

USER MANUAL

# FOXMAN-UN

## Circuit Emulation Application

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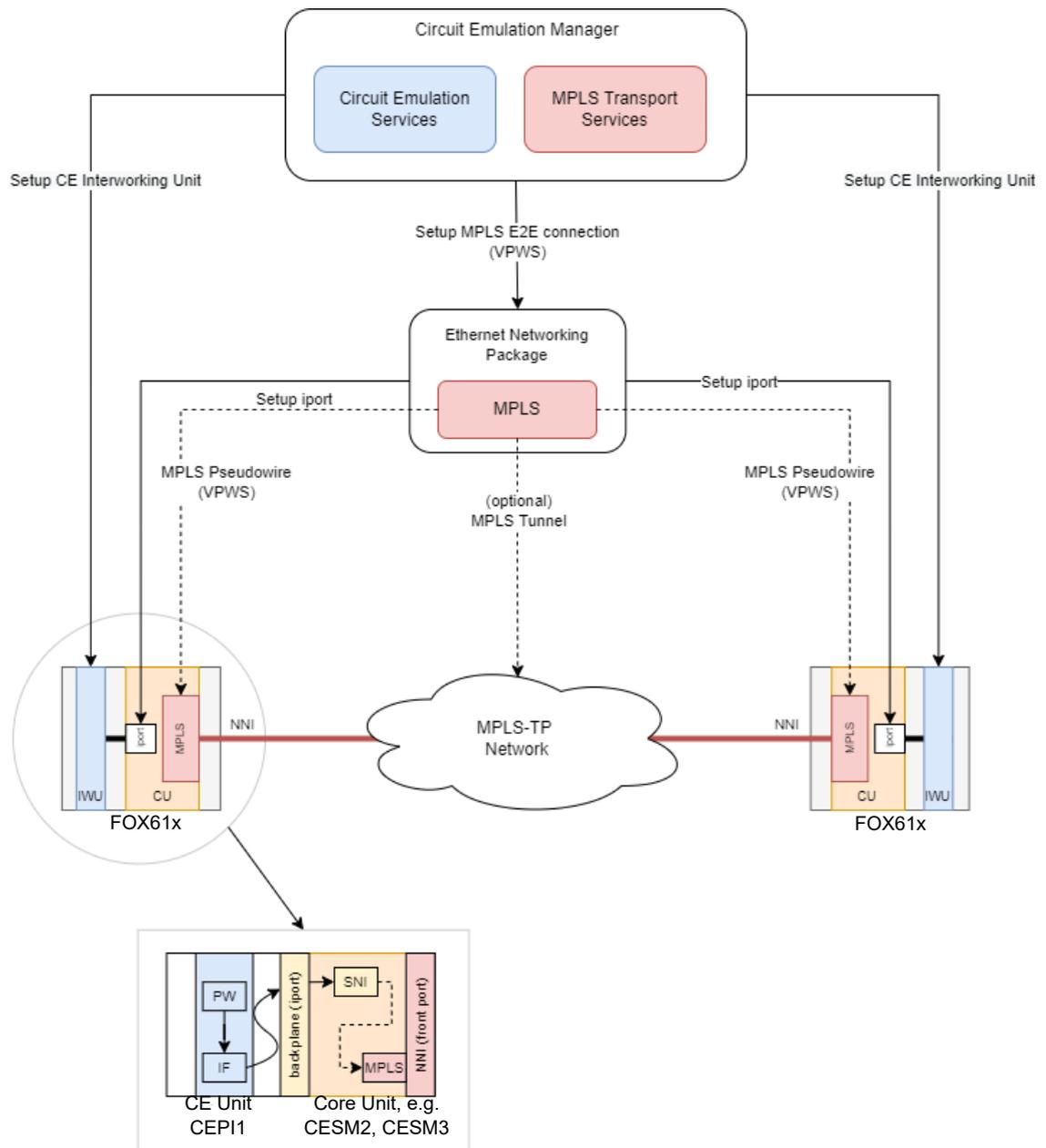
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# 1 Introduction

## 1.1 General

This document provides a general description of the Circuit Emulation service in FOXMAN-UN. The Circuit Emulation Manager (CEM) allows you to manage point-to-point (P2P) circuit emulation (CE) services between CE Interworking Units (CE Unit) and Circuit services between suitable TDM Units. A CE Unit is a unit which is capable of transmitting TDM traffic over Ethernet. Circuit Emulation Services (CES) are composed out of CE configuration on CE Unit and Ethernet transport service forwarding the traffic over the Packet Switched Network (PSN). The CEM is responsible for provisioning and management of the CE services including automatic provision of the MPLS-TP P2P transport services. Usage of the FOXCST during CE service provisioning is reduced to a minimum.



Main Circuit Emulation Manager functions:

- Create and delete P2P Circuit Emulation Services using a dedicated wizard;

- Create and delete P2P MPLS-TP VPWS;
- Create and delete P2P end-to-end Circuit Services for TDM circuits making use of Circuit Emulation Services.
- Discover currently deployed CE configuration in the network, based on UUID number placed in Label2 of CE Unit pseudowire and the service VLAN interface (see Figure 1);
  - underlying VPWS services are automatically detected.

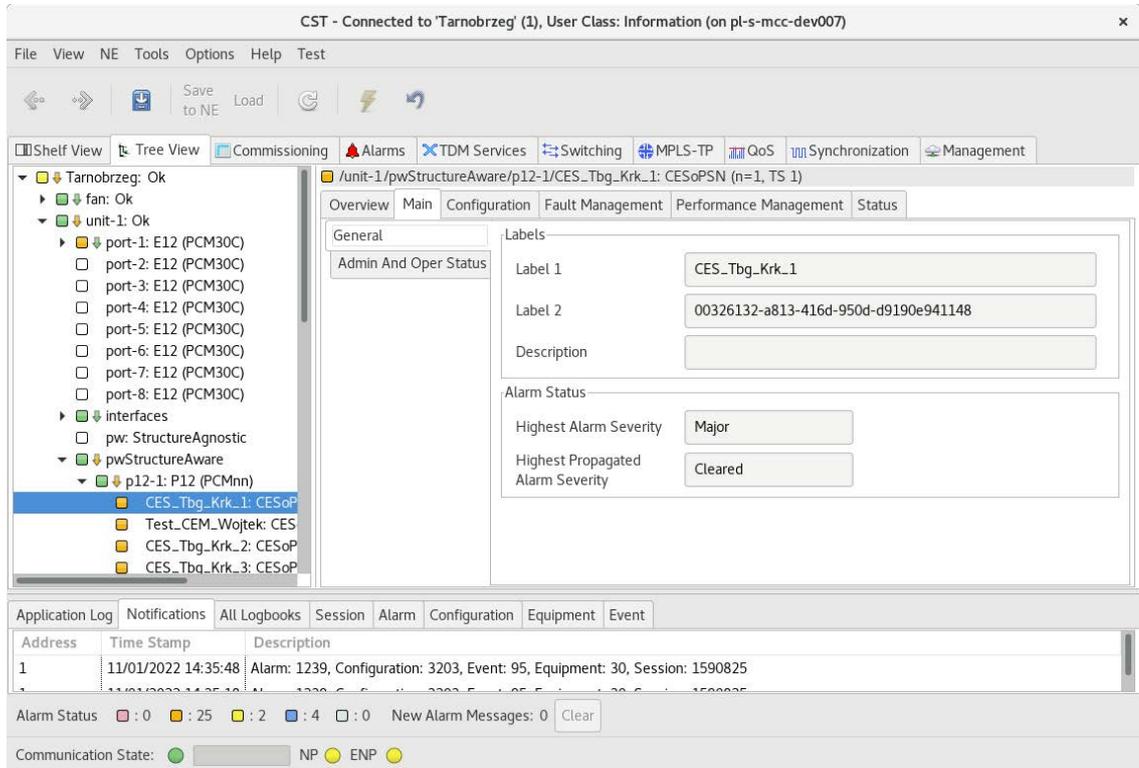


Figure 1: UUID stored in Label 2 of the CESoPSN endpoint

A Circuit Emulation service requires an MPLS-TP VPWS service to be created. A VPWS matching the CE bandwidth requirements between node internal ports (iports) is automatically created on corresponding endpoints. This is done during service creation with the “Create CES” wizard. An MPLS tunnel is created automatically during service creation with the “Create CES” wizard if a tunnel matching the requirements does not yet exist. For the VPWS, a service profile and Class-Type can be selected during creation. When a CES is deleted from the system, the underlying VPWS is also removed from the network.



Figure 2: Circuit Emulation application start tile

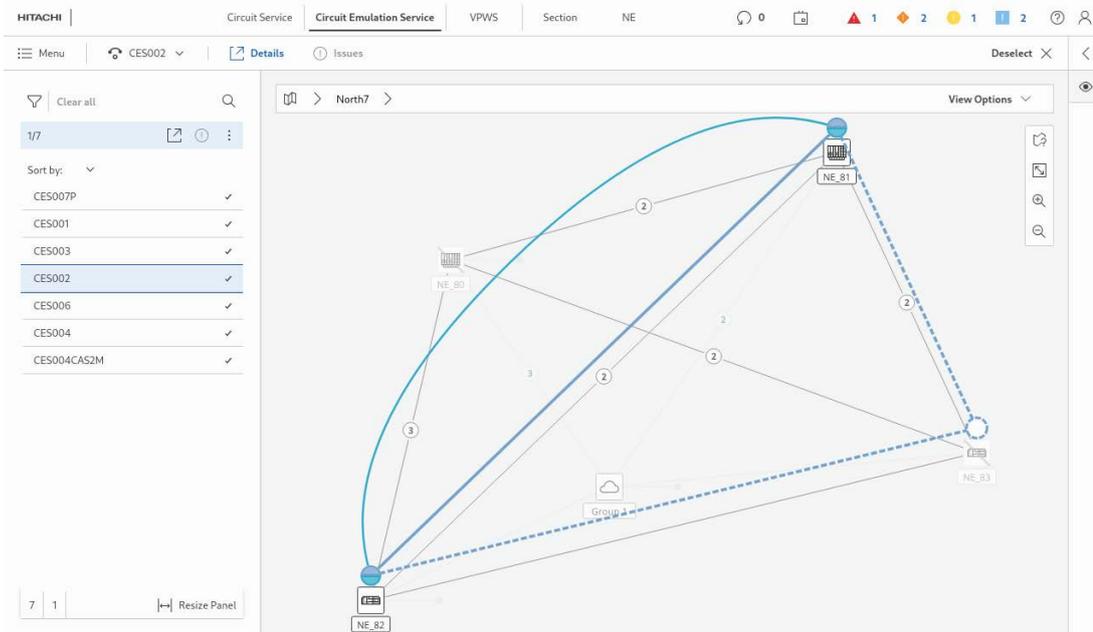
The Web UI “Circuit Emulation” application provides a network-wide view of the existing configuration:

- list of Circuit Emulation services,
- list of Circuit services,
- list of VPWS used by the CE services,
- list of Network Elements (NE) having Interworking Units,
- list of sections.

## 2 UI Overview

### 2.1 Circuit Emulation Services Tab

This view shows a list of Circuit Emulation services which are deployed in the network. Selected services are also shown on the map if the list is not expanded to full window width.



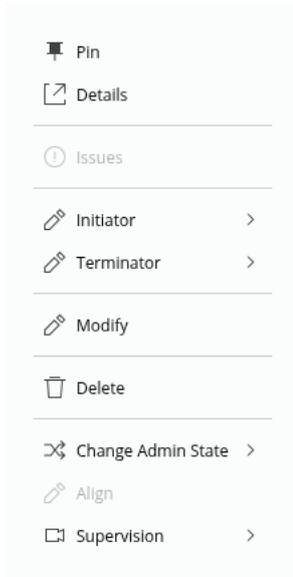
The list can be filtered, and the columns shown can be selected via the icon in the lower right corner.

By using the “+” or “+ Create” button while not having an existing service selected, a new Circuit Emulation service can be created; see section 3.3 "Circuit Emulation Service Provisioning".

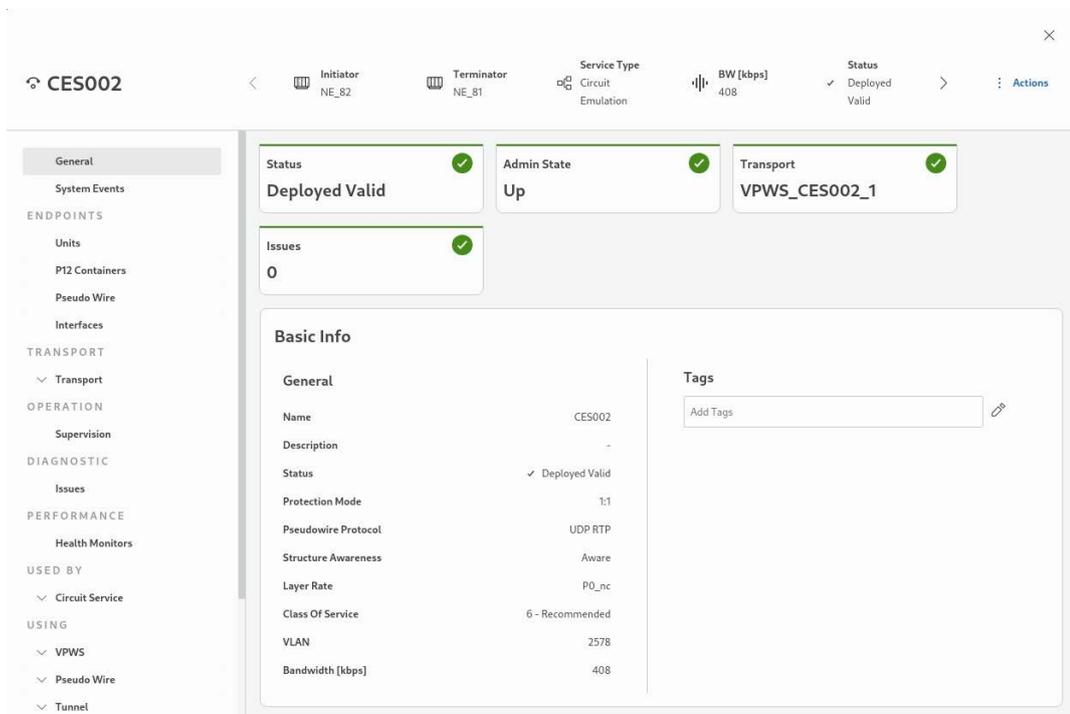
A listed CE service is discoverable by the CEM based on the Label 2 value of both Pseudowire (PW) endpoints.

#### 2.1.1 Details View

In order to open details of a selected CES, use the “Details” option from the action menu; the action menu is opened from the three dots in the ribbon:



The CES Details view is presented as follows:



It provides the following hierarchical structure of Categories:

- General,
  - Basic Info (default view when opening the dialog)
- Endpoints,
  - Units,
  - P12 Containers,
  - Pseudowires,
  - Interfaces,
- Transport,
  - Basic Info,
  - Endpoints,
- Operation

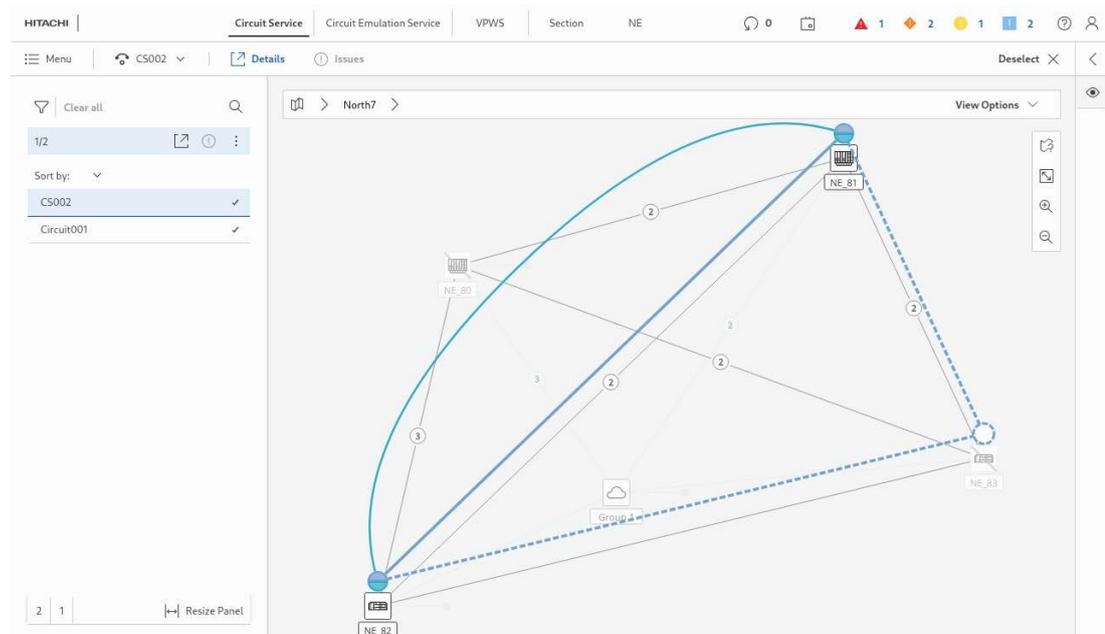
- Supervision
- Diagnostic,
  - Issues,
- Performance
  - Health Monitors
- Used By
  - Circuit Service
- Using
  - a list of items the selected service is using, such as VPWS, Pseudo Wire, Tunnel, Service Profile, Class Type, Section, Network Element.

which are available in left pane navigation. A category can have sub-categories which are all co-located in one auto-expanding and collapsing view. In order to go to a particular sub-category section select it in the left pane navigation, or scroll up or down in the right pane.

Back in the list of CE services, from the context menu, you can also change the administrative state (Admin State) of a service to “up” or “down”.

## 2.2 Circuit Service Tab

This view shows TDM circuits involved in CE services. It provides information on ports and cross connections used by the service in the TDM area.

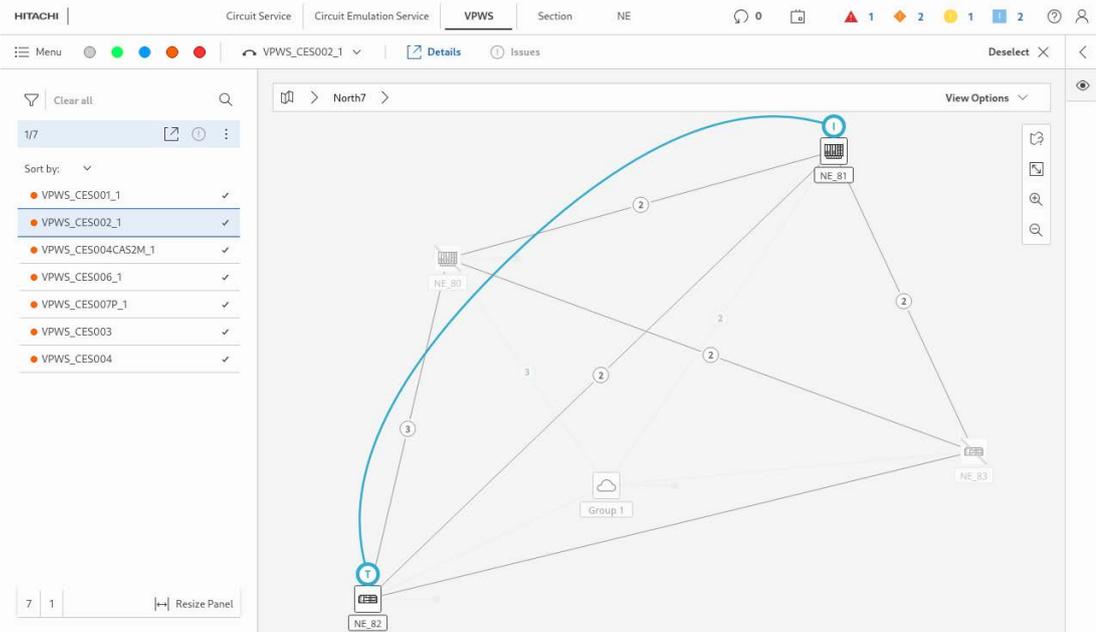


The list can be filtered, and the columns shown can be selected via the icon in the lower right corner.

By using the “+” or “+ Create” button, a new Circuit Service can be created; see section [3.5 "End-to-End TDM Services"](#).

## 2.3 VPWS Tab

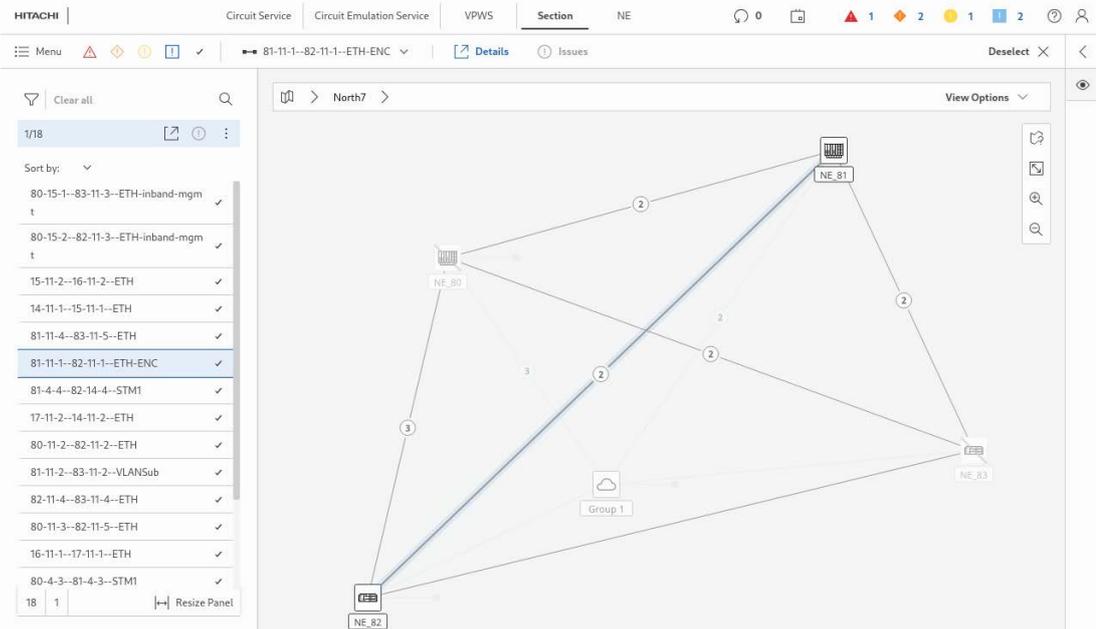
This view shows basic information about only those VPWS which are in use by CE Services.



The list can be filtered, and the columns shown can be selected via the icon in the lower right corner.

## 2.4 Section Tab

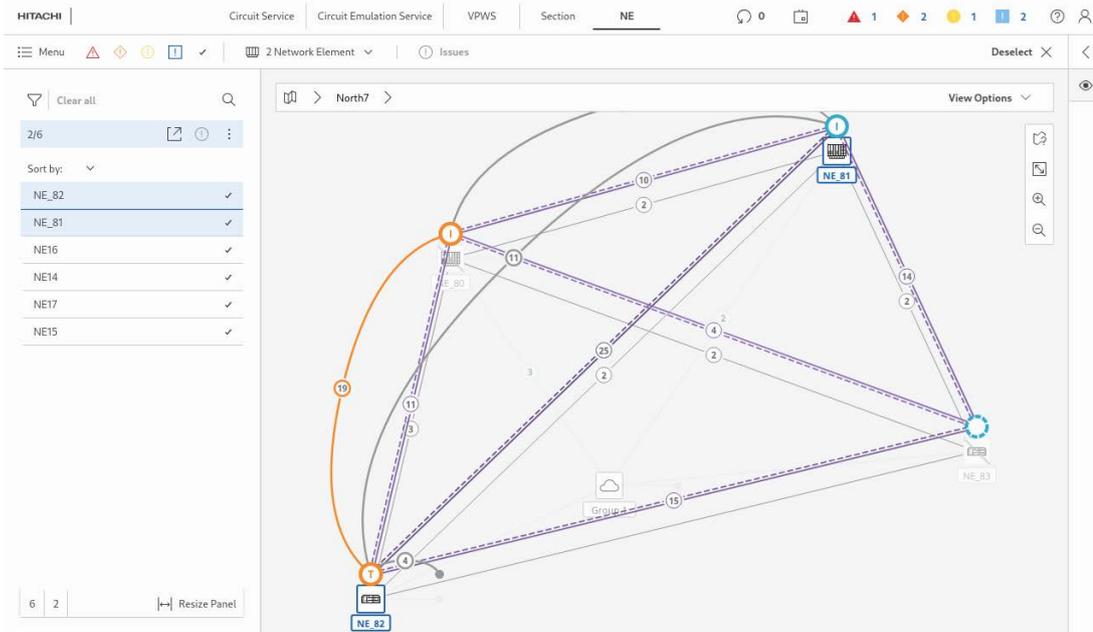
This view shows all sections which are present in the system.



The list can be filtered, and the columns shown can be selected via the icon in the lower right corner.

## 2.5 NE Tab

All NEs in the selected network are visible in this view. As a default, a filter can be set to view NEs only that belong to the CEM domain. In the network view, e.g., the “Show Transport” option can be selected:



In the list view (via “Resize Panel”) Circuit Emulation capable NEs are shown by default:

Name	Addressing	Operational State	CE Structure Mode	Supported Service Types	Highest Alarm Severity	Performance State	Validity	Issues
NE_82	192.168.3.122	Manageable	Aware	CircuitEmulation MPL	✓ Cleared	✓ Ok	✓ Current	0
NE_81	192.168.3.181	Manageable	Aware	CircuitEmulation MPL	✓ Cleared	✓ Ok	✓ Current	0
NE16	172.31.80.16	Manageable	Agnostic	CircuitEmulation MPL	✓ Cleared	⊛ Unavailable	No Data	0
NE14	172.31.80.14	Manageable	Aware Agnostic	CircuitEmulation MPL	✓ Cleared	⊛ Unavailable	No Data	0
NE17	172.31.80.17	Manageable	Agnostic	CircuitEmulation MPL	✓ Cleared	⊛ Unavailable	No Data	0
NE15	172.31.80.15	Manageable	Aware Agnostic	CircuitEmulation MPL	✓ Cleared	⊛ Unavailable	No Data	0

The list can be filtered, and the columns shown can be selected via the icon in the lower right corner.

Basic information is present alongside to service specific data - preferably with the “CEM” filter selected, such as:

- Structure modes that are available on a given NE; at least one CE unit working in that mode must be present (“CE Structure Mode” column):
  - Aware,
  - Agnostic.
- Support for services types (“Supported Service Types” column), such as:
  - CircuitEmulation,
  - MPLS-TP,
  - TDM,
  - Teleprotection.

### 3 Feature Description

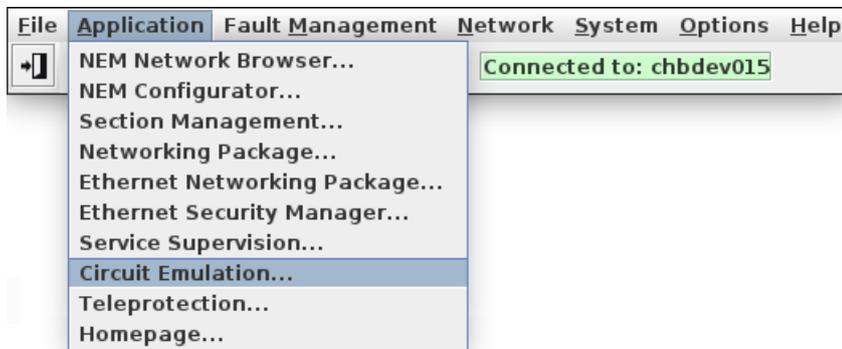
This section covers the following subjects:

- [System Operation](#),
- [Main GUI](#),
- [Circuit Emulation Service Provisioning](#), [Circuit Emulation Service Removal](#),
- [End-to-End TDM Services](#),
- [VPWS \(Virtual Private Wire Services\)](#),
- [NE \(Network Elements\)](#),
- [Section](#).

#### 3.1 System Operation

The Circuit Emulation application is a Web UI based application. It can be started from the following NEM Desktop menu:

**NEM Desktop > Application > Circuit Emulation...**



The CEM service is listed in the Services Management list of the NEM Remote Admin Tool. It is running by default and can be started or stopped only together with other NEM Core services.

The Circuit Emulation application can also be called from the Homepage via the "Circuit Emulation" tile within the "Configuration" group:



#### 3.2 Main GUI

The user interface provides the following five main tabs:



Circuit Service, see

- [End-to-End TDM Services](#)
- [Creating end-to-end Circuit.](#)



Circuit Emulation Service (selected by default when opening the CEM UI), see

- [Circuit Emulation Service Provisioning](#),
- [Circuit Emulation Service Removal](#).

Circuit Service	Circuit Emulation Service	<b>VPWS</b>	Section	NE
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VPWS, see [VPWS \(Virtual Private Wire Services\)](#).

Circuit Service	Circuit Emulation Service	VPWS	<b>Section</b>	NE
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Section, see [Section](#).

Circuit Service	Circuit Emulation Service	VPWS	Section	<b>NE</b>
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NE, see [NE \(Network Elements\)](#).

## 3.3 Circuit Emulation Service Provisioning

### 3.3.1 Prerequisites

To start creating a point-to-point Circuit Emulation service, both NEs which are meant to be the service endpoints (Initiator NE, Terminator NE) need to:

- be manageable;
- be present in NP and ENP domains;
- have at least one CE unit which is assigned and still has available resources in terms of:
  - maximum number of interfaces,
  - maximum number of Pseudowires,
  - free timeslots in P12 containers (Structure Aware only),
- be operating in required Structure Mode: Aware or Agnostic (for details see CEPI1 user manual, sections 5.5 (CESoP configuration model), 5.6 (Packet parameters), 6.1 and 6.2 (Commissioning of a Pseudo Wire)),
- if MEF8 is going to be used: be operating in needed MEF8 Protocol: with or without Real-Time Protocol (RTP),

If the service is going to use MEF8 Broadcast MAC addressing:

- the CE units need to operate in the mode supporting it.

Transport Service requirements:

- VPWS Service Profile exists which is compatible in several required parameters. The compatibility checks include:
  - Bandwidth (BW): if the SP BW is smaller than required service BW, and BW variability in SP is set to fixed, the SP is not eligible.
  - Protection (Prot): if the SP Prot variability is set to variable, the SP is not eligible.
  - Protection (Prot): only SP with protected or unprotected tunnel with fixed protection variability is eligible.
  - A-end and Z-end UNI port configuration of the transport VPWS (UNI): only SP with scheduling profile equal to UNI scheduling profile is eligible.
  - BW Enforcement: SP is eligible only if with BW Enforcement can be enabled.
  - CoS Type (CT): If the CoS Type in the SP cannot be changed to “PCP”, the SP is not eligible.
  - CoS Type (CT): If the CoS Type in the SP cannot be changed to “DSCP”, the SP is not eligible.
  - CoS Type (CT): If the CoS Type in the SP cannot be changed to “INTERFACE”, the SP is not eligible.
  - CoS Type (CT): If the Default Priority in the SP cannot be changed, the SP is not eligible.

- Link path between Initiator NE and Terminator NE exists and meets bandwidth requirements considering Service Profile Class Type allocation.



**Please note:**

To complete the service provisioning, a TDM Circuit Service needs to be created after the point-to-point Circuit Emulation Service has been created any deployed.

→ The procedure to create the TDM Circuit Service is described in section **End-to-End TDM Services**.

### 3.3.2 Starting the ‘Create CES’ Wizard

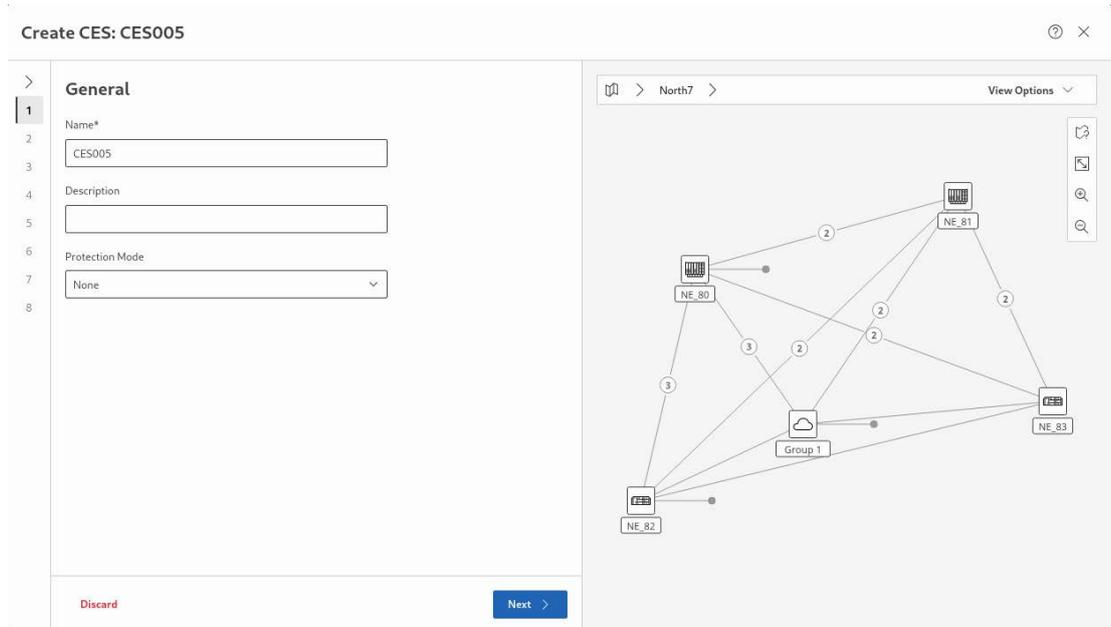
- Navigate to the Circuit Emulation Service tab:



- Use the “+ Create” action button:

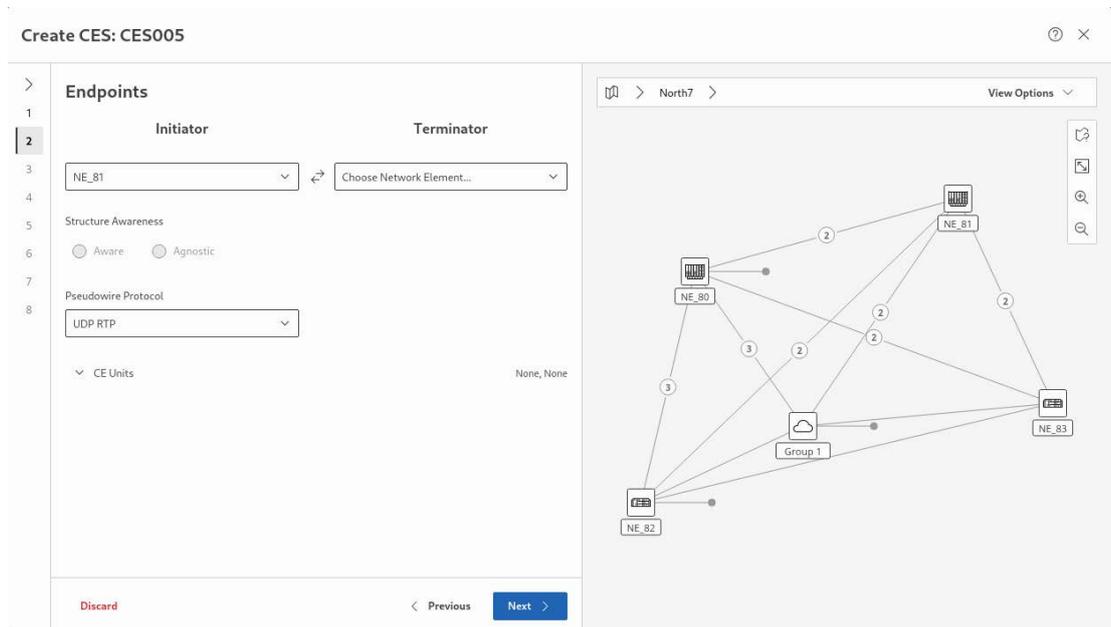
- The “Create CES” wizard dialog window appears in front of the CEM:
- Follow the steps in the “Create CES” wizard (**bold** parameters are mandatory and require user input).

## 1 General



- **Name** - maximum 50 characters long. It should be descriptive but concise.
  - **Description** – not required, optional field, maximum 50 characters long.
  - **Protection Mode** - select from “None”, “1:1”. Default is “None”.
- click “Next >” to proceed.

## 2 Endpoints



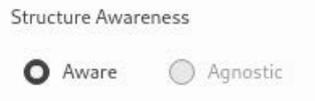
- **Initiator** and **Terminator** NEs.



**Please note:**

Initiator and Terminator selectors are showing only those NEs which have at least one CE-capable unit, other NEs will not be shown. If required, for information purposes, non-suitable NEs can be included by activating the “Show All” option below the list.

- Structure Awareness mode:



**Please note:**

Both Initiator and Terminator NEs must be equipped with a CE unit working in selected Structure Awareness Mode, i.e. the “Structure Awareness” mode must match the “CES Mode” in “Configuration - General” of the unit configuration (via FOXCAST). If the two do not match, the unit cannot be selected as CE unit.

- Pseudowire Protocol:
  - MEF8
  - MEF8 RTP
  - UDP
  - UDP RTP



**Please note:**

The CEPI1 unit cannot operate in MEF8 and MEF8 RTP protocols at once; all Pseudowires configurations must use either of them.



- CE units selection; the user can see a list of available CE units on the selected NEs:



After Initiator and Terminator NEs are chosen, the wizard is automatically selecting the first applicable CE unit. If other units are available, you can select one of these if required.

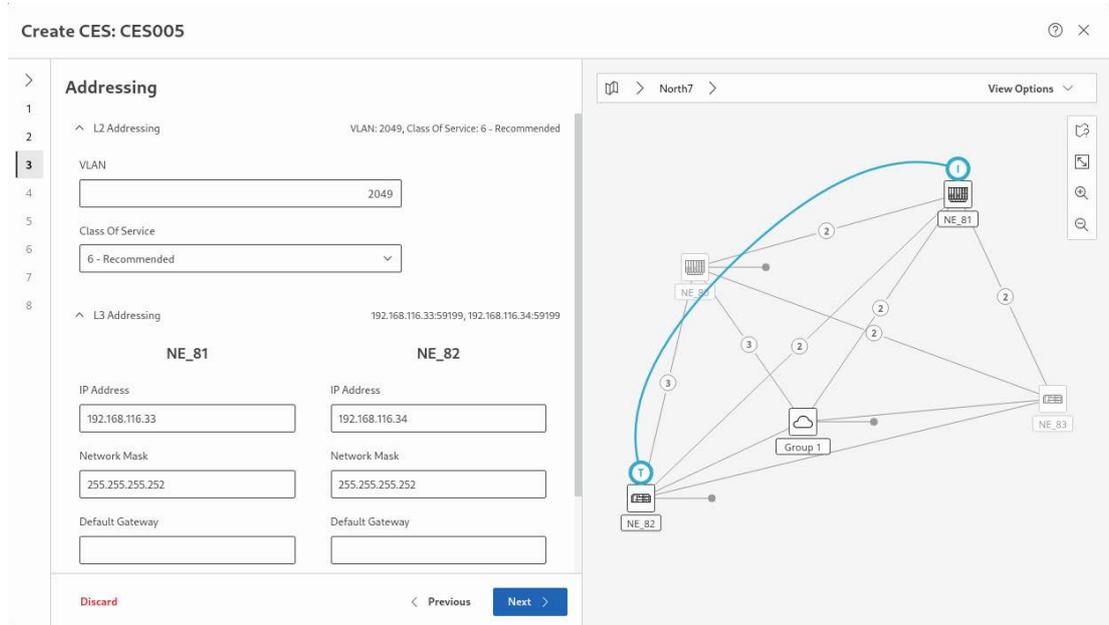


**Please note:**

If the CE unit entry is disabled it might be due to selected Structure Awareness or Pseudowire Protocol which might not be supported by the CE unit in its current configuration.

→ click “Next >” to proceed.

**3 Addressing**



**Please note:**

Addressing configuration is calculated automatically and should be changed only when necessary.

L2 Addressing provides automatically selected VLAN ID and Class Of Service parameters:

- VLAN - tag used to mark Ethernet frames which are carrying CE traffic. Used to differentiate traffic coming from other Network Services including other CE Services. Integer with a range 1 to 4089. Default value is proposed by CEM but its uniqueness is not guaranteed (current limitation).
- CoS (Class of Service): priority of packets carrying CE traffic:



Available for selection: from 0 to 7. Value 6 is recommended.

L3 Addressing provides automatically selected IP addresses, network masks, default gateway (if required), and source UDP ports:

- IP Address: automatically set on both initiator and terminator.
- Network Mask: automatically set on both initiator and terminator.
- Default Gateway: automatically set; is left empty if not required.
- Source UDP Port: automatically set on both initiator and terminator.

If no service has been created on the unit, the source IP address can be overwritten in the wizard. If a service already exists, the source IP address cannot be modified (the input field is disabled).

**Please note:**

UDP addressing configuration is also necessary in case of Layer 2 Protocols (MEF8, MEF8 RTP).

- (MEF8, MEF8 RTP only) Destination MAC Address.

**Please note:**

Destination MAC Address should match Source MAC Address of second endpoint.

→ click “Next >” to proceed.

#### 4 Quality of Service – Structure Aware mode

- Termination Mode; select from:
  - PCMnn (nn concatenated 64 kbit/s timeslots, nn from 1 to max 31), default
  - PCMnn CAS (nn concatenated 64 kbit/s timeslots with CAS, nn from 1 to max 30)
  - PCM30 (30 concatenated 64 kbit/s timeslots)
  - PCM30C (30 concatenated 64 kbit/s timeslots with CRC4)
  - PCM31 (31 concatenated 64 kbit/s timeslots)
  - PCM31C (31 concatenated 64 kbit/s timeslots with CRC4)
- Timeslots Per Frame: Integer in the range from 1 to 30, variable only in modes PCMnn and PCMnn CAS.
- Frames Per Packet: Integer in the range from 1 to 32. Check calculated Bandwidth Overhead and Latency bars to estimate suitability of selections.
- Packet Delay Variation Tolerance (PDVT):
  - 0.25 ms,
  - 0.5 ms,
  - 1 ms,
  - 2 ms,
  - 4 ms,
  - 8 ms,
  - 16 ms,
  - 32 ms;
 Default is 8 ms; check calculated values of Required Bandwidth and Jitter Buffer.



**Please note:**

Calculated Jitter Buffer value needs to be in the range from 4 to 128 packets. In Structure Aware mode Jitter Buffer size depends on PDVT and Frames Per Packet values.



**Please note:**

Timeslots Per Frame and Frames Per Packet settings have influence on Bandwidth Overhead and Latency.

The “Bandwidth Overhead and Latency” chart is showing the relative influence of parameter changes on CES characteristics:

- Sending small packets often => Bigger overhead, lower latency;
- Sending big packets rarely => Lower overhead, bigger latency.



**Please note:**

The calculated Packet Payload Size must be in range from 4 to 512 Bytes. Payload size is a result of multiplication of Timeslots Per Frame and Frames Per Packet values.

Packet Payload Size

1000 B

ⓘ Must be between 4 and 512

- P12 containers on both ends.

^ P12 Container	
TARNOBRZEG CEPI1 <1>	KIELCE CEPI1 <1>
p12-1	p12-1
p12-2	p12-2
p12-3	p12-3
p12-4	p12-4
p12-5	p12-5
p12-6	p12-6
p12-7	p12-7
p12-8	p12-8

Shows a list of 8 available P12s on Initiator and Terminator CE units. Application selects automatically the first valid option.



**Please note:**

Particular P12 containers may be disabled due to several reasons:

- P12 container is configured to operate with different Termination Mode from selected one (limitation, can be changed only via FOXCST).
- Another Pseudowire which is using fixed timeslots Termination Mode (PCM30, PCM30C, PCM31, PCM31C) is already using that P12 container.
- Current allocation of Timeslots in that P12 container does not allow to deploy new Pseudowire (only for variable timeslots Termination Modes PCMnn, PCMnn CAS).

- Timing:

- Clock Recovery Mode: Synchronous (default); Adaptive 1; Adaptive 2; Adaptive 3.  
If Structure Awareness mode has been set to “agnostic” in step 2, Adaptive clock recovery mode needs to be selected.
  - Filter: Filter 1; Filter 2; Filter 3; Filter 4 (default).
- click “Next >” to proceed.

#### 4 Quality of Service – Structure Agnostic mode

The screenshot shows the 'Create CES: CES005' configuration window. The left pane is titled 'Quality of Service' and contains the following settings:

- 1 Termination Mode: PCM31
- 2 Packet Payload Size [B]: 128
- 3 Packet Delay Variation Tolerance: 8 ms
- 4 Required Bandwidth [kbps]: 3424
- 5 Jitter Buffer [Packets]: 32

Below the settings, there are two bar charts: 'Bandwidth Overhead' (a tall blue bar) and 'Latency' (a short red bar). At the bottom of the left pane are 'Discard', '< Previous', and 'Next >' buttons.

The right pane shows a network diagram titled 'North7' with 'View Options' in the top right. The diagram features several nodes: NE\_81, NE\_82, NE\_83, and Group 1. A blue path is highlighted, starting from a source node (labeled '1') and passing through NE\_81, NE\_82, and NE\_83. The links between these nodes are labeled with numbers: 2 between NE\_81 and NE\_82, 2 between NE\_81 and NE\_83, and 3 between NE\_82 and NE\_83. A cloud icon labeled 'Group 1' is also present in the network.

- Termination Mode:
  - Transparent (transparent for clock and data)
  - Clock Master (transparent data; retimed with the NE clock)
  - PCM30 (30 concatenated 64 kbit/s timeslots)
  - PCM30C (30 concatenated 64 kbit/s timeslots with CAS)
  - PCM31 (31 concatenated 64 kbit/s timeslots), default
  - PCM31C (31 concatenated 64 kbit/s timeslots with CAS)
  - V5 Uplink (P12 signal terminated, retimed to NE clock, V5 specific Sa bit handling, with CRC4)
  - V5 Uplink NCI (P12 signal terminated, retimed to NE clock, V5 specific Sa bit handling, without CRC4)
- Payload size – integer in the range from 4 to 1408. Affects Required Bandwidth and Jitter Buffer size.
- Packet Delay Variation Tolerance (PDVT):
  - 0.25 ms
  - 0.5 ms
  - 1 ms
  - 2 ms
  - 4 ms
  - 8 ms
  - 16 ms
  - 32 ms



**Please note:**

The calculated Jitter Buffer value needs to be in range from 4 to 128 packets. In Structure Agnostic mode Jitter Buffer size depends on PDVT and Packet Payload Size values.



**Please note:**

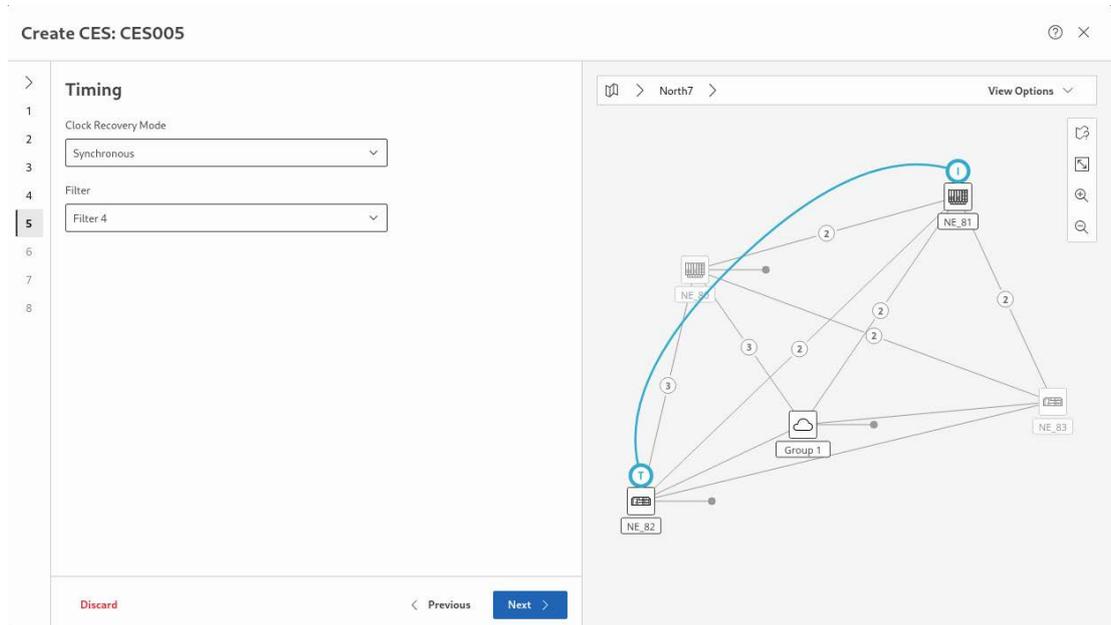
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The “Bandwidth Overhead and Latency” chart is showing the relative influence of parameter changes on CES characteristics:

- Sending small packets often => Bigger overhead, lower latency;
- Sending big packets rarely => Lower overhead, bigger latency.

→ click “Next >” to proceed.

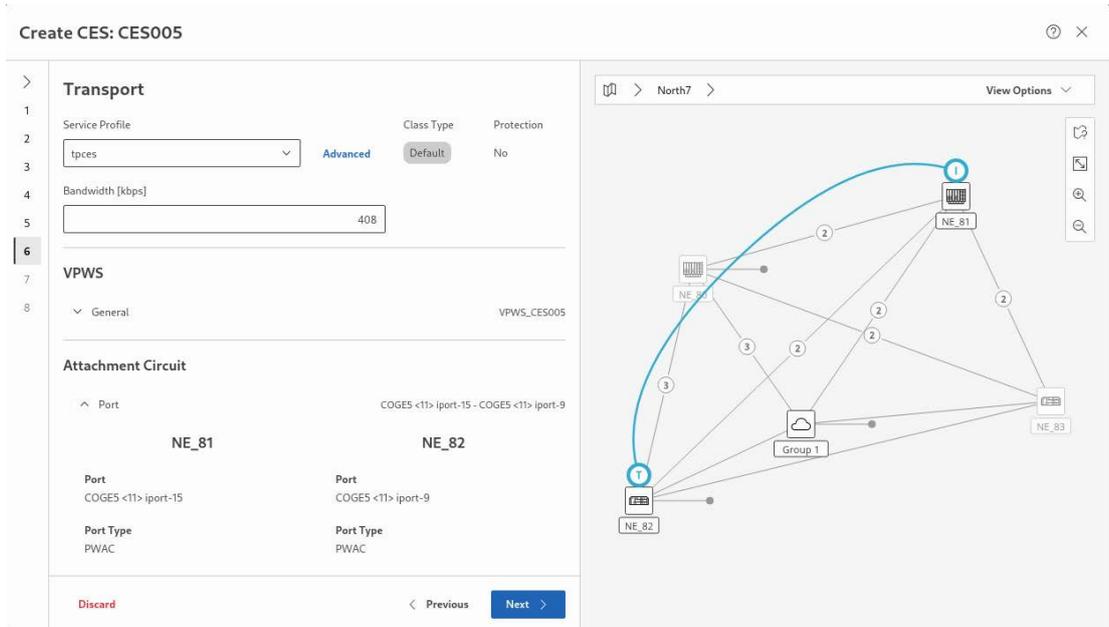
### 5 Timing



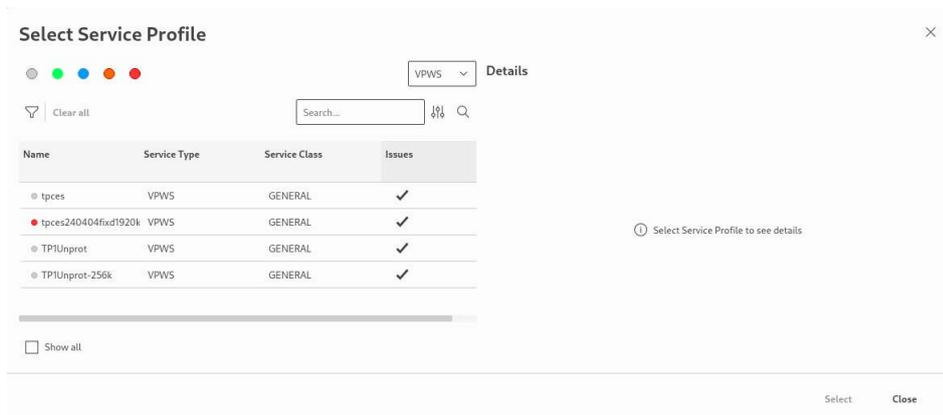
- Select the clock recovery mode from
  - Synchronous (default)
  - Adaptive 1,
  - Adaptive 2,
  - Adaptive 3.
- Select the filter from
  - Filter 1,
  - Filter 2,
  - Filter 3,
  - Filter 4.

→ click “Next >” to proceed.

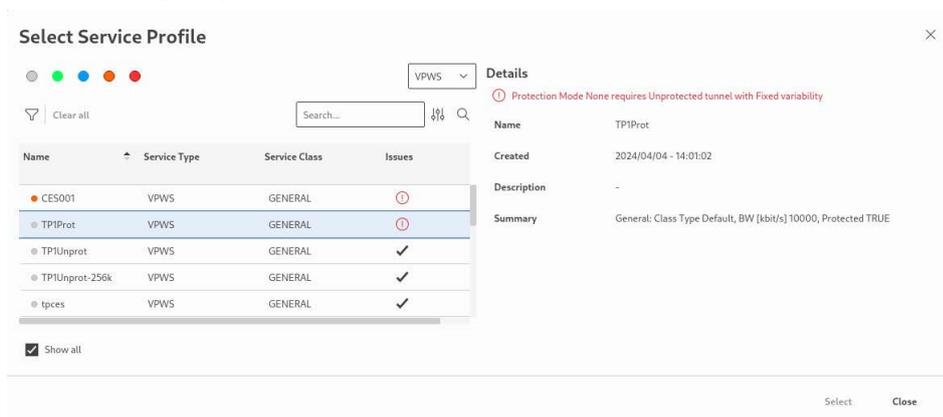
## 6 Transport



- Select service profile from a list of appropriate service profiles;  
The “Advanced” button allows you to view more service profile details (name, creation date, description, summary) and edit these as far as permissions are sufficient. For Service Profile requirements see section 3.3.1 “Prerequisites”, “Transport Service requirements.”.



The service profiles can be filtered by class type via a click on the colored dots above the list. Service profiles with issues that prevent a selection can be included in the list by enabling “Show all” below the list. When selecting a service profile with issues, the reason for its non-eligibility is shown in the details area.



**Please note:**

In case of using Fixed Bandwidth Service Profile it must be able to ensure a bandwidth at least as big as the CES bandwidth calculated in the previous step.

- If required, modify the Bandwidth (kbps), provided the service profile allows that. It needs to be at least as large as the CES Bandwidth calculated in a previous step.

**VPWS**

A VPWS is either proposed if existing and suitable, or it will be created automatically.

**Please note:**

The VPWS service will be created using the default Protection setting from the Service Profile.

**Attachment Circuit**

An attachment circuit with its ports and port types will be proposed if existing and suitable, or it will be created automatically. The ports can be edited manually if required by clicking on the “Edit Port” buttons. The parameters are as follows:

- Label 1,
- Label 2,
- Description,
- Port Type (PWAC, CVP),
- Admin State.

Any changes done to the ports must be deployed and will be applied immediately.

**Please note:**

VPWS will use Attachment Circuits of type “VLAN Based, No change with AC VLAN” with the same VLAN as configured in a previous step.

→ click “Next >” to proceed.

**7 Tunnel**

The screenshot shows the 'Create CES: CES005' wizard in the 'Tunnel' step. The configuration pane on the left shows a tunnel named '80-81-82-83-001\_tunnel\_NE\_81\_NE\_82' with a status of 'Deployed Valid'. The 'Action' field indicates a requirement to increase the tunnel bandwidth to 71848 kbit/s. The 'Label Switched Path' section shows a 'Working' path between NE\_B1 and NE\_B2. The network diagram on the right shows a topology with nodes NE\_81, NE\_82, NE\_83, and Group 1, with a highlighted path between NE\_81 and NE\_82.

Usually shows a preselected tunnel if a suitable tunnel is available. In this case, “Action” might still indicate that the tunnel bandwidth needs to be increased if insufficient.

If there already is a proposed tunnel (in status Deployed Valid), the wizard will automatically perform the required actions. Alternatively, you may select a suitable tunnel manually or edit the

tunnel to manually correct its properties. Take note of any possible proposed Action, such as, e.g., an increase of the tunnel bandwidth.

If no suitable tunnel is available, “New Tunnel” is shown and “Action” shows “Create new tunnel”. The new tunnel will automatically be created by the wizard.

To select an appropriate tunnel, click on the “Tunnel” drop-down field.

- Now you can use an existing tunnel (click radio button “Use existing tunnel”) and
  - Change the tunnel,
  - Refresh the tunnel, or
  - Pick an existing tunnel.
- Or you can create a new tunnel that is more appropriate for your specific requirements under **Label Switched Path** by clicking the “Route automatically” settings icon to define the LSP auto routing parameters, such as
  - routing order,
  - max hops,
  - max cost,
  - excluded NEs,
  - included NEs,
  - excluded links.

When done with the auto routing parameters, click on “Apply”. Back in the wizard, click the “Route automatically” button which will create an LSP between the selected Initiator and Terminator NEs.

Do not forget to do this for both Working and Protecting LSP if protection is used.

The result will be indicated by the tunnel status “Unsaved”.

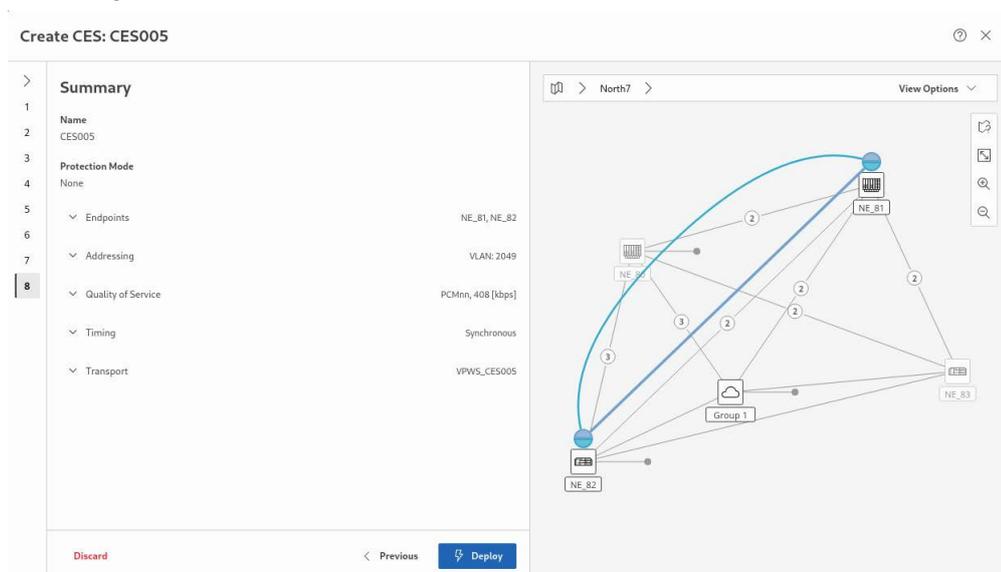


**Please note:**

In case auto-routing fails, it is recommended to launch ENP and create & deploy the tunnel(s) from there. Then in the CES wizard select them as existing tunnels.

- Make sure that all tunnel conflicts are resolved
- click “Next >” to proceed.

## 8 Summary



- Review and verify all settings specified in the previous steps, shown in the summary; if OK, click “Deploy”, otherwise go back to previous steps to make modifications before finishing.



**Please note:**

Invoking the “Deploy” action will trigger deployment of the CES to the network (no intermediate saved state is available). The Wizard will display details about the deployment process and its successful (or failed) sub-processes.

- Expected result: Once deployed, a confirmation is shown in the bottom right corner of the wizard:



- With the deployment confirmation in the summary, the action button will change to “Finish”. Click on the Finish button to close the wizard.

The resulting new service is listed in the Circuit Emulation Services overview table as soon as the service has been deployed and discovered from the network.

### 3.4 Circuit Emulation Service Removal

Any created CES can be removed. Proceed as follows:

- Navigate to the Circuit Emulation Services tab:

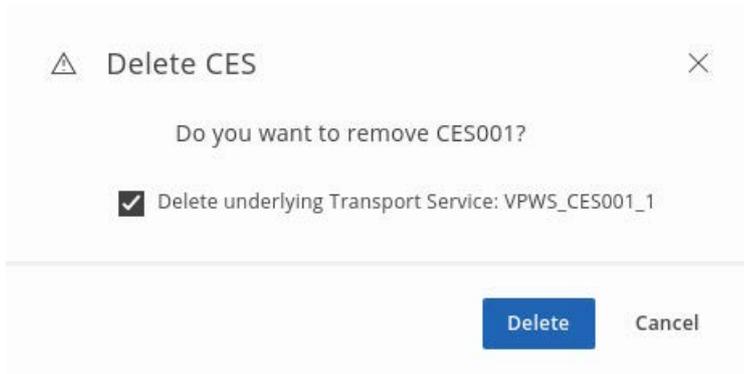


- Select the service to be removed in the list/table. Optionally many services can be removed at once. To select several services, use the “Shift” or “Ctrl” key.
- Use the action menu with the three dots symbol - or the context menu - and trigger the Delete action:

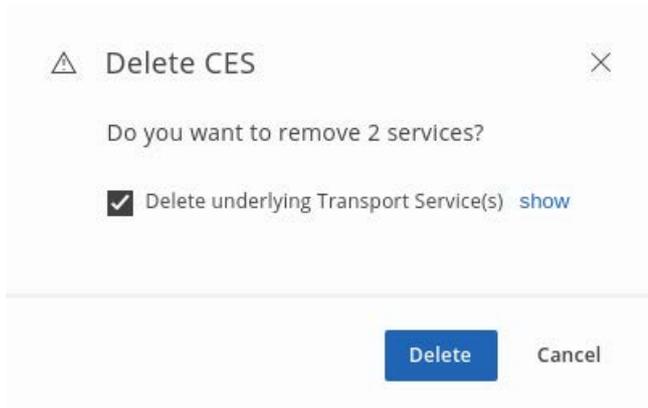


- Delete CES dialog should appear:

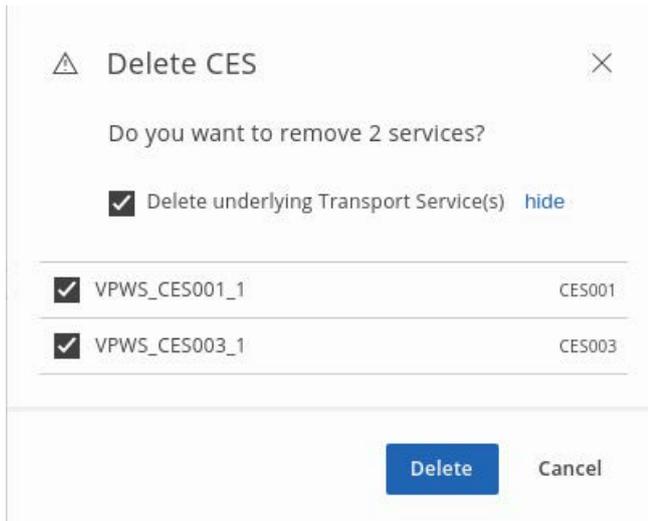
Single delete dialog:



Multiple delete dialog:



Multiple delete dialog with show Transport Service(s) option:



The “Delete CES” dialogs allow the user to decide whether transport service(s) of selected services should be also removed from the network. By default, transport service(s) will be removed.

- After confirming the dialog with “Delete”, the CE service(s) and selected associated transport service(s) will be removed.
- Expected result:  
A success message should be visible in the right bottom corner of the application view.  
After some processing time the removed services should no more be visible in the CES table.

## 3.5 End-to-End TDM Services

### 3.5.1 Prerequisites

To create an end-to-end TDM service using one of the previously created CES, use the Circuit Service creation wizard initiated via the “+ Create” button.

Before starting the Circuit Service creation wizard, make sure that the CES units (CEP11, OPIC2) and the TDM circuit termination units (e.g., LEDE1, LEDS1, LECO1, LEDA1) are configured in an appropriate manner, i.e.,

- The CES Mode on the CES unit (Structure Aware, Structure Agnostic) must be suitable for the service. A change of the mode setting requires a unit reboot.
- The termination mode used on the CES units for the pwStructureAware p12-y instances must match the port termination mode of the TDM circuit termination unit, including the CAS mode.
- There must be free channels on both CES unit and TDM circuit termination unit to cope with the new service bandwidth.
- There must be enough cross connect capacity available on both the CES unit and the TDM circuit termination unit.

### 3.5.2 Creating end-to-end Circuit

Once you have an appropriate service of type CES configured and deployed and the prerequisites for circuit configuration are fulfilled, click on the “+ Create” button on the “Circuit Service” tab:

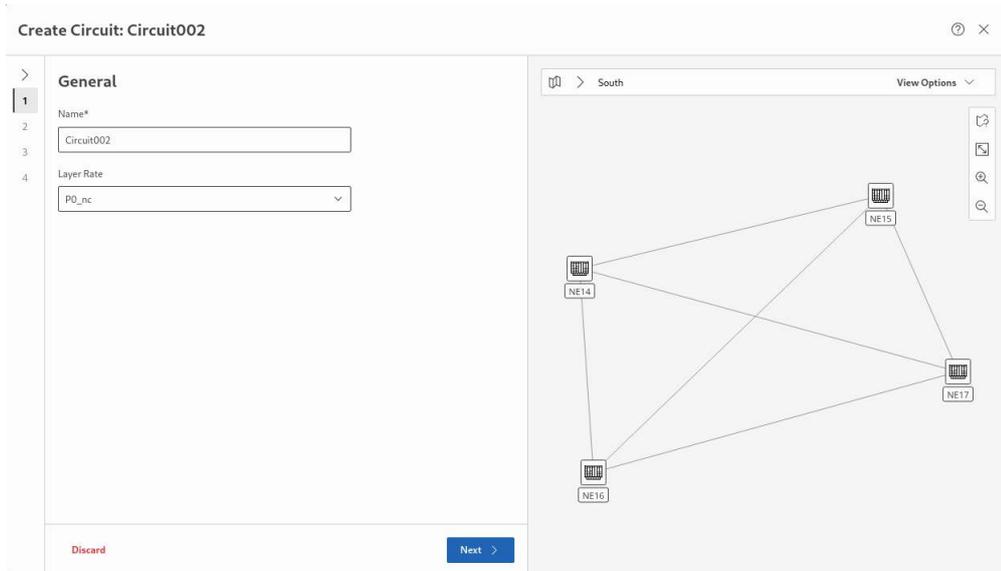
The screenshot displays the Hitachi Circuit Emulation Application interface. The main window shows a network diagram with four nodes labeled NE14, NE15, NE16, and NE17. The nodes are interconnected, forming a mesh-like structure. The interface includes a top navigation bar with tabs for 'Circuit Service', 'Circuit Emulation Service', 'VPWS', 'Section', and 'NE'. A '+ Create' button is visible in the top left. On the right side, there is a 'Summary' panel with the following information:

Summary	
Entities	Circuit Service(s) in Circuit Emulation Application
2	
Admin State	
Up	100%
Supervision	
Oper State	Fault State
- 100%	- 100%
Issues (0)	
Critical	Major
0	0
Minor	Warning
0	0
Severity	

This will start the Circuit Service creation wizard.

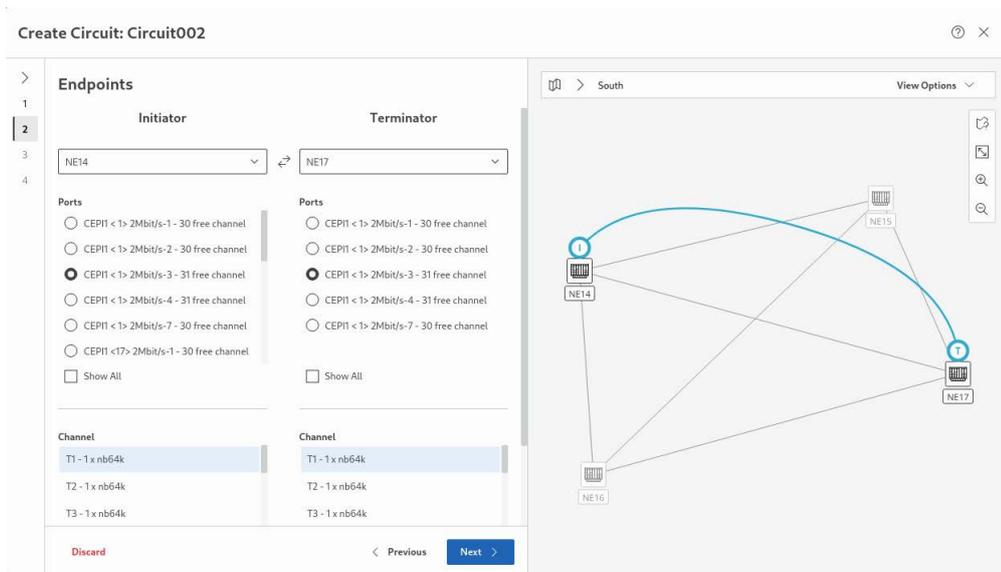
Follow the steps in the wizard:

## 1 General



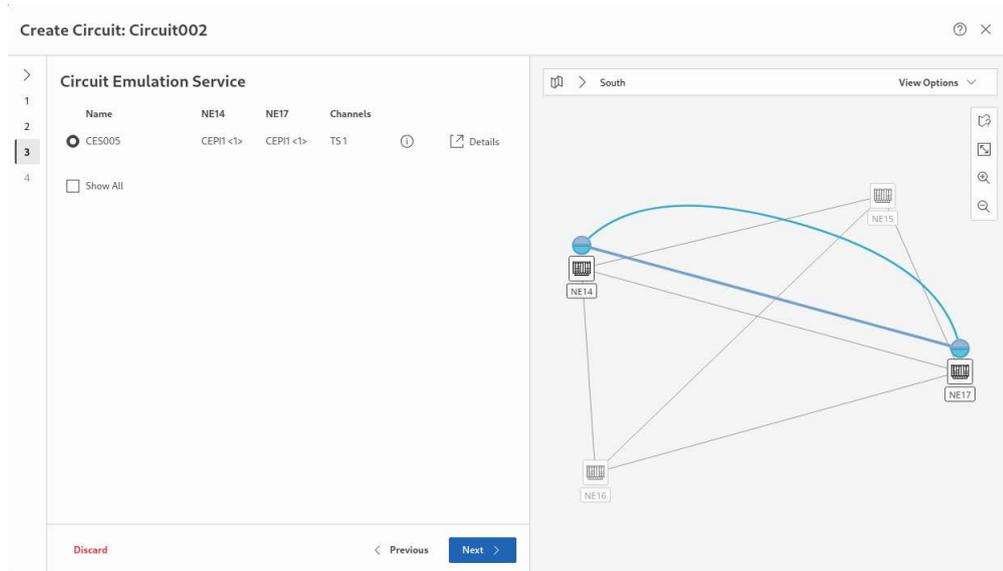
- Enter a service name.
  - Select the required layer Rate (P0\_nc, P12)
- click “Next >” to proceed.

## 2 Endpoints



- Select the Initiator and Terminator NEs.
  - Select a port from the list of suitable ports for both Initiator and Terminator NEs.  
Note that only ports with matching termination mode can be selected. If “Show All” is enabled, the list includes ports with any termination mode. Unsuitable ports are shown for information purposes only.
  - Scroll down and select the suitable channel(s) from the list of channels for Initiator and Terminator NEs.
- click “Next >” to proceed.

### 3 Circuit Emulation Service



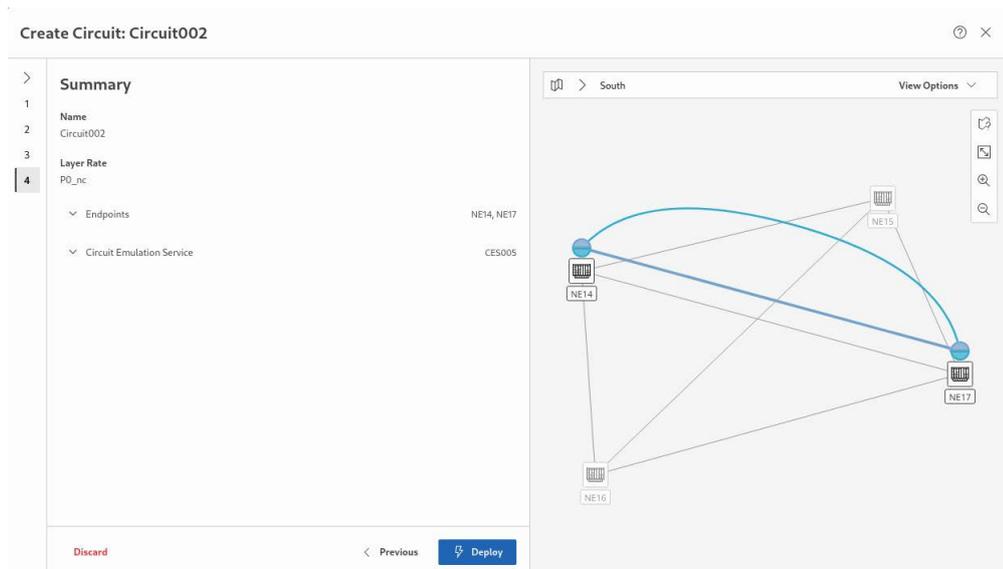
- From the list of available Circuit Emulation services, select the required service. Note that only suitable CE services are listed.

If “Show All” is enabled, the list also includes unsuitable CE services. Unsuitable ports are shown for information purposes only. Details on the CE service, including a reason for not being eligible for transporting the Circuit, are shown when hovering over the (i) icon of the list entry. A possible reason could be, e.g., “CAS mismatch”.

Example: If the Circuit Emulation service to be selected in this step 3 has a termination mode without CAS (e.g., PCM30, PCM31), at least one of the endpoints that were selected in step 2 must be without CAS (as indicated in the channel list in step 2, e.g., “T1 - 1 x nb64k”). If both endpoints use CAS (as indicated in the channel list in step 2, e.g., “T1 - 1 x nb64k - CAS”), only Circuit Emulation services with termination modes using CAS (e.g., PCM30C, PCM31C) are eligible.

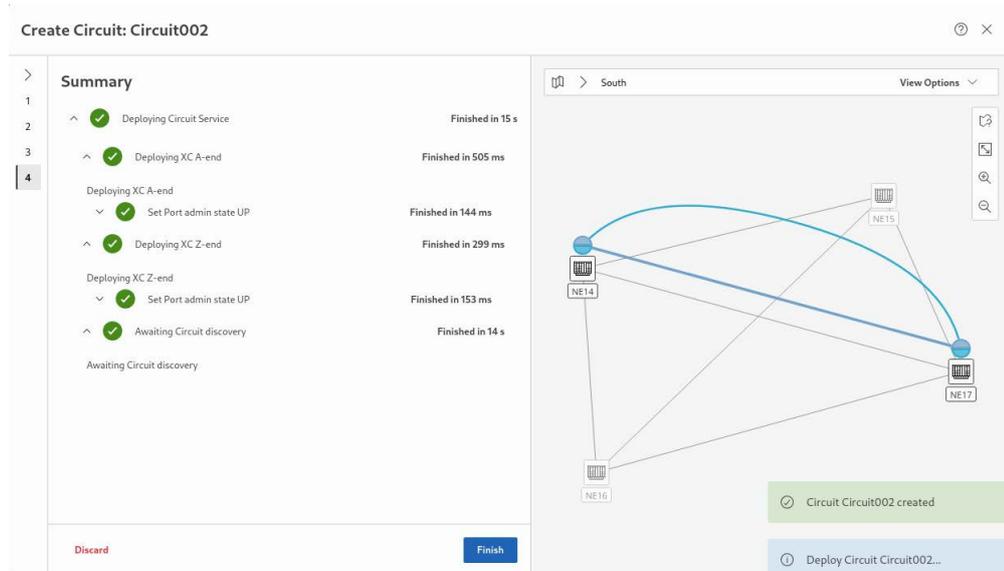
→ click “Next >” to proceed.

### 4 Summary



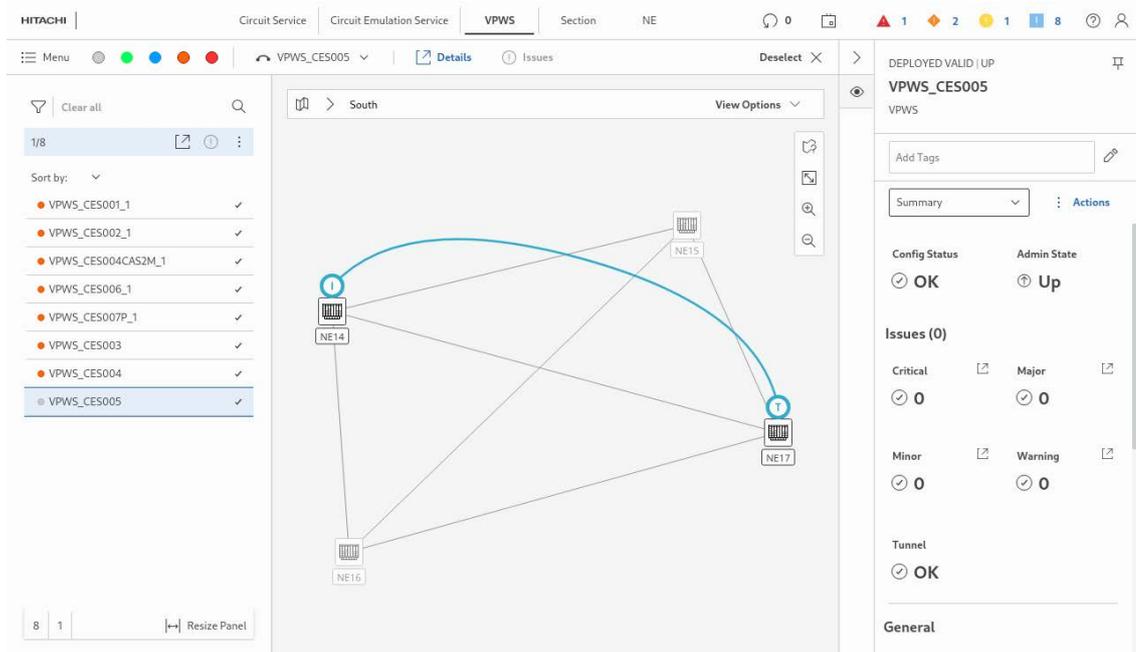
- Under “Endpoints” and under “Transport Services” you can verify the settings. Once these are OK,
  - click “Deploy” to deploy the circuit service configuration to the network.
- This will show a deployment progress icon with the text “Deploying Circuit Service”.

- Once the service is deployed, details are available:



- Once successfully completed, the final deployment status is shown and the wizard can be closed with the “Finish” button. In case an error during deployment occurs, the errors are shown here.

### 3.6 VPWS (Virtual Private Wire Services)



All VPWS that are used for Circuit Emulation services are listed in this view.

You can select one or several items in the list. For a single selected item, you can view detailed information by clicking on the “view” icon in the right-hand icon bar. The detailed information for a selected VPWS includes

**GENERAL:**

- Name
- Description
- CES
- Bandwidth

- Class Type
- Service Profile

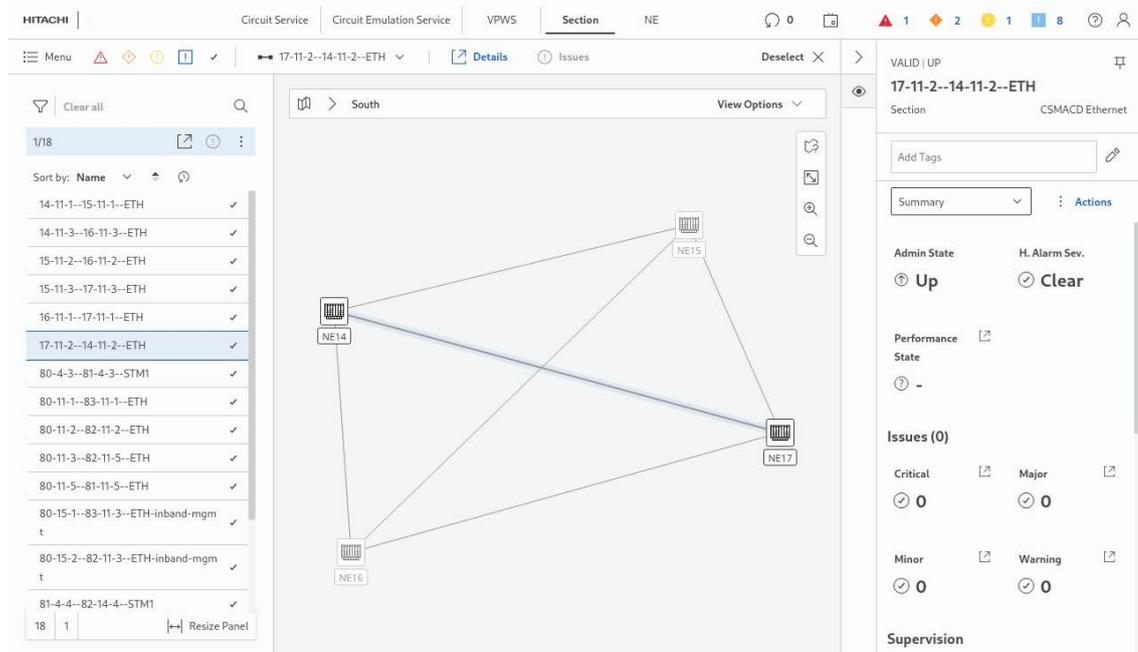
INITIATOR / TERMINATOR (for each of the two):

- NE
- Port Label
- Port Type
- Type
- AC VLAN
- Pseudowire VLAN

For a single selected item, via the context menu, you can also open the Initiator or Terminator node in the local craft terminal (FOXCAST) with the required user class or view the alarm list for the selected Initiator or Terminator node.

You can pin one or several items in the list (see pin icon in the left-most column) so that an icon for their details information will appear in the right-hand icon bar. If you expand the icon bar by clicking on the respective icon, more details on the pinned item(s) will be shown.

### 3.7 Section



All sections that are member of the NP (TDM) and/or ENP (MPLS) domains are listed in this view.

You can select one or several items in the list. For a single selected item, you can view detailed information by clicking on the “view” icon in the right-hand icon bar. The detailed information for a selected section includes

GENERAL:

- Name
- Type
- Layer Rate
- Bandwidth
- Highest Alarm Severity

INITIATOR:

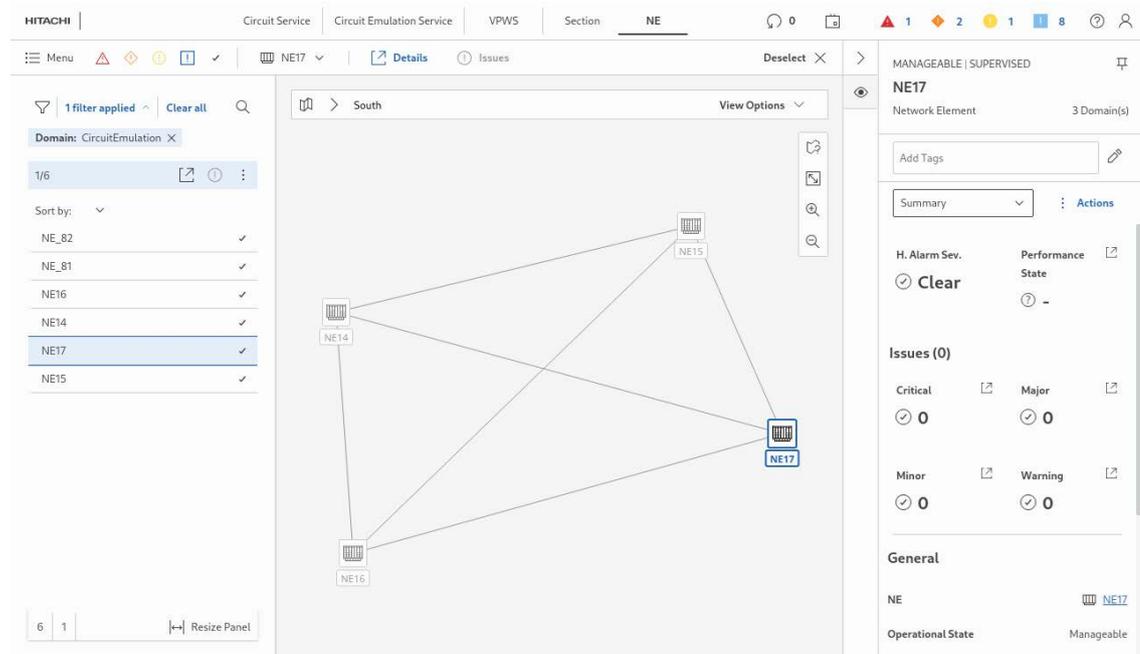
- NE
- Port Label

TERMINATOR:

- NE
- Port Label

You can pin one or several items in the list (see pin icon in the left-most column) so that an icon for their details information will appear in the right-hand icon bar. If you expand the icon bar by clicking on the respective icon, more details on the pinned item(s) will be shown.

### 3.8 NE (Network Elements)



All Network Elements that are member of the NP (TDM) and/or ENP (MPLS) domains are listed in this view.

You can select one or several items in the list. For a single selected item, you can view detailed information by clicking on the “view” icon in the right-hand icon bar. The detailed information for a selected NE includes

GENERAL:

- Name
- Address
- CE Unit
- Applicable for CEM
- State
- Highest Alarm Severity
- Domain

You can pin one or several items in the list (see pin icon in the left-most column) so that an icon for their details information will appear in the right-hand icon bar. If you expand the icon bar by clicking on the respective icon, more details on the pinned item(s) will be shown.

## 4 Annex

### 4.1 Associated Documents

[1KHW002499] Release Note “FOXMAN-UN”

### 4.2 Document History

Table 1: Document History

Document ID	FOXMAN-UN Release	Rev	Date	Changes since previous version
1KHW029177	R18	A	Jul 2025	Reworked and updated version for R18, including: - update of screenshots for CES creation wizard, - update of screenshots for Circuit creation wizard.
1KHW029177	R17A	A	Sep 2024	Reworked and updated version for R17A, including: - update of screenshots for CES creation wizard, - update of screenshots for Circuit creation wizard.
1KHW029177	R16B	A	Sept 2023	Reworked and updated version for R16B. Replaced manual creation of end-to-end TDM services creation by new end-to-end “Circuit Service” provisioning using a wizard (section 3.5 “End-to-End TDM Services”).
1KHW029177	R16A	A	Sept 2022	Revised version for R16A.
1KHW029177	R15B	A	Jan 2022	First version.

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