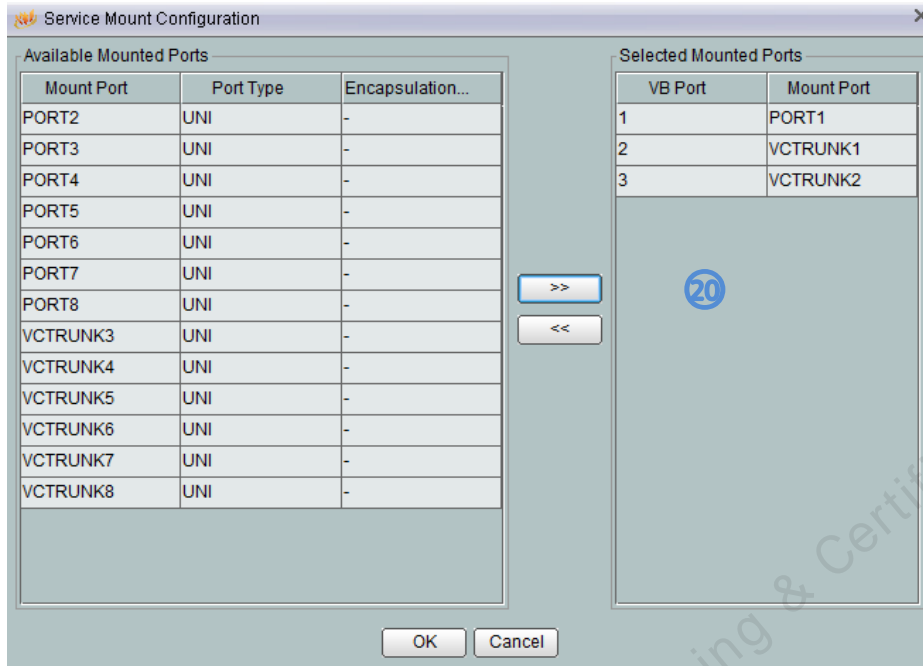
c. Set the parameters in the **Create Ethernet LAN Service** dialog box based on **Table 2-10**.

Attribute	Attribute Value
Board	A-1-EFS8
VB Name	VB1
Bridge Type	802.1d
Bridge Switch Mode	SVL/Ingress Filter Disable
Bridge Learning Mode	SVL
Ingress Filter	Disabled
MAC Address Self-Learning	Enabled

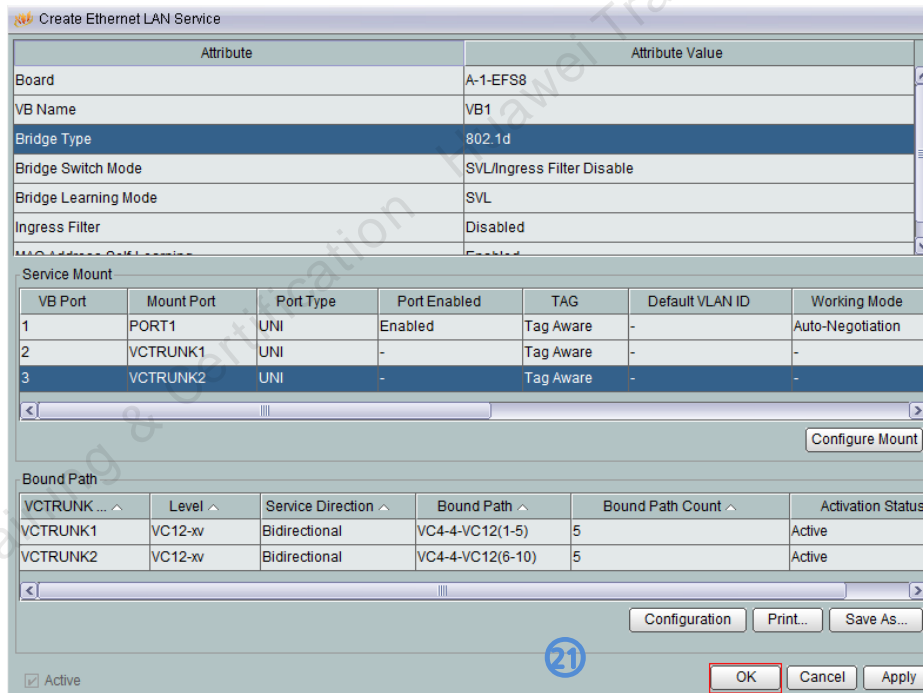
d. Click **Configure Mount**.



e. In the **Available Mounted Ports** window, select PORT1, VCTRUNK1, and VCTRUNK2. Then move them to right. Click **OK**.

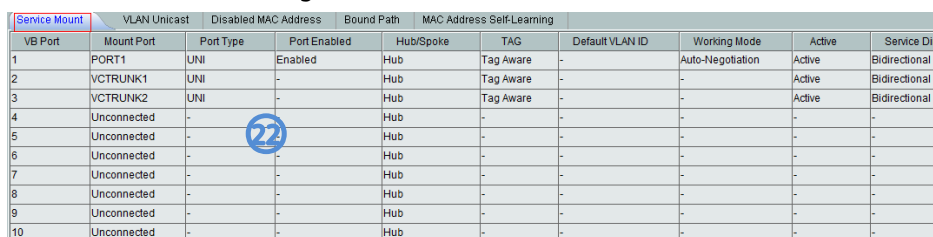


f. In the **Create Ethernet LAN Service** dialog box, click **OK**.



Step 4 Change the Hub/Spoke attribute of the port that is mounted to the bridge.

a. Select the created bridge and click the **Service Mount** tab.

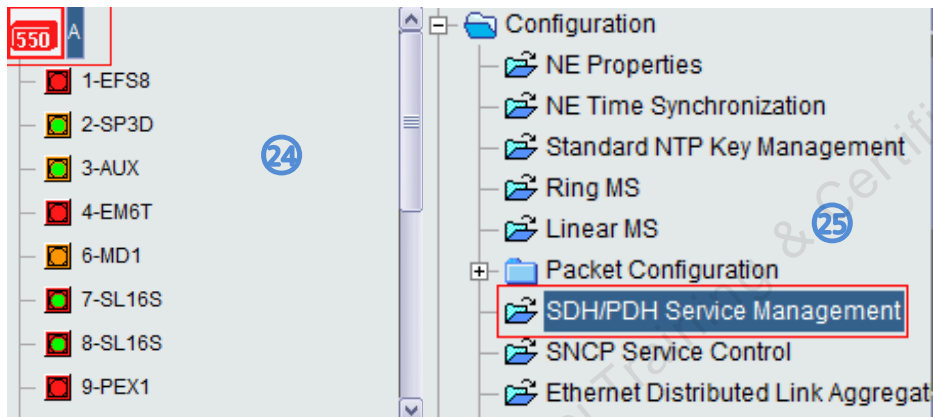


b. Change the Hub/Spoke attribute of the port that is mounted to the bridge based on **Table 2-10**. After setting the parameters, click **Apply**.

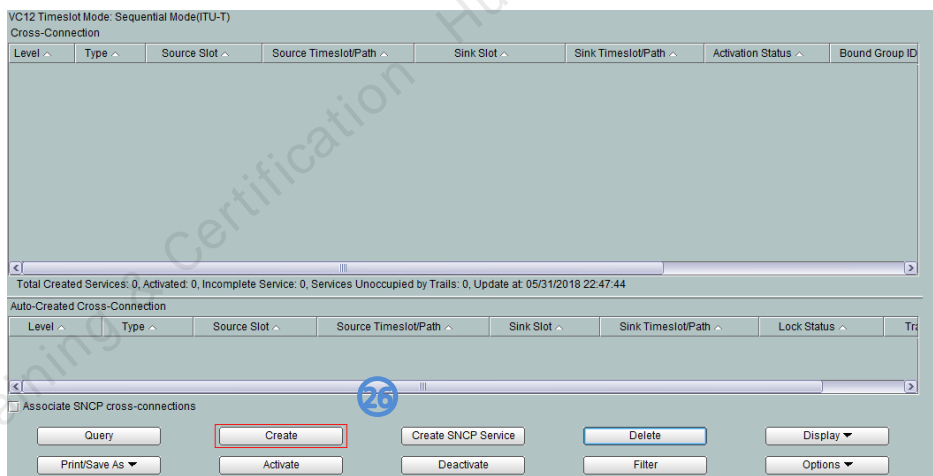
Service Mount	VLAN Unicast	Disabled MAC Address	Bound Path	MAC Address Self-Learning						
1	PORT1	UNI	Enabled	Hub	Tag Aware	-	-	Auto-Negotiation	Active	Bidirectional
2	VCTRUNK1	UNI	-	Spoke	Tag Aware	-	-	-	Active	Bidirectional
3	VCTRUNK2	UNI	-	Spoke	Tag Aware	-	-	-	Active	Bidirectional

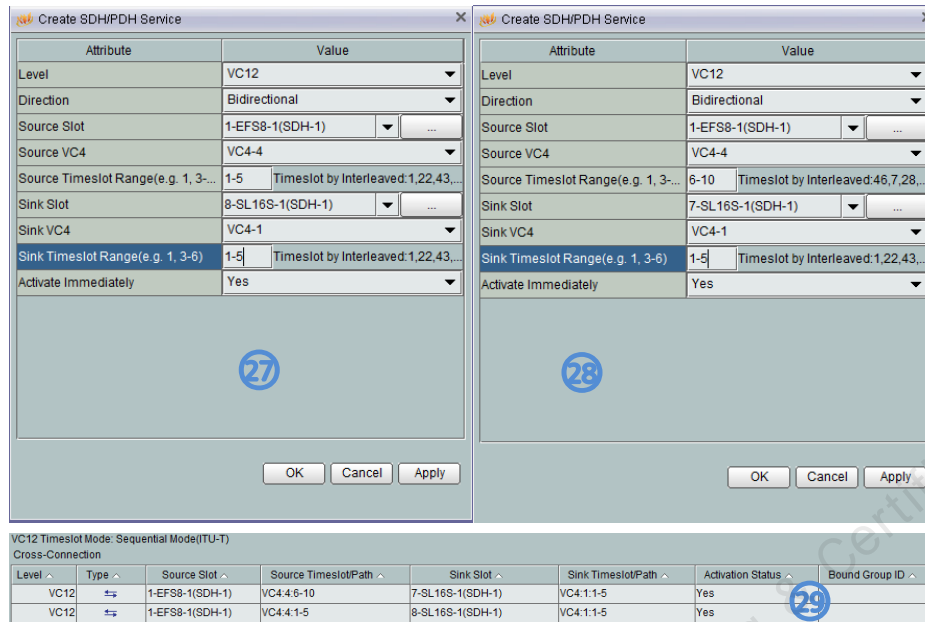
Step 5 Configure the cross-connections from Ethernet services (between user A1 to user A2 and user A1 to user A3) to the SDH links.

a. In the NE Explorer, select NE A and then choose **Configuration > SDH/PDH Service Configuration** from the Function Tree.



b. Click **Create** on the lower-right pane to display the **Create SDH/PDH Service** dialog box. Set the parameters.



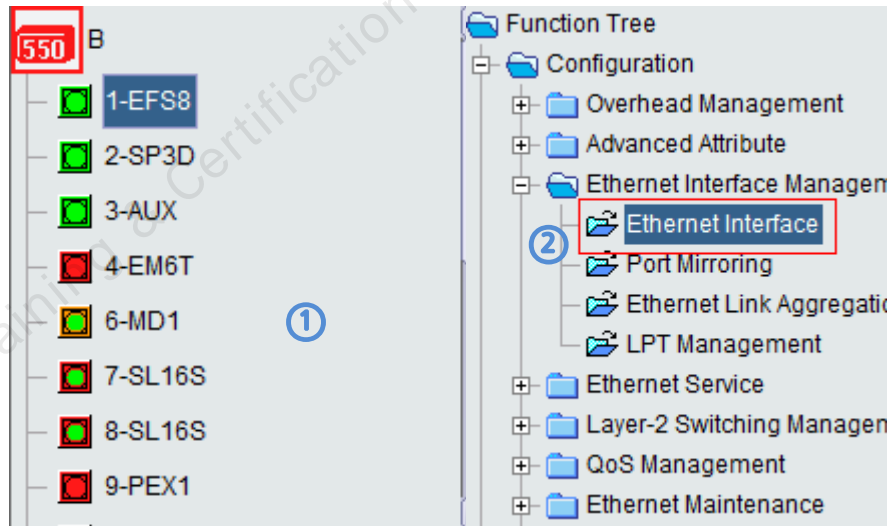


### 2.4.3.2 Configure the EPL Services on NE B and NE C.

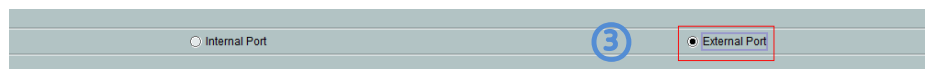
**Caution:** Here we use NE B as an example, the configuration of NE C is the same with NE B.

Step 1 Set the attributes of the external ports (PORT1 of the EFS8 board) used by the service of user A2.

a. In the NE Explorer, select the EFS8 board, and then choose **Configuration > Ethernet Interface Management > Ethernet Interface** from the Function Tree.



b. Select **External Port**.



c. Click the **Basic Attributes** tab. After setting the parameters based on **Table 2-8**, click **Apply**.

Basic Attributes		Flow Control	TAG Attributes	Network Attributes	Advanced Attributes		
Port	Name	Enabled/Disabled	Working Mode	Maximum Frame Length (bytes)	Port Physical Parameters	MAC Loopback	PHY Loopback
B-1-EFS8-PO...	PORT-1	Enabled	Auto-Negotiation	1522		Non-Loopback	Non-Loopback
B-1-EFS8-PO...	PORT-2	Disabled	Auto-Negotiation	1522		Non-Loopback	Non-Loopback
B-1-EFS8-PO...	PORT-3	Disabled	Auto-Negotiation	1522		Non-Loopback	Non-Loopback
B-1-EFS8-PO...	PORT-4	Disabled	Auto-Negotiation	1522		Non-Loopback	Non-Loopback
B-1-EFS8-PO...	PORT-5	Disabled	Auto-Negotiation	1522		Non-Loopback	Non-Loopback
B-1-EFS8-PO...	PORT-6	Disabled	Auto-Negotiation	1522		Non-Loopback	Non-Loopback
B-1-EFS8-PO...	PORT-7	Disabled	Auto-Negotiation	1522		Non-Loopback	Non-Loopback
B-1-EFS8-PO...	PORT-8	Disabled	Auto-Negotiation	1522		Non-Loopback	Non-Loopback

Step 2 Set the attributes of the internal port (VCTRUNK1 on the EFS8 board) used by the services of user A2.

a. Select **Internal Port**.



b. Click the **TAG Attributes** tab. After setting the parameters, click **Apply**.

TAG Attributes		Network Attributes	Encapsulation/Mapping	LCAS	Bound Path	Advanced Attributes		
Port	Name	TAG	Default VLAN ID	VLAN Priority	Entry Detection			
B-1-EFS8-VCTRUNK1	VCTRUNK-1	Tag Aware	-	-	Enabled			
B-1-EFS8-VCTRUNK2	VCTRUNK-2	Tag Aware	-	-	Enabled			
B-1-EFS8-VCTRUNK3	VCTRUNK-3	Tag Aware	-	-	Enabled			
B-1-EFS8-VCTRUNK4	VCTRUNK-4	Tag Aware	-	-	Enabled			
B-1-EFS8-VCTRUNK5	VCTRUNK-5	Tag Aware	-	-	Enabled			
B-1-EFS8-VCTRUNK6	VCTRUNK-6	Tag Aware	-	-	Enabled			
B-1-EFS8-VCTRUNK7	VCTRUNK-7	Tag Aware	-	-	Enabled			
B-1-EFS8-VCTRUNK8	VCTRUNK-8	Tag Aware	-	-	Enabled			

c. Click the **Network Attributes** tab. After setting the parameters, click **Apply**.

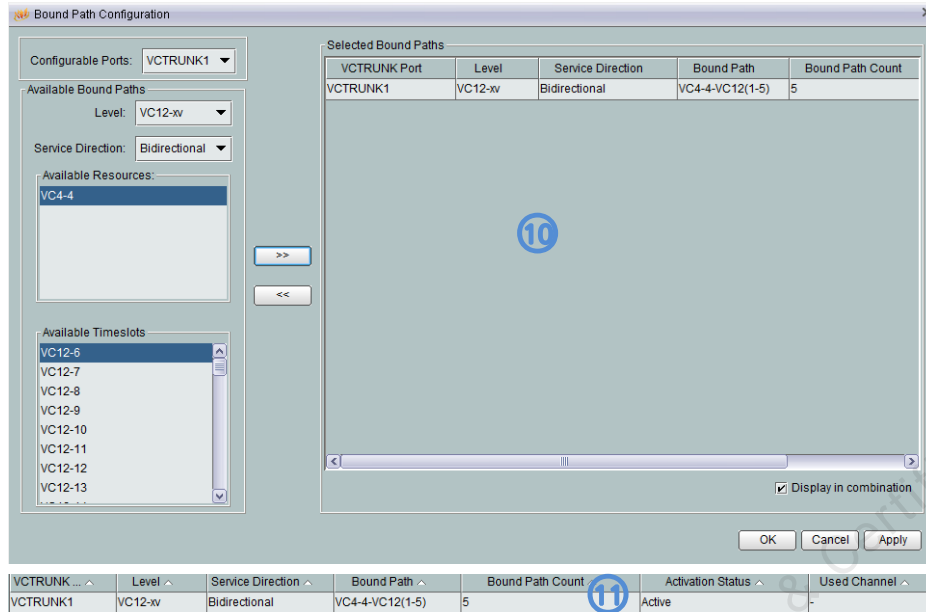
TAG Attributes		Network Attributes	Encapsulation/Mapping	LCAS	Bound Path	Advanced Attributes		
Port			Port Attributes					
B-1-EFS8-VCTRUNK1								UNI
B-1-EFS8-VCTRUNK2								UNI
B-1-EFS8-VCTRUNK3								UNI
B-1-EFS8-VCTRUNK4								UNI
B-1-EFS8-VCTRUNK5								UNI
B-1-EFS8-VCTRUNK6								UNI
B-1-EFS8-VCTRUNK7								UNI
B-1-EFS8-VCTRUNK8								UNI

d. Click the **Encapsulation/Mapping** tab. After setting the parameters, click **Apply**.

TAG Attributes		Network Attributes	Encapsulation/Mapping	LCAS	Bound Path	Advanced Attributes		
Port	Mapping Protocol	Scramble	Set Inverse Value for CRC	Check Field Length	FCS Calculated Bit Sequence			
B-1-EFS8-VCTRUNK1	GFP	Scrambling mode[X43+1]	-	FCS32	Big endian			
B-1-EFS8-VCTRUNK2	GFP	Scrambling mode[X43+1]	-	FCS32	Big endian			
B-1-EFS8-VCTRUNK3	GFP	Scrambling mode[X43+1]	-	FCS32	Big endian			
B-1-EFS8-VCTRUNK4	GFP	Scrambling mode[X43+1]	-	FCS32	Big endian			
B-1-EFS8-VCTRUNK5	GFP	Scrambling mode[X43+1]	-	FCS32	Big endian			
B-1-EFS8-VCTRUNK6	GFP	Scrambling mode[X43+1]	-	FCS32	Big endian			
B-1-EFS8-VCTRUNK7	GFP	Scrambling mode[X43+1]	-	FCS32	Big endian			
B-1-EFS8-VCTRUNK8	GFP	Scrambling mode[X43+1]	-	FCS32	Big endian			

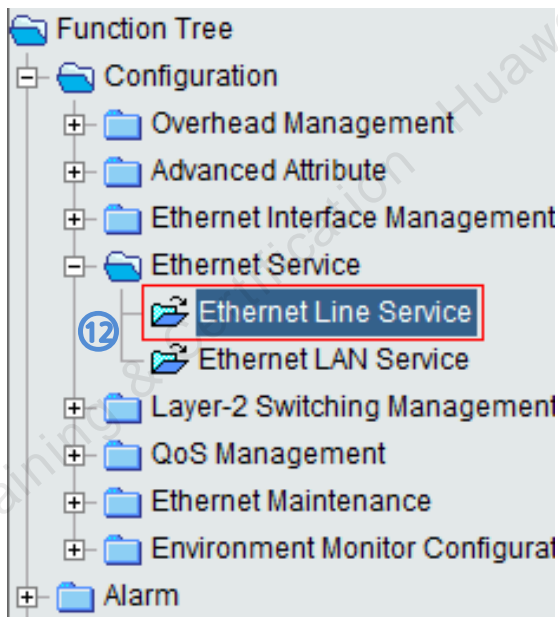
e. Click the **Bound Path** tab. Click the **Configuration** button. Set the parameters based on **Table 2-9** in the **Bound Path Configuration** dialog box. Then, click **Apply**.

TAG Attributes		Network Attributes	Encapsulation/Mapping	LCAS	Bound Path	Advanced Attributes		
VCTRUNK ...	Level	Service Direction	Bound Path	Bound Path Count	Activation Status	Used Channel		
Empty table content								
						<input type="button" value="Query"/> <input type="button" value="Configuration"/> <input type="button" value="Delete"/> <input type="button" value="Print..."/> <input type="button" value="Save As..."/>		



Step 3 Configure the Ethernet private line services for user A1 and user A2.

a. In the NE Explorer, select the EFS8 board, and then choose **Configuration > Ethernet Service > Ethernet Line Service** from the Function Tree.



b. Click **New** on the lower-right pane to display the **Create Ethernet Line Service** window. Set the parameters based on **Table 2-9** and then click OK. The **Operation Result** dialog box is displayed, indicating that the operation is successful. Click **Close**.

Board Service Ty... Service Direction Source Port Source VLAN Sink Port Sink VLAN Activation Status

Total:0 Activated:0 Selected:0

PortAttributes Bound Path

Port Port Type Port Enabled TAG

Display QinQ shared service

Query New Delete Unfold Print...

### Create Ethernet Line Service

Attribute	Attribute Value
Board	B-1-EFS8
Service Type	EPL
Service Direction	Bidirectional
Source Port	PORT1
Source VLAN(e.g.1, 3-6)	
Sink Port	VCTRUNK1
Sink VLAN(e.g.1, 3-6)	

Port Attributes

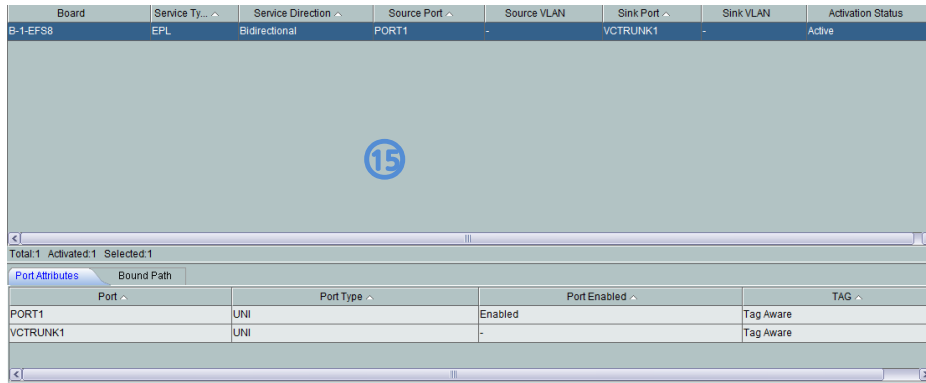
Port	Port Type	Port Enabled	TAG
PORT1	UNI	Enabled	Tag Aware
VCTRUNK1	UNI	-	Tag Aware

Bound Path

VCTRUNK ...	Level	Service Direction	Bound Path
VCTRUNK1	VC12-xv	Bidirectional	VC4-4-VC12(1-5)

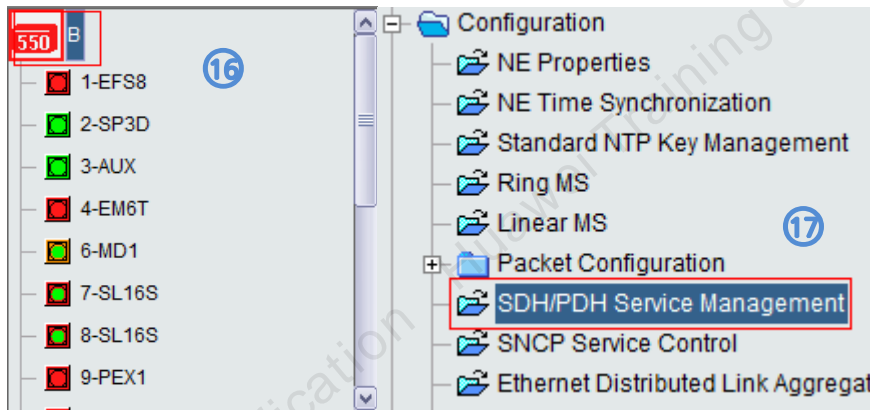
Configuration Print... Save As...

Active OK Cancel Apply

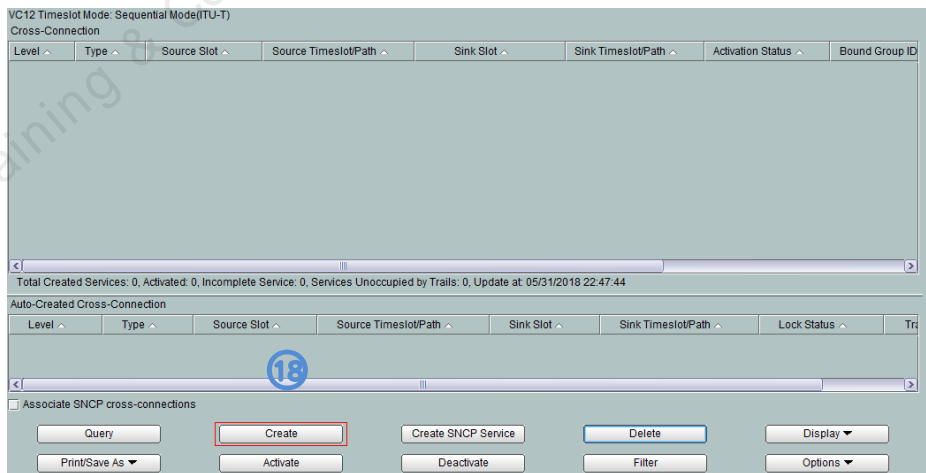


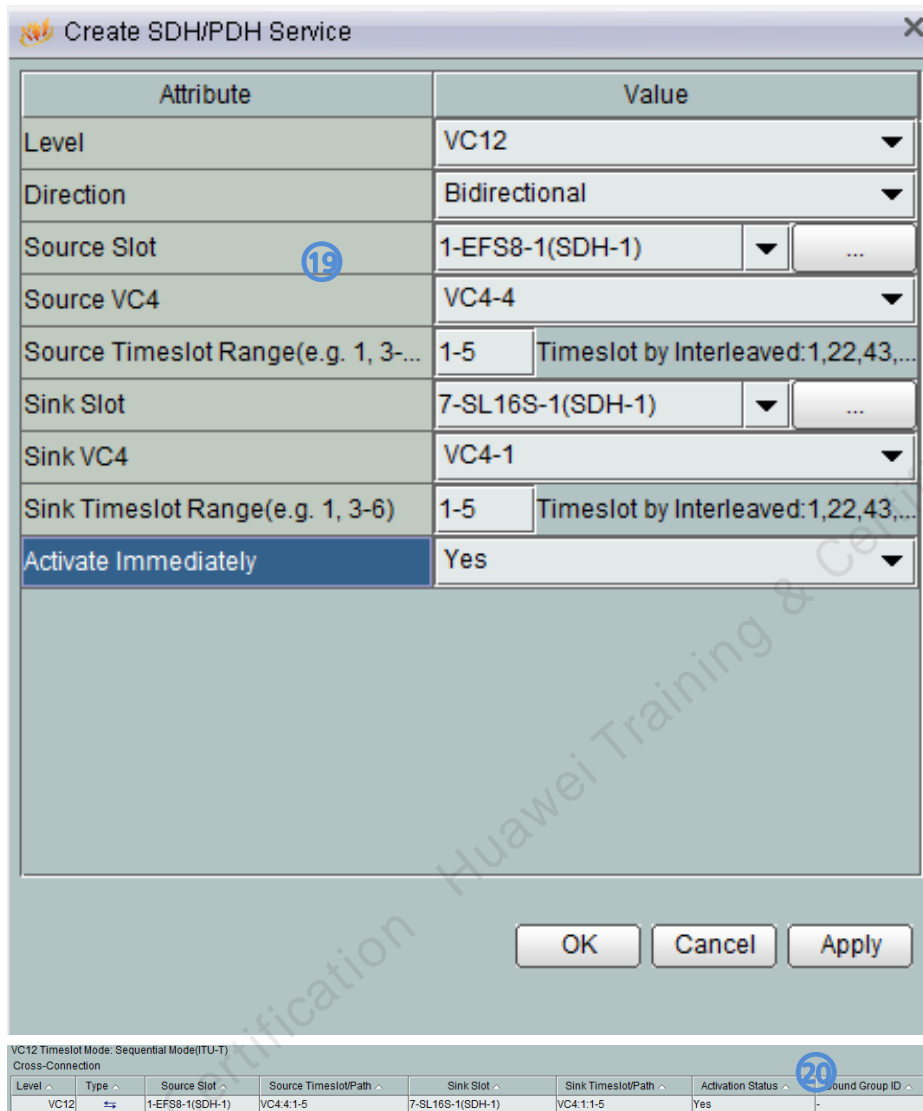
Step 4 Configure the cross-connections from the Ethernet services to the SDH links for user A1 and user A2.

a. In the NE Explorer, select NE B and then choose **Configuration > SDH/PDH Service Configuration** from the Function Tree.



b. Click **Create** on the lower-right pane to display the **Create SDH/PDH Service** dialog box. Set the parameters.



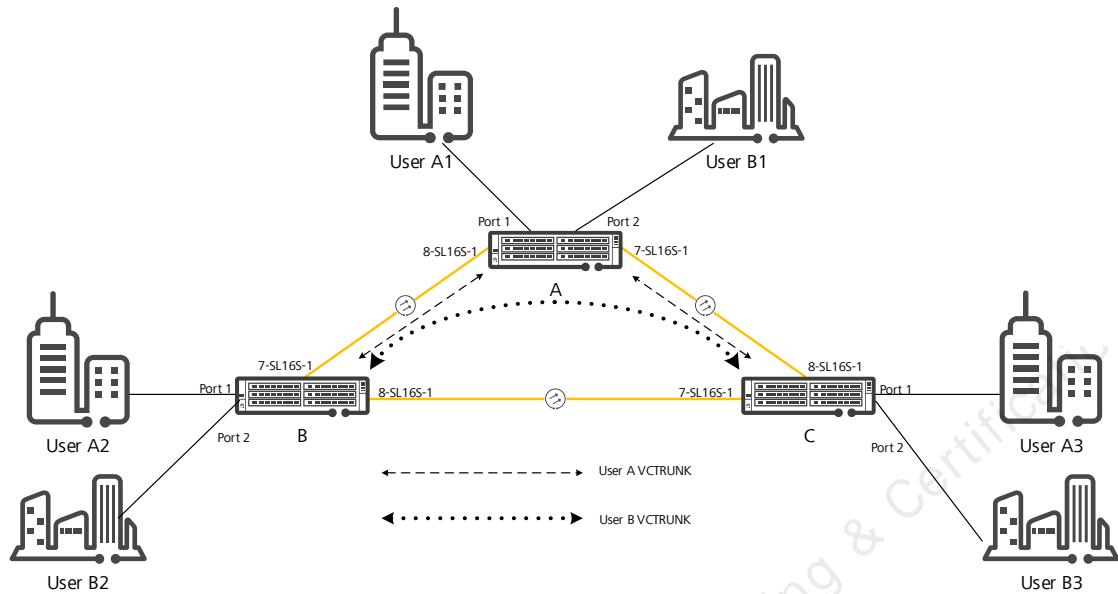


## 2.5 Configuring EVPLAN Services (IEEE 802.1q Bridge)

### 2.5.1 Service Requirement

In the network as shown in Figure 2-8 the service requirements are as follows:

1. Three branches (A1, A2, and A3) of user A are located at NE A, NE B and NE C respectively. The branches need to form a LAN and share a 10 Mbit/s bandwidth. A2 and A3 do not need to communicate with each other.
2. Three branches (B1, B2 and B3) of user B are located at NE A, NE B and NE C respectively. The branches need form a LAN and share a 20 Mbit/s bandwidth. B2 and B3 need to communicate with each other.
3. The service of user G needs to be isolated from the service of user H.
4. The Ethernet equipment of user A and user B provides 100 Mbit/s Ethernet electrical interfaces that work in auto-negotiation mode and do not support VLANs.

**Figure 2-8 Networking Diagram for EVPLAN Services**


## 2.5.2 Signal Flow and Timeslot Allocation

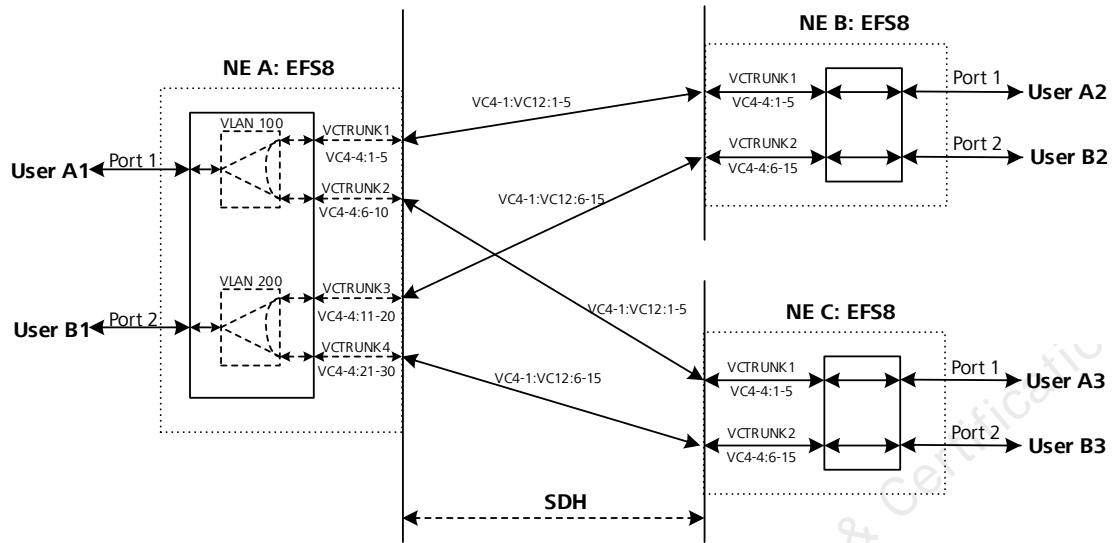
User A:

1. Based on service requirement, the Ethernet LAN services of user A occupy the first to fifth VC-12 timeslots of the first VC-4 (VC4-1:VC12:1-5) on the SDH link from NE A to NE B and the first to fifth VC-12 timeslots of the first VC-4 (VC4-1:VC12:1-5) on the SDH link from NE A to NE C.
2. The Ethernet LAN services of user A are added and dropped by using the first to fifth VC-12 timeslots of the fourth VC-4 (VC4-4:VC12:1-5) on the EFS8 board of NE A and the first to fifth VC-12 timeslots of the fourth VC-4 (VC4-4:VC12:1-5) on the EFS8 board of NE B.
3. The Ethernet LAN services of user A are added and dropped by using the sixth to tenth VC-12 timeslots of the fourth VC-4 (VC4-4:VC12:6-10) on the EFS8 board of NE A and the first to fifth VC-12 timeslots of the fourth VC-4 (VC4-4:VC12:1-5) on the EFS8 board of NE C.

User B:

1. Based on service requirement, the Ethernet LAN services of user B occupy the sixth to fifteenth VC-12 timeslots of the first VC-4 (VC4-1:VC12:6-15) on the SDH link from NE A to NE B and the sixth to fifteenth VC-12 timeslots of the first VC-4 (VC4-1:VC12:6-15) on the SDH link from NE A to NE C.
2. The Ethernet LAN services of user B are added and dropped by using the 11-20 VC-12 timeslots of the fourth VC-4 (VC4-4:VC12:11-20) on the EFS8 board of NE A and the 1-5 VC-12 timeslots of the fourth VC-4 (VC4-4:VC12:1-5) on the EFS8 board of NE C.
3. The Ethernet LAN services of user B are added and dropped by using the twenty-first to thirtieth VC-12 timeslots of the fourth VC-4 (VC4-4:VC12:21-30) on the EFS8 board of NE A and the sixth to fifteenth VC-12 timeslots of the fourth VC-4 (VC4-4:VC12:6-15) on the EFS8 board of NE B.

**Figure 2-9 Signal Flow**



**Table 2-11 Parameters of External Ports on the Ethernet Boards**

Parameter	NE A		NE B		NE C	
	PORT1	PORT2	PORT1	PORT2	PORT1	PORT2
Board	EFS8		EFS8		EFS8	
Port	PORT1	PORT2	PORT1	PORT2	PORT1	PORT2
Enabled/Disabled	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled
Working Mode	Auto-Negotiation	Auto-Negotiation	Auto-Negotiation	Auto-Negotiation	Auto-Negotiation	Auto-Negotiation
Maximum Frame Length	1522	1522	1522	1522	1522	1522
TAG	Access	Access	Access	Access	Access	Access
Entry Detection	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled
Default VLAN ID	100	200	100	200	100	200
VLAN Priority	0	0	0	0	0	0

**Table 2-12 Parameters of Internal Ports on the Ethernet Boards (NE A)**

Parameter	NE A			
Board	EFS8			
Port	VCTRUNK1	VCTRUNK2	VCTRUNK3	VCTRUNK4
Mapping Protocol	GFP	GFP	GFP	GFP
TAG	Tag aware	Tag aware	Tag aware	Tag aware
Entry Detection	Enabled	Enabled	Enabled	Enabled

Bound Path	VC4-4:VC12:1-5	VC4-4:VC12:6-10	VC4-4:VC12:11-20	VC4-4:VC12:21-30
Port Type	UNI	UNI	UNI	UNI

**Table 2-13 Parameters of Internal Ports on the Ethernet Boards (NE B and NE C)**

Parameter	NE B		NE C	
Board	EFS8		EFS8	
Port	VCTRUNK1	VCTRUNK2	VCTRUNK1	VCTRUNK2
Mapping Protocol	GFP	GFP	GFP	GFP
TAG	Tag aware	Tag aware	Tag aware	Tag aware
Entry Detection	Enabled	Enabled	Enabled	Enabled
Bound Path	VC4-4:VC12:1-5	VC4-4:VC12:6-15	VC4-4:VC12:1-5	VC4-4:VC12:6-15
Port Type	UNI	UNI	UNI	UNI

**Table 2-14 Parameters of Ethernet LAN Services (IEEE 802.1q)**

Parameter	Ethernet LAN Service of NE A		
Board	EFS8		
VB Name	VB1		
Bridge Type	IEEE 802.1q		
Bridge Switch Mode	IVL/Ingress Filter Enable		
Bridge Learning Mode	IVL		
Ingress Filter	Enabled		
VB Mount Port	Port 1, Port 2, VCTRUNK1, VCTRUNK2, VCTRUNK3, VCTRUNK4		
VLAN Filtering	VLAN Filtering	VLAN filter table 1	VLAN filter table 2
	VLAN ID	100	200
	Fowarding Physical Port	Port 1, VCTRUNK1, VCTRUNK2	Port 2, VCTRUNK3, VCTRUNK4
Hub/Spoke	Port1	Hub	
	Port2	Hub	
	VCTRUNK1	Spoke	
	VCTRUNK2	Spoke	
	VCTRUNK3	Hub	

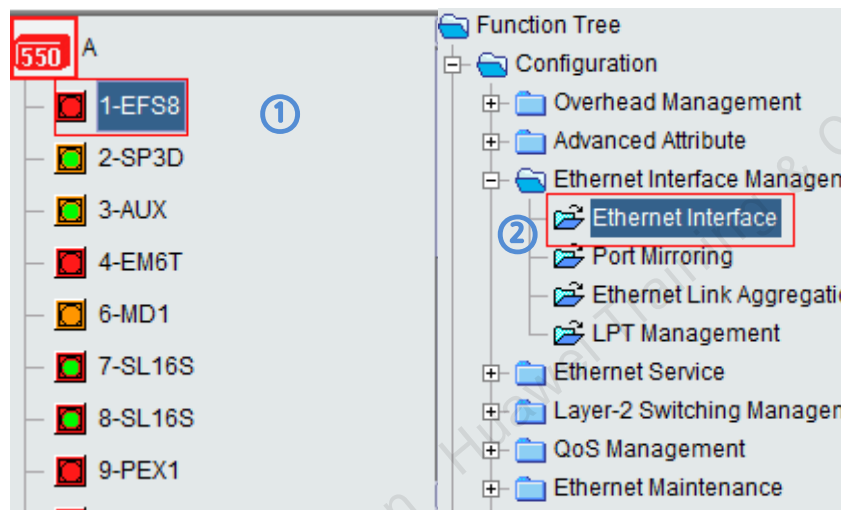
	VCTRUNK4	Hub
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## 2.5.3 Configuration Procedure

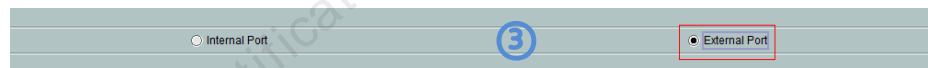
### 2.5.3.1 Configure the EVPLAN services for user A1 and user B1 on NE A

Step 1 Set the attributes of the external ports (PORT1 and PORT2 on the EFS8 board) used by the service of user A1 and user B1.

a. In the **NE Explorer**, select the EFS8 board, and then choose **Configuration > Ethernet Interface Management > Ethernet Interface** from the Function Tree.



b. Select **External Port**.



c. Click the **Basic Attributes** tab. After setting the parameters based on **Table 2-11**, click **Apply**.

Basic Attributes		Flow Control	TAG Attributes	Network Attributes	Advanced Attributes		
Port	Name	Enabled/Disabled	Working Mode	Maximum Frame Length ...	Port Physical Parameters	MAC Loopback	PHY Loopback
A-1-EFS8-PO...	PORT-1	Enabled	Auto-Negotiation	1522		Non-Loopback	Non-Loopback
A-1-EFS8-PO...	PORT-2	Enabled	Auto-Negotiation	1522		Non-Loopback	Non-Loopback
A-1-EFS8-PO...	PORT-3	Disabled	Auto-Negotiation	1522		Non-Loopback	Non-Loopback
A-1-EFS8-PO...	PORT-4	Disabled	Auto-Negotiation	1522		Non-Loopback	Non-Loopback
A-1-EFS8-PO...	PORT-5	Disabled	Auto-Negotiation	1522		Non-Loopback	Non-Loopback
A-1-EFS8-PO...	PORT-6	Disabled	Auto-Negotiation	1522		Non-Loopback	Non-Loopback
A-1-EFS8-PO...	PORT-7	Disabled	Auto-Negotiation	1522		Non-Loopback	Non-Loopback
A-1-EFS8-PO...	PORT-8	Disabled	Auto-Negotiation	1522		Non-Loopback	Non-Loopback

d. Click the **Flow Control** tab. The parameters in the **Flow Control** tab page adopt the default values.

Basic Attributes		Flow Control	TAG Attributes	Network Attributes	Advanced Attributes		
Port	Non-Autonegotiation Flow Control Mode			Autonegotiation Flow Control Mode			
A-1-EFS8-PORT1	Disabled			Disabled			
A-1-EFS8-PORT2	Disabled			Disabled			
A-1-EFS8-PORT3	Disabled			Disabled			
A-1-EFS8-PORT4	Disabled			Disabled			
A-1-EFS8-PORT5	Disabled			Disabled			
A-1-EFS8-PORT6	Disabled			Disabled			
A-1-EFS8-PORT7	Disabled			Disabled			
A-1-EFS8-PORT8	Disabled			Disabled			

e. Click the **TAG Attributes** tab. Set the parameters based on **Table 2-11**, click **Apply**.

Basic Attributes	Flow Control	TAG Attributes	Network Attributes	Advanced Attributes
Port	TAG	Default VLAN ID	VLAN Priority	Entry Detection
A-1-EFS8-PORT1	Access	100	0	Enabled
A-1-EFS8-PORT2	Access	200	0	Enabled
A-1-EFS8-PORT3	Tag Aware	-	-	Enabled
A-1-EFS8-PORT4	Tag Aware	-	-	Enabled
A-1-EFS8-PORT5	Tag Aware	-	-	Enabled
A-1-EFS8-PORT6	Tag Aware	-	-	Enabled
A-1-EFS8-PORT7	Tag Aware	-	-	Enabled
A-1-EFS8-PORT8	Tag Aware	-	-	Enabled

f. Click the **Advanced Attributes** tab. The parameters in the **Advanced Attributes** tab page adopt the default values.

Basic Attributes	Flow Control	TAG Attributes	Network Attributes	Advanced Attributes		
Port	Broadcast Packet Suppression	Broadcast Packet Suppressio...	Traffic Threshold (...)	Port Traffi...	Loop Detection	Loop Port Shutdown
A-1-EFS8-PORT1	Disabled	30%	100	0	Disabled	Enabled
A-1-EFS8-PORT2	Disabled	30%	100	0	Disabled	Enabled
A-1-EFS8-PORT3	Disabled	30%	100	0	Disabled	Enabled
A-1-EFS8-PORT4	Disabled	30%	100	0	Disabled	Enabled
A-1-EFS8-PORT5	Disabled	30%	100	0	Disabled	Enabled
A-1-EFS8-PORT6	Disabled	30%	100	0	Disabled	Enabled
A-1-EFS8-PORT7	Disabled	30%	100	0	Disabled	Enabled
A-1-EFS8-PORT8	Disabled	30%	100	0	Disabled	Enabled

Step 2 Set the attributes of the internal ports (VCTRUNK1, VCTRUNK2, VCTRUNK3, and VCTRUNK4 on the EFS8 board) used by the service between user A1 and user A2, the service between user A1 and user A3, the service between user B1 and user B2, and the service between user B1 and user B3.

a. Select **Internal Port**.

Internal Port  External Port

b. Click the **TAG Attributes** tab. Set the parameters based on **Table 2-12**, click **Apply**.

TAG Attributes	Network Attributes	Encapsulation/Mapping	LCAS	Bound Path	Advanced Attributes
Port	Name	TAG	Default VLAN ID	VLAN Priority	Entry Detection
A-1-EFS8-VCTRUNK1	VCTRUNK-1	Tag Aware	-	-	Enabled
A-1-EFS8-VCTRUNK2	VCTRUNK-2	Tag Aware	-	-	Enabled
A-1-EFS8-VCTRUNK3	VCTRUNK-3	Tag Aware	-	-	Enabled
A-1-EFS8-VCTRUNK4	VCTRUNK-4	Tag Aware	-	-	Enabled
A-1-EFS8-VCTRUNK5	VCTRUNK-5	Tag Aware	-	-	Enabled
A-1-EFS8-VCTRUNK6	VCTRUNK-6	Tag Aware	-	-	Enabled
A-1-EFS8-VCTRUNK7	VCTRUNK-7	Tag Aware	-	-	Enabled
A-1-EFS8-VCTRUNK8	VCTRUNK-8	Tag Aware	-	-	Enabled

c. Click the **Network Attributes** tab. After setting the parameters, click **Apply**.

TAG Attributes	Network Attributes	Encapsulation/Mapping	LCAS	Bound Path	Advanced Attributes
Port	Port Attributes				
A-1-EFS8-VCTRUNK1	UNI				
A-1-EFS8-VCTRUNK2	UNI				
A-1-EFS8-VCTRUNK3	UNI				
A-1-EFS8-VCTRUNK4	UNI				
A-1-EFS8-VCTRUNK5	UNI				
A-1-EFS8-VCTRUNK6	UNI				
A-1-EFS8-VCTRUNK7	UNI				
A-1-EFS8-VCTRUNK8	UNI				

d. Click the **Encapsulation/Mapping** tab. After setting the parameters, click **Apply**.

TAG Attributes	Network Attributes	Encapsulation/Mapping	LCAS	Bound Path	Advanced Attributes
Port	Mapping Protocol	Scramble	Set Inverse Value for CRC	Check Field Length	FCS Calculated Bit Sequence
A-1-EFS8-VCTRUNK1	GFP	Scrambling mode{K43+1}	-	FCS32	Big endian
A-1-EFS8-VCTRUNK2	GFP	Scrambling mode{K43+1}	-	FCS32	Big endian
A-1-EFS8-VCTRUNK3	GFP	Scrambling mode{K43+1}	-	FCS32	Big endian
A-1-EFS8-VCTRUNK4	GFP	Scrambling mode{K43+1}	-	FCS32	Big endian
A-1-EFS8-VCTRUNK5	GFP	Scrambling mode{K43+1}	-	FCS32	Big endian
A-1-EFS8-VCTRUNK6	GFP	Scrambling mode{K43+1}	-	FCS32	Big endian
A-1-EFS8-VCTRUNK7	GFP	Scrambling mode{K43+1}	-	FCS32	Big endian
A-1-EFS8-VCTRUNK8	GFP	Scrambling mode{K43+1}	-	FCS32	Big endian

e. Click the **Bound Path** tab. Click the **Configuration** button. Set the parameters based on **Table 2-12** in the **Bound Path Configuration** dialog box. Then, click **Apply**.

The screenshot shows the 'Bound Path Configuration' dialog box in the NE Explorer. On the left, 'Configurable Ports' is set to 'VCTRUNK4'. Under 'Available Bound Paths', 'Level' is 'VC12-xv' and 'Service Direction' is 'Bidirectional'. 'Available Resources' includes 'VC4-4'. 'Available Timeslots' includes 'VC12-31' through 'VC12-38'. The 'Selected Bound Paths' table is as follows:

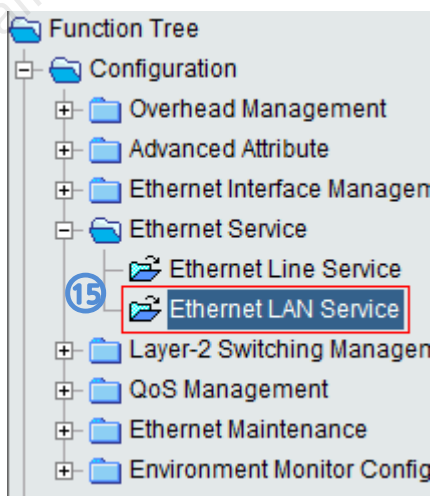
VCTRUNK Port	Level	Service Direction	Bound Path	Bound Path Count
VCTRUNK1	VC12-xv	Bidirectional	VC4-4-VC12(1-5)	5
VCTRUNK2	VC12-xv	Bidirectional	VC4-4-VC12(6-10)	5
VCTRUNK3	VC12-xv	Bidirectional	VC4-4-VC12(11-20)	10
VCTRUNK4	VC12-xv	Bidirectional	VC4-4-VC12(21-30)	10

Below the dialog, a table shows the configuration for all VCTRUNK ports:

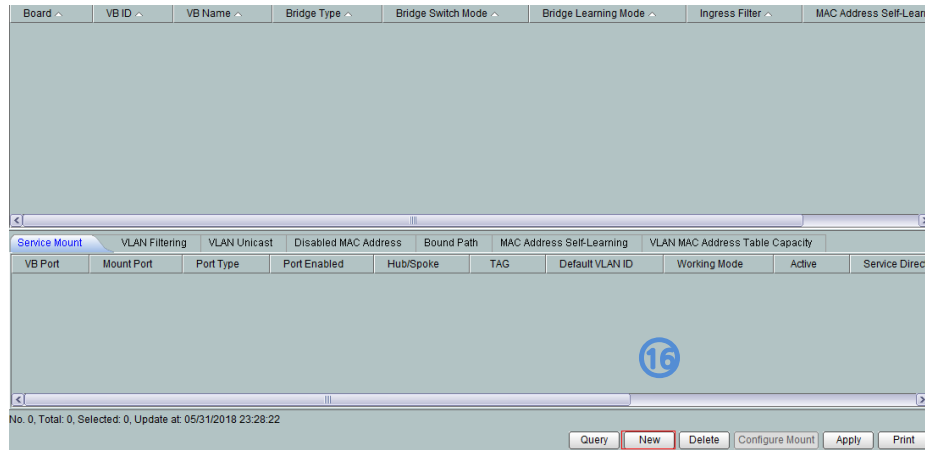
VCTRUNK ...	Level	Service Direction	Bound Path	Bound Path Count	Activation Status	Used Channel
VCTRUNK1	VC12-xv	Bidirectional	VC4-4-VC12(1-5)	5	Active	-
VCTRUNK2	VC12-xv	Bidirectional	VC4-4-VC12(6-10)	5	Active	-
VCTRUNK3	VC12-xv	Bidirectional	VC4-4-VC12(11-20)	10	Active	-
VCTRUNK4	VC12-xv	Bidirectional	VC4-4-VC12(21-30)	10	Active	-

Step 3 Create a bridge for the EFS8 board on NE A

a. In the NE Explorer, select the EFS8 board, and then choose **Configuration > Ethernet Service > Ethernet LAN Service** from the Function Tree.



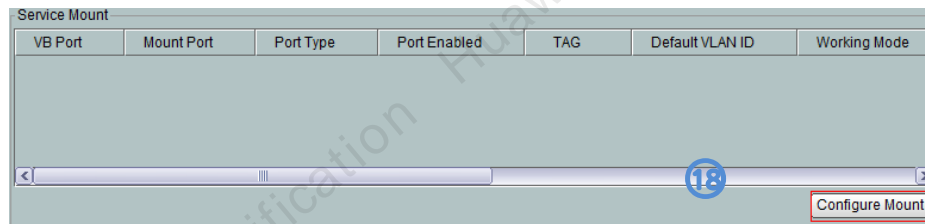
b. Click **New**.



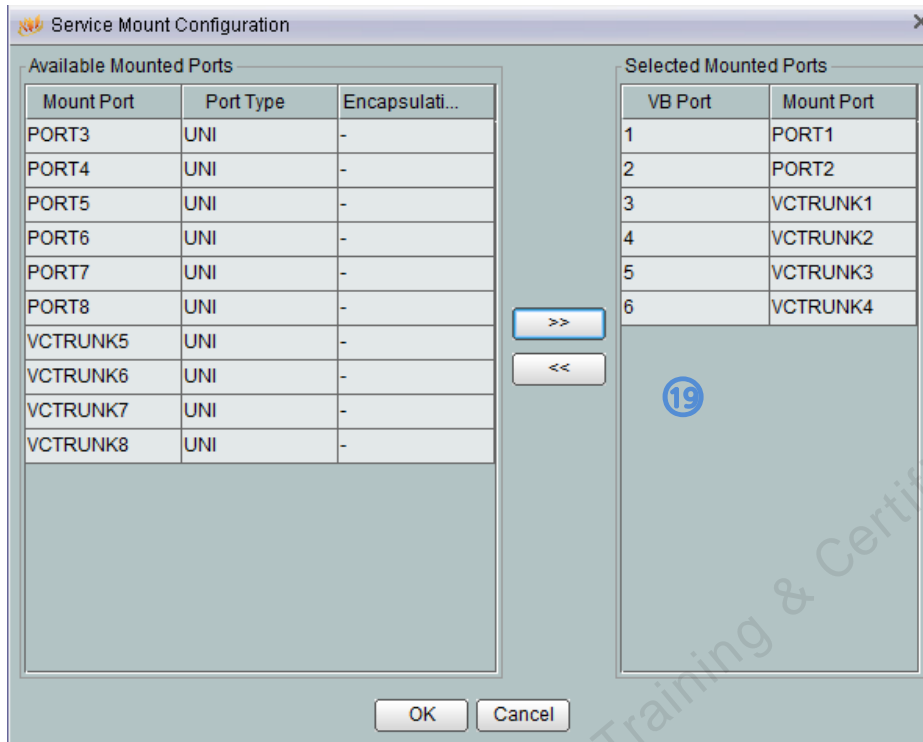
c. Set the parameters in the **Create Ethernet LAN Service** dialog box based on **Table 2-14**.

Attribute	Attribute Value
Board	A-1-EFS8
VB Name	VB1
Bridge Type	802.1q
Bridge Switch Mode	IVL/Ingress Filter Enable
Bridge Learning Mode	IVL
Ingress Filter	Enabled
MAC Address Self-Learning	Enabled

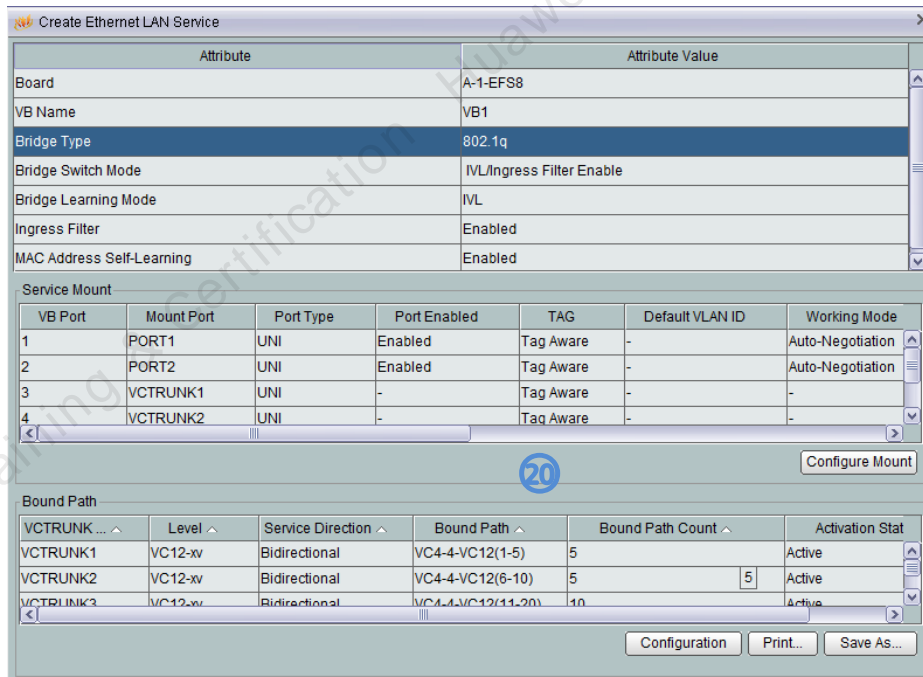
d. Click **Configure Mount**.



e. In the **Available Mounted Ports** window, select PORT1, PORT2, VCTRUNK1, VCTRUNK2, VCTRUNK3 and VCTRUNK4. Then move them to right. Click **OK**.

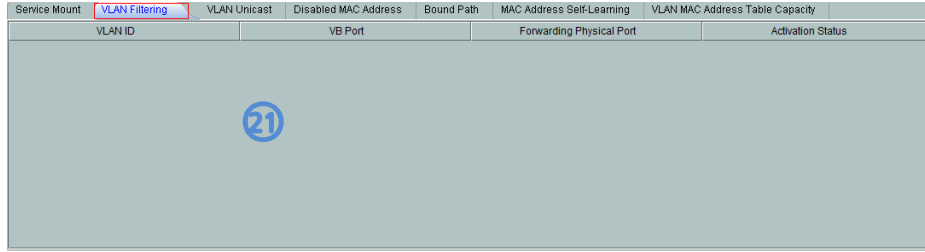


f. In the **Create Ethernet LAN Service** dialog box, click **OK**.

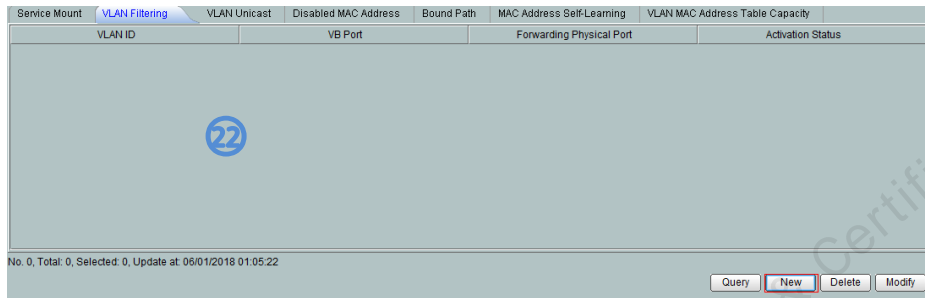


Step 4 Create a VLAN filtering table

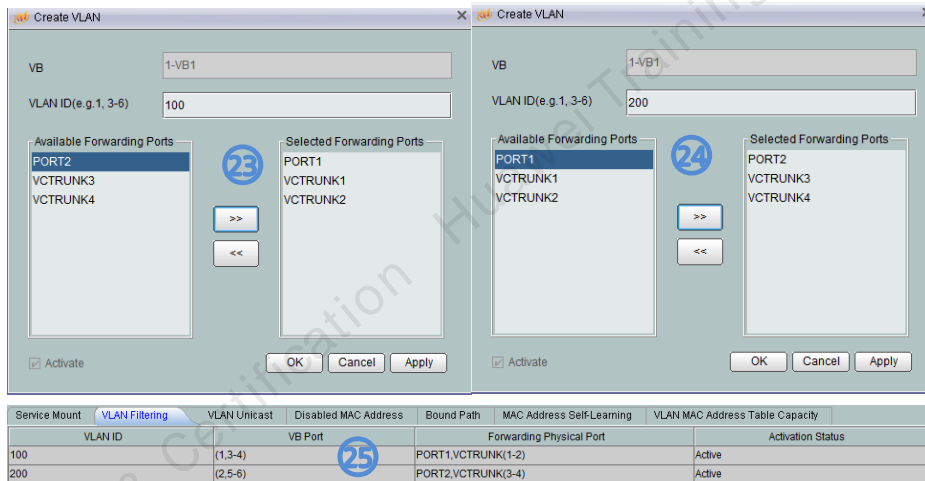
a. Select the created bridge and click the **VLAN Filtering** tab.



b. Click **New**.



c. Create the VLAN filtering table for user A1, user A2, and user A3.



Step 5 Change the Hub/Spoke attribute of the port that is mounted to the bridge.

a. Select the created bridge and click the **Service Mount** tab.

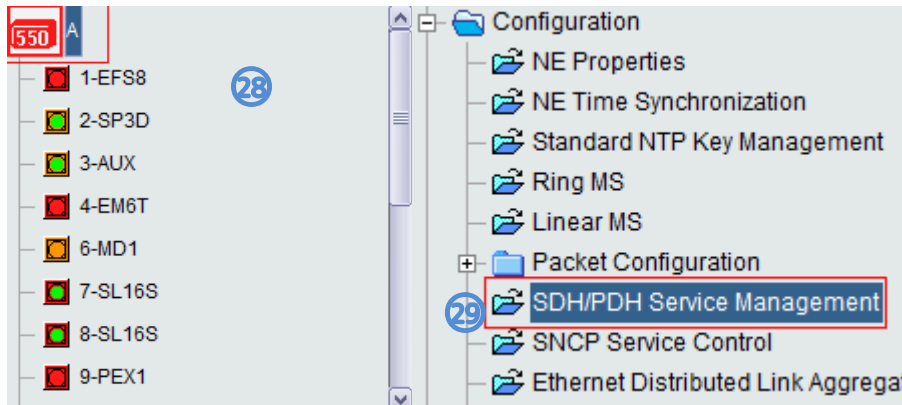
VB Port	Mount Port	Port Type	Port Enabled	Hub/Spoke	TAG	Default VLAN ID	Working Mode	Active	Service Dir
1	PORT1	UNI	Enabled	Hub	Tag Aware	-	Auto-Negotiation	Active	Bidirectional
2	PORT2	UNI	Enabled	Hub	Tag Aware	-	Auto-Negotiation	Active	Bidirectional
3	VCTRUNK1	UNI	-	Hub	Tag Aware	-	-	Active	Bidirectional
4	VCTRUNK2	UNI	-	Hub	Tag Aware	-	-	Active	Bidirectional
5	VCTRUNK3	UNI	-	Hub	Tag Aware	-	-	Active	Bidirectional
6	VCTRUNK4	UNI	-	Hub	Tag Aware	-	-	Active	Bidirectional

b. Change the Hub/Spoke attribute of the port that is mounted to the bridge based on **Table 2-14**. After setting the parameters, click **Apply**.

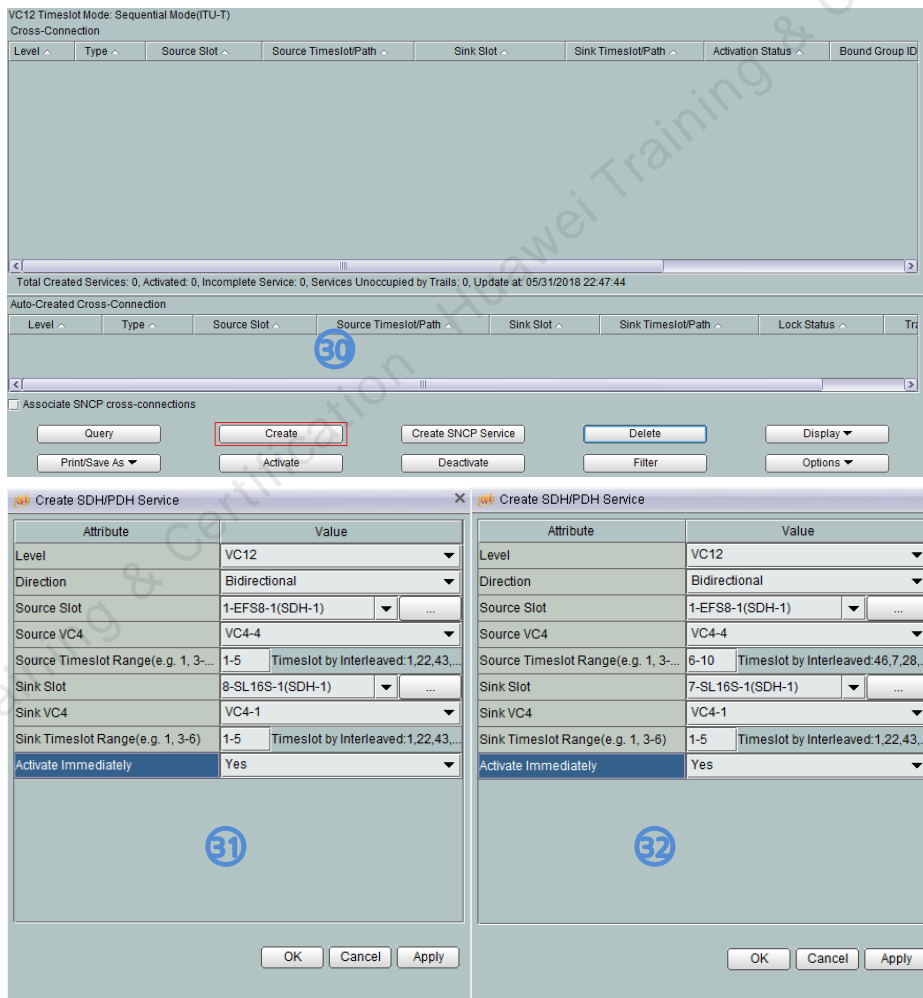
VB Port	Mount Port	Port Type	Port Enabled	Hub/Spoke	TAG	Default VLAN ID	Working Mode	Active	Service Dir
1	PORT1	UNI	Enabled	Hub	Tag Aware	-	Auto-Negotiation	Active	Bidirectional
2	PORT2	UNI	Enabled	Hub	Tag Aware	-	Auto-Negotiation	Active	Bidirectional
3	VCTRUNK1	UNI	-	Spoke	Tag Aware	-	-	Active	Bidirectional
4	VCTRUNK2	UNI	-	Spoke	Tag Aware	-	-	Active	Bidirectional
5	VCTRUNK3	UNI	-	Hub	Tag Aware	-	-	Active	Bidirectional
6	VCTRUNK4	UNI	-	Hub	Tag Aware	-	-	Active	Bidirectional

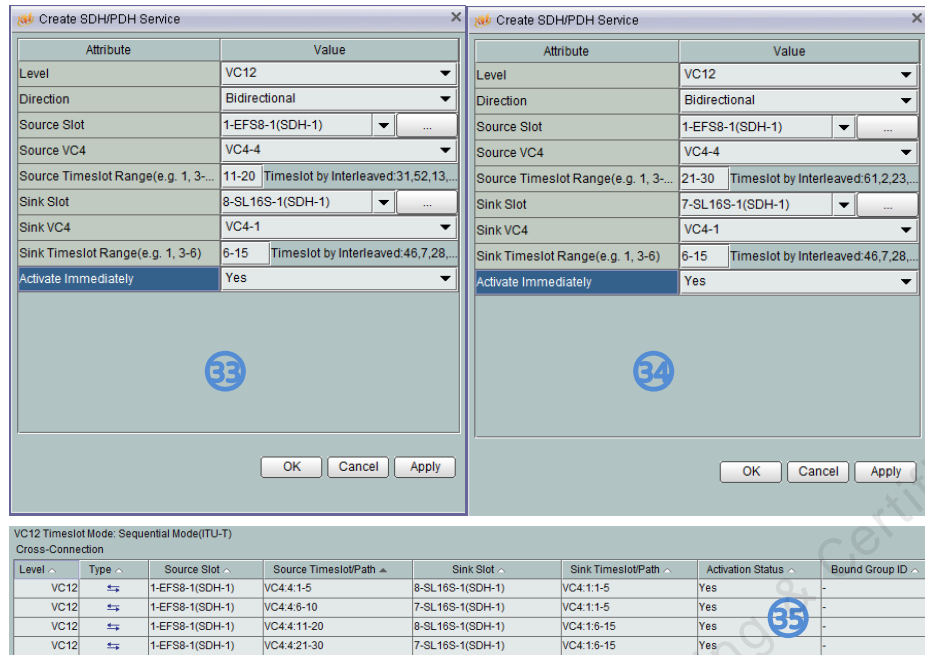
Step 6 Configure the cross-connections from Ethernet services to the SDH link for user A2, user A3, user B2, and user B3.

a. In the NE Explorer, select NE A and then choose **Configuration > SDH/PDH Service Configuration** from the Function Tree.



b. Click **Create** on the lower-right pane to display the **Create SDH/PDH Service** dialog box. Set the parameters.



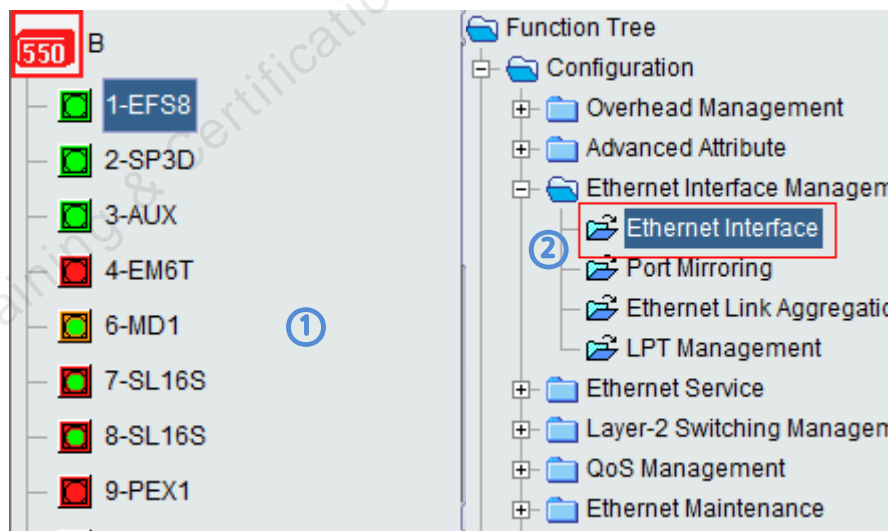


### 2.5.3.2 Configure the EPL Services on NE B and NE C.

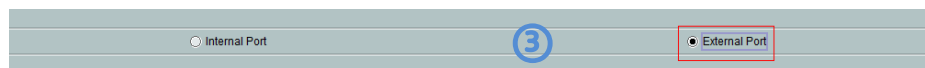
**Caution:** Here we use NE B as an example, the configuration of NE C is the same with NE B.

Step 1 Set the attributes of the external ports (PORT1 and PORT2 of the EFS8 board) used by the service of user A2 and user B2.

a. In the NE Explorer, select the EFS8 board, and then choose **Configuration > Ethernet Interface Management > Ethernet Interface** from the Function Tree.



b. Select **External Port**.



c. Click the **Basic Attributes** tab. After setting the parameters based on **Table 2-11**, click **Apply**.

Basic Attributes		Flow Control	TAG Attributes	Network Attributes	Advanced Attributes	Port Physical Parameters	MAC Loopback	PHY Loopb
Port	Name	Enabled/Disabled	Working Mode	Maximum Frame Length (bytes)				
B-1-EFS8-PO	PORT-1	Enabled	Auto-Negotiation	1522			Non-Loopback	Non-Loopback
B-1-EFS8-PO	PORT-2	Enabled	Auto-Negotiation	1522			Non-Loopback	Non-Loopback
B-1-EFS8-PO	PORT-3	Disabled	Auto-Negotiation	1522			Non-Loopback	Non-Loopback
B-1-EFS8-PO	PORT-4	Disabled	Auto-Negotiation	1522			Non-Loopback	Non-Loopback
B-1-EFS8-PO	PORT-5	Disabled	Auto-Negotiation	1522			Non-Loopback	Non-Loopback
B-1-EFS8-PO	PORT-6	Disabled	Auto-Negotiation	1522			Non-Loopback	Non-Loopback
B-1-EFS8-PO	PORT-7	Disabled	Auto-Negotiation	1522			Non-Loopback	Non-Loopback
B-1-EFS8-PO	PORT-8	Disabled	Auto-Negotiation	1522			Non-Loopback	Non-Loopback

Step 2 Set the attributes of the internal port (VCTRUNK1 and VCTRUNK2 on the EFS8 board) used by the services between user A1 and user A2 and between B1 and user B2.

a. Select **Internal Port**.

b. Click the **TAG Attributes** tab. Set the parameters based on **Table 2-13**, click **Apply**.

Basic Attributes		Flow Control	TAG Attributes	Network Attributes	Advanced Attributes	VLAN Priority	Entry Detection
Port		TAG	Default VLAN ID				
B-1-EFS8-PORT1		Tag Aware	-				Enabled
B-1-EFS8-PORT2		Tag Aware	-				Enabled
B-1-EFS8-PORT3		Tag Aware	-				Enabled
B-1-EFS8-PORT4		Tag Aware	-				Enabled
B-1-EFS8-PORT5		Tag Aware	-				Enabled
B-1-EFS8-PORT6		Tag Aware	-				Enabled
B-1-EFS8-PORT7		Tag Aware	-				Enabled
B-1-EFS8-PORT8		Tag Aware	-				Enabled

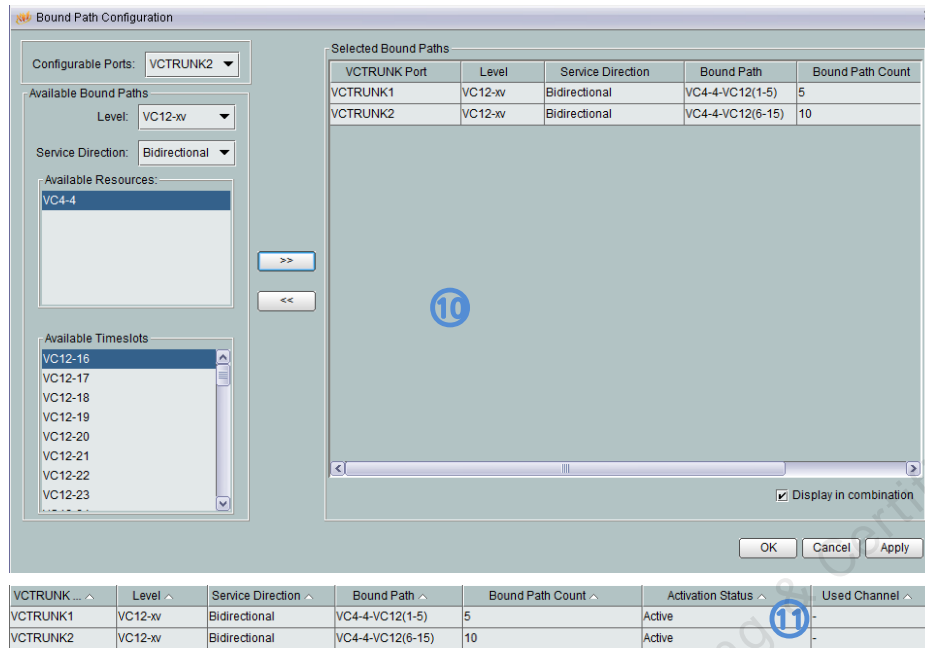
c. Click the **Network Attributes** tab. After setting the parameters, click **Apply**.

TAG Attributes		Network Attributes	Encapsulation/Mapping	LCAS	Bound Path	Advanced Attributes
Port		Port Attributes				
B-1-EFS8-VCTRUNK1		UNI				
B-1-EFS8-VCTRUNK2		UNI				
B-1-EFS8-VCTRUNK3		UNI				
B-1-EFS8-VCTRUNK4		UNI				
B-1-EFS8-VCTRUNK5		UNI				
B-1-EFS8-VCTRUNK6		UNI				
B-1-EFS8-VCTRUNK7		UNI				
B-1-EFS8-VCTRUNK8		UNI				

d. Click the **Encapsulation/Mapping** tab. After setting the parameters, click **Apply**.

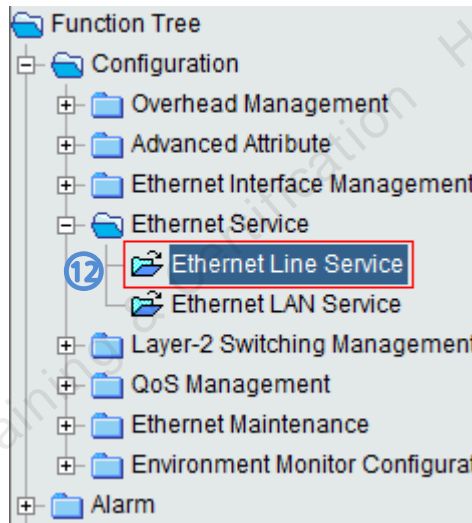
TAG Attributes	Network Attributes	Encapsulation/Mapping	LCAS	Bound Path	Advanced Attributes
Port	Mapping Protocol	Scramble	Set Inverse Value for CRC	Check Field Length	FCS Calculated Bit Sequen
B-1-EFS8-VCTRUNK1	GFP	Scrambling mode[X43+1]	-	FCS32	Big endian
B-1-EFS8-VCTRUNK2	GFP	Scrambling mode[X43+1]	-	FCS32	Big endian
B-1-EFS8-VCTRUNK3	GFP	Scrambling mode[X43+1]	-	FCS32	Big endian
B-1-EFS8-VCTRUNK4	GFP	Scrambling mode[X43+1]	-	FCS32	Big endian
B-1-EFS8-VCTRUNK5	GFP	Scrambling mode[X43+1]	-	FCS32	Big endian
B-1-EFS8-VCTRUNK6	GFP	Scrambling mode[X43+1]	-	FCS32	Big endian
B-1-EFS8-VCTRUNK7	GFP	Scrambling mode[X43+1]	-	FCS32	Big endian
B-1-EFS8-VCTRUNK8	GFP	Scrambling mode[X43+1]	-	FCS32	Big endian

e. Click the **Bound Path** tab. Click the **Configuration** button. Set the parameters based on **Table 2-13** in the **Bound Path Configuration** dialog box. Then, click **Apply**.

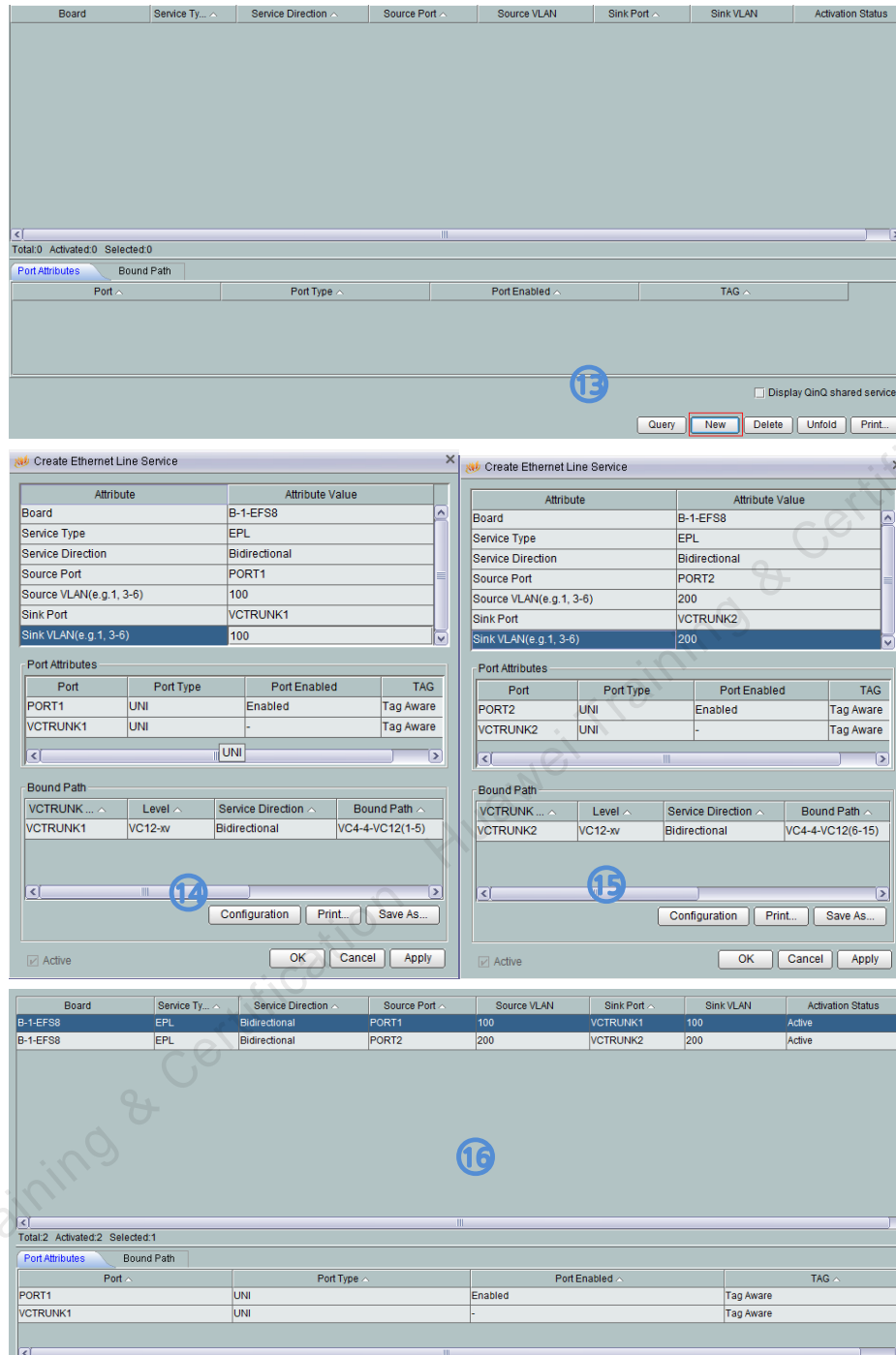


Step 3 Configure the Ethernet private line services between user A1 and user A2 and between user B1 and user B2.

a. In the NE Explorer, select the EFS8 board, and then choose **Configuration > Ethernet Service > Ethernet Line Service** from the Function Tree.



b. Click **New** on the lower-right pane to display the **Create Ethernet Line Service** window. Set the parameters and then click **OK**. The **Operation Result** dialog box is displayed, indicating that the operation is successful. Click **Close**.



The screenshot displays the configuration interface for Ethernet Line Services in the NE Explorer. It is divided into three main sections:

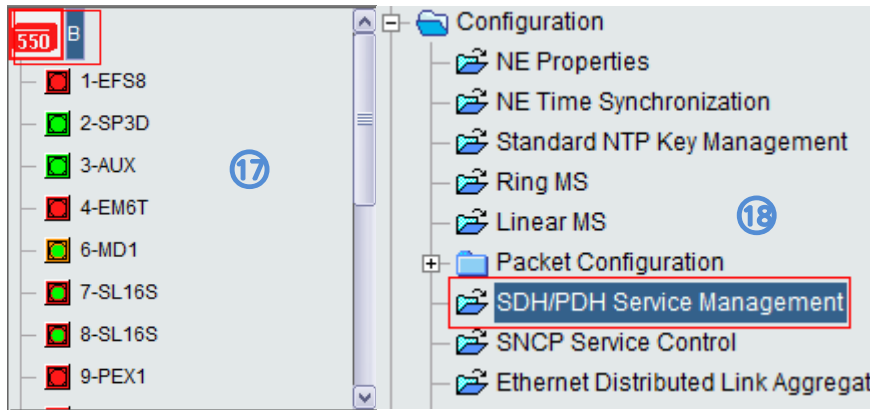
- Top Section:** A table with columns: Board, Service Type, Service Direction, Source Port, Source VLAN, Sink Port, Sink VLAN, and Activation Status. The status bar shows "Total:0 Activated:0 Selected:0".
- Middle Section (Step 14 & 15):** Two "Create Ethernet Line Service" dialog boxes.
  - Step 14:** Shows configuration for a service on board B-1-EFS8. Service Type is EPL, Service Direction is Bidirectional, Source Port is PORT1, Source VLAN is 100, Sink Port is VCTRUNK1, and Sink VLAN is 100. The Port Attributes table shows PORT1 and VCTRUNK1 both as UNI ports, with PORT1 enabled and Tag Aware.
  - Step 15:** Shows configuration for a service on board B-1-EFS8. Service Type is EPL, Service Direction is Bidirectional, Source Port is PORT2, Source VLAN is 200, Sink Port is VCTRUNK2, and Sink VLAN is 200. The Port Attributes table shows PORT2 and VCTRUNK2 both as UNI ports, with PORT2 enabled and Tag Aware.
- Bottom Section (Step 16):** A summary table showing the configured services:
 

Board	Service Type	Service Direction	Source Port	Source VLAN	Sink Port	Sink VLAN	Activation Status
B-1-EFS8	EPL	Bidirectional	PORT1	100	VCTRUNK1	100	Active
B-1-EFS8	EPL	Bidirectional	PORT2	200	VCTRUNK2	200	Active

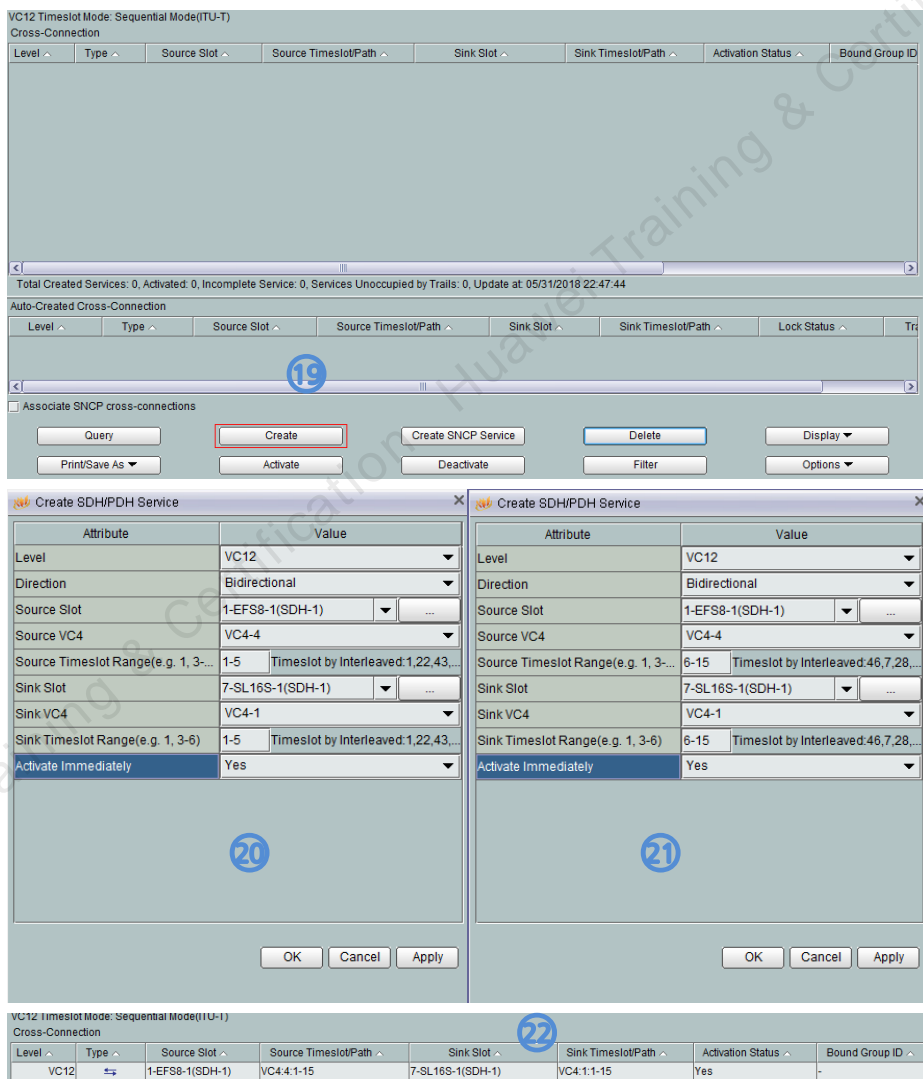
 The status bar shows "Total:2 Activated:2 Selected:1".

Step 4 Configure the cross-connections from the Ethernet services to the SDH links for user A2 and user B2.

a. In the NE Explorer, select NE B and then choose **Configuration > SDH/PDH Service Configuration** from the Function Tree.



b. Click **Create** on the lower-right pane to display the **Create SDH/PDH Service** dialog box. Set the parameters.

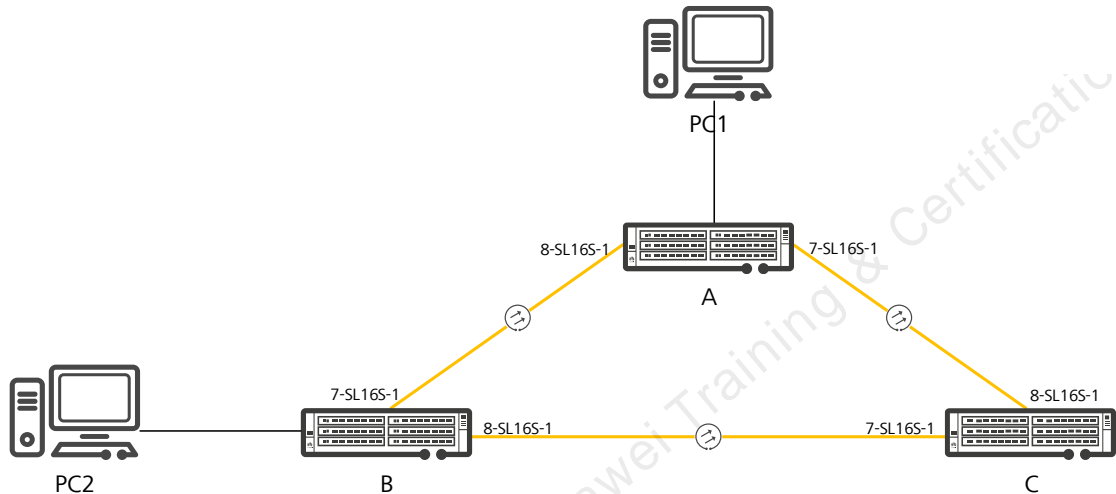


## 2.6 Testing

### 2.6.1 Testing Ethernet Service Availability using Ping Test

You can access the computer at both ends of the Ethernet service and run the ping command to test the availability of the Ethernet service.

**Figure 2-10 Connection Diagram for Testing Ethernet Services**



### 2.6.2 Testing Procedure

- Step 1 Connect the computer network port to the Ethernet service port on the device according to the Figure 2-10
- Step 2 Set the IP addresses of PC 1 and PC 2 to ensure that the IP addresses are in the same network segment. For example: Set the IP address of PC1 to 192.168.0.100 and subnet mask to 255.255.255.0. Set the IP address of PC2 to 192.168.0.101 and subnet mask to 255.255.255.0.
- Step 3 On the PC 1, Open **cmd** dialog box, enter the ping command: ping 192.168.0.101 and run the ping command (-ping 192.169.0.101). Observe the test result.
  - a. If the message "Reply from 192.168.0.101: bytes=64 time=1ms TTL=255" is displayed, this information indicates that the Ethernet service is normal.
  - b. If "Request timed out" is displayed, the Ethernet service is abnormal. Check the network cable connection and Ethernet service configuration. Perform the test again after rectifying the fault.



## Recommendations

- Huawei Learning Website
  - <http://learning.huawei.com/en>
- Huawei e-Learning
  - <https://ilearningx.huawei.com/portal/#/portal/ebg/51>
- Huawei Certification
  - [http://support.huawei.com/learning/NavigationAction!createNavi?navId=\\_31&lang=en](http://support.huawei.com/learning/NavigationAction!createNavi?navId=_31&lang=en)
- Find Training
  - [http://support.huawei.com/learning/NavigationAction!createNavi?navId=\\_trainingsearch&lang=en](http://support.huawei.com/learning/NavigationAction!createNavi?navId=_trainingsearch&lang=en)



## More Information

- Huawei learning APP

