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USER MANUAL

FOXMAN-UN

Teleprotection Application UI

Hitachi Energy

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Contents

1 Introduction

1.1 General

This document provides a description of the Teleprotection application in FOXMAN-UN. The Teleprotection application is part of the E2E (end-to-end) Services & Applications in the FOX-MAN-UN Web UI.

2 UI Overview

For an overview of the Web UI refer to [1MRC000084] User Manual “Web UI”.

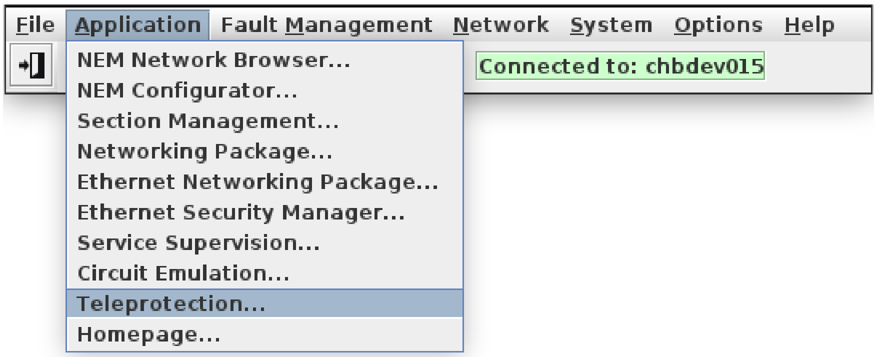
3 Feature Description

This section covers the following subjects:

- System Operation,
- Main GUI,
- Teleprotection Service Provisioning, Teleprotection Service Removal,
- VPWS (Virtual Private Wire Services) Details,
- NE (Network Elements) Details,
- Section Details.

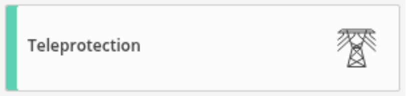
3.1 System Operation

The Teleprotection application UI can be started from the following menu:
NEM Desktop > Application > Teleprotection...



Connected to: chbdev015

The Teleprotection application can also be called from the Homepage via the “Teleprotection” tile:

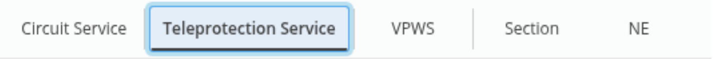


3.2 Main GUI

The user interface provides the following five main tabs:

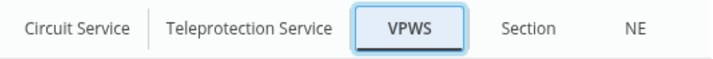
Circuit Service, see

- Creating end-to-end Circuit.

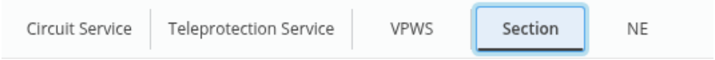


Teleprotection Service, see

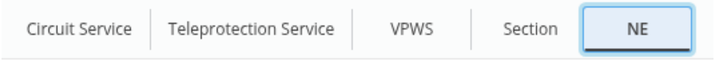
- Teleprotection Service Provisioning,
- Teleprotection Service Removal.



VPWS, see VPWS (Virtual Private Wire Services) Details.



Section, see Section Details.



NE, see NE (Network Elements) Details.

3.3 Teleprotection Service Provisioning

3.3.1 Prerequisites

To create and deploy a Teleprotection service, both NEs which are meant to be the service endpoints (Initiator NE, Terminator NE) need to:

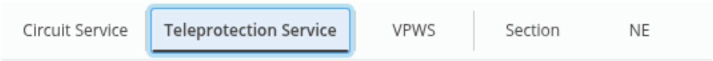
- be manageable;
- be present in NP and ENP domains;
- have at least one Teleprotection unit which is assigned and still has capability in terms of:
  - supporting the required type of teleprotection,
  - number of interfaces,
  - number of Pseudowires;
- be operating in required Termination Mode;
- provide the required interface configuration type (e.g., IEEE C37.94).

Transport Service requirements:

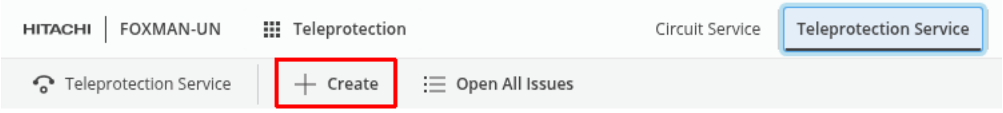
- VPWS Service Profile exists which meets Teleprotection service bandwidth requirements or has flexible bandwidth.
- The VPWS Service Profile must have fixed (i.e., NOT variable) tunnel protection settings; otherwise it cannot be selected during Teleprotection service creation.
- For Hitless services, only Service Profiles with unprotected tunnel are selectable (“protection=false”).
- For 1:1 services, only Service Profiles with protected tunnel are selectable (“protection=true”). 1:1 protection mode is not recommended for teleprotection services.
- Link path between Initiator NE and Terminator NE exists and meets bandwidth requirements considering Service Profile Class Type allocation.

3.3.2 Starting the “Create Teleprotection Service” Wizard

- Navigate to the Teleprotection Services tab:



- Use the “+ Create” action button:



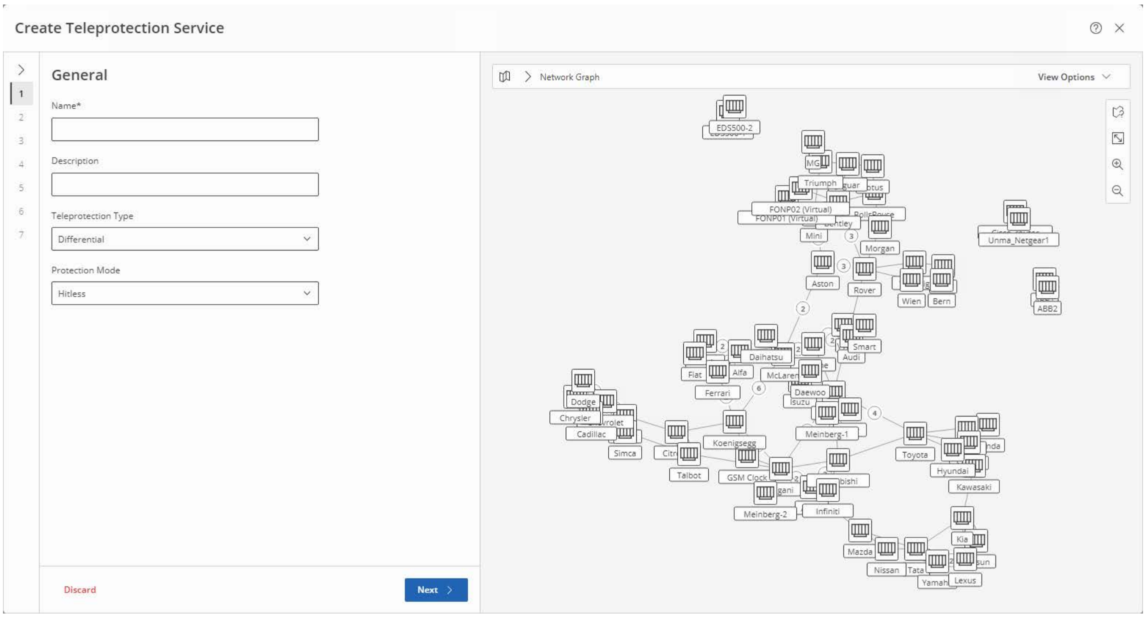
- The “Create Teleprotection” wizard dialog window appears in front of the Teleprotection Service table and/or map.
- Follow the steps in the “Create Teleprotection” wizard (**bold** parameters are mandatory and require user input).

The Teleprotection service wizard guides you through service creation in 7 main steps as shown in the following sample.

Step 1 General

In step 1 “General” you need to provide basic service identification including

- **Name**
- Description (optional)
- **Teleprotection Type** (Differential; Distance; GOOSE/SV)
- **Protection Mode** (None; 1:1 (not recommended); Hitless)



Create Teleprotection Service

General

Name*

Description

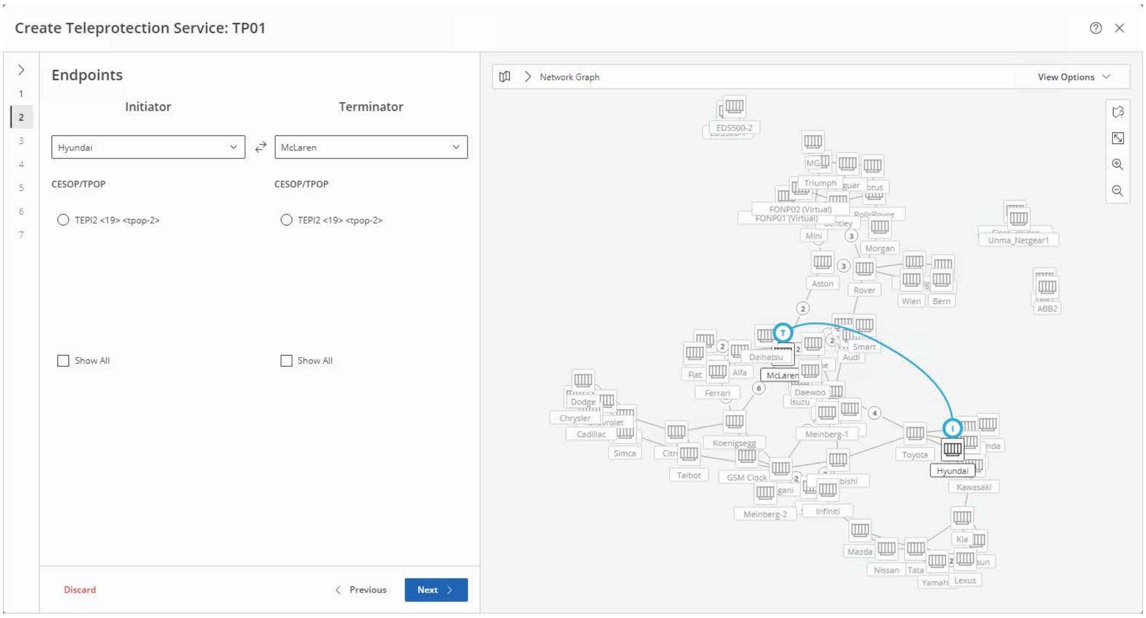
Teleprotection Type: Differential

Protection Mode: Hitless

Teleprotection Type and related Protection Modes have some dependencies and will also restrict their applicability to certain NEs and the units in operation on these NEs. Also see step 2.

Click “Next >” to proceed to step 2 “Endpoints”.

Step 2 Endpoints



Create Teleprotection Service: TP01

Endpoints

Initiator	Terminator
Hyundai	McLaren
CESOP/TPOP	CESOP/TPOP
○ TEPI2 <19> <tpop-2>	○ TEPI2 <19> <tpop-2>
□ Show All	□ Show All

Select an Initiator NE and a Terminator NE. If no suitable NEs are available due to their provisioning with appropriate units supporting the chosen teleproction type and/or protection mode, you can click on “Show All” at the bottom of the selection list to include NEs that would provide teleprotection service features, but do not support the required combination of teleproction type and protection mode. Initiator and Terminator NE and the service connection are marked on the map.

If suitable NEs are selected, select the unit ports you want to use for the service. Use the “Show All” option for each NE to include units/ports that provide support for teleprotection services but are not available for selection, e.g., because they are already carrying such a service.

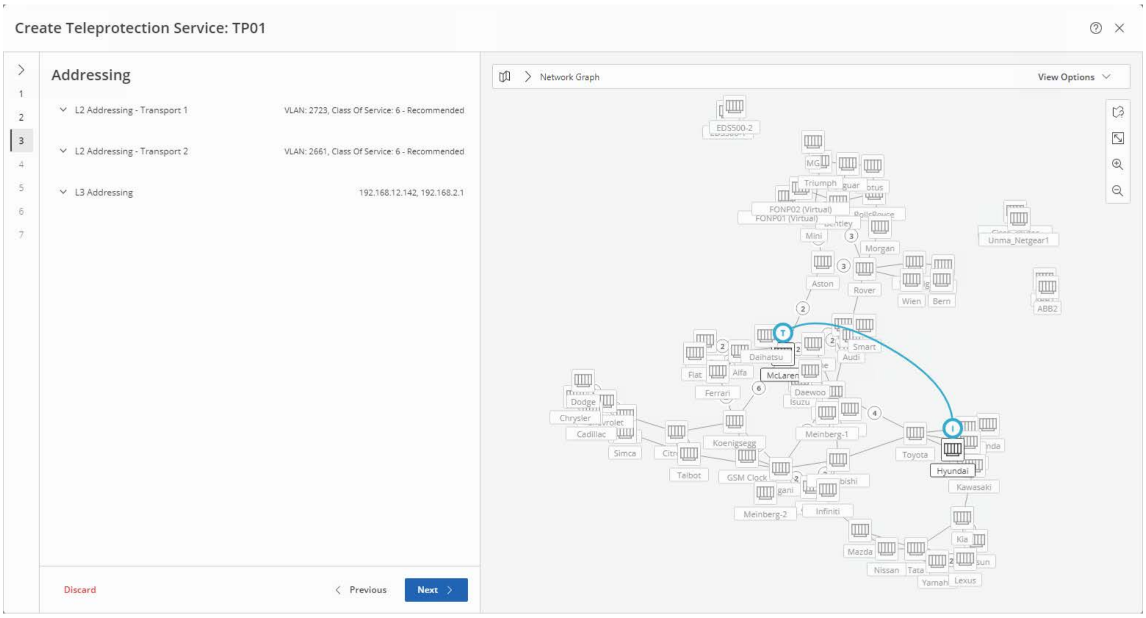
Once unit ports are selected, a proposed port configuration is added for both NEs with their pre-selected termination modes. If required, you can select a different termination mode from the drop-down list.

Click “Next >” to proceed to step 3 “Addressing”.

Step 3 Addressing

Step 3 proposes preselected settings for

- L2 addressing, transport 1;
- L2 addressing, transport 2;
- L3 addressing.



Create Teleprotection Service: TP01

Addressing

L2 Addressing - Transport 1 VLAN: 2723, Class Of Service: 6 - Recommended

L2 Addressing - Transport 2 VLAN: 2661, Class Of Service: 6 - Recommended

L3 Addressing 192.168.12.142, 192.168.2.1

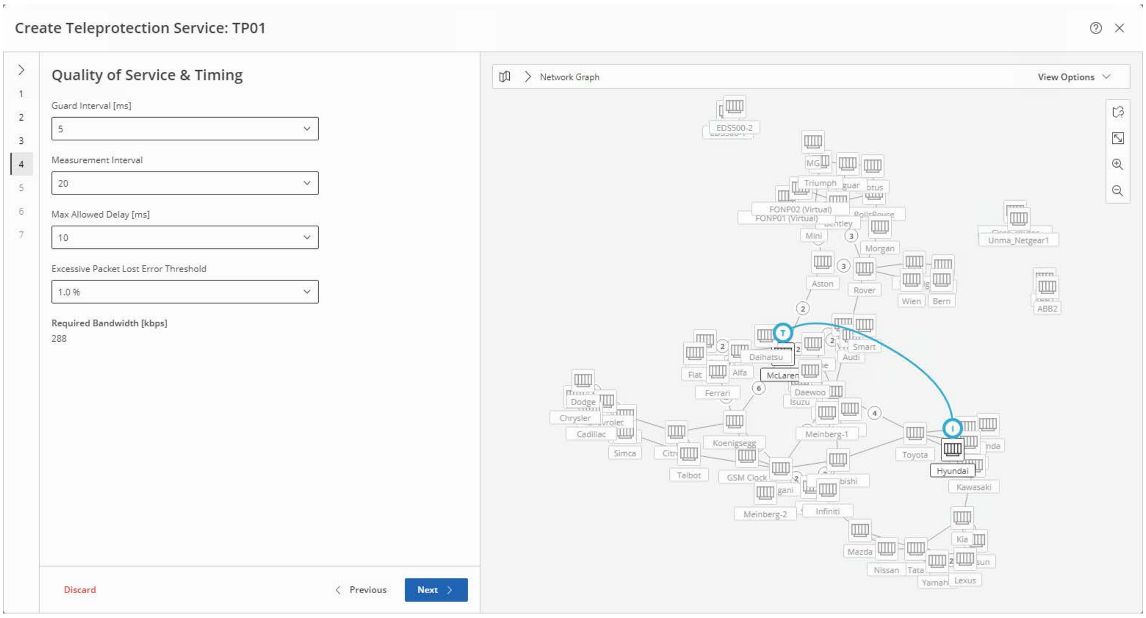
You can expand each of the characteristics to view the details and modify them if required. Note that some of the settings (e.g., L3 source IP addresses), if modified, need further actions to ensure a working service.

Click “Next >” to proceed to step 4 “Quality of Service & Timing”.

Step 4 Quality of Service & Timing

Depending on the service type, select the requied settings for

- Guard Interval
- Measurement Inteval
- Max Allowed Delay
- Excessive Packet Loss Error Threshold



Create Teleprotection Service: TP01

Quality of Service & Timing

Guard Interval [ms]: 5

Measurement Interval: 20

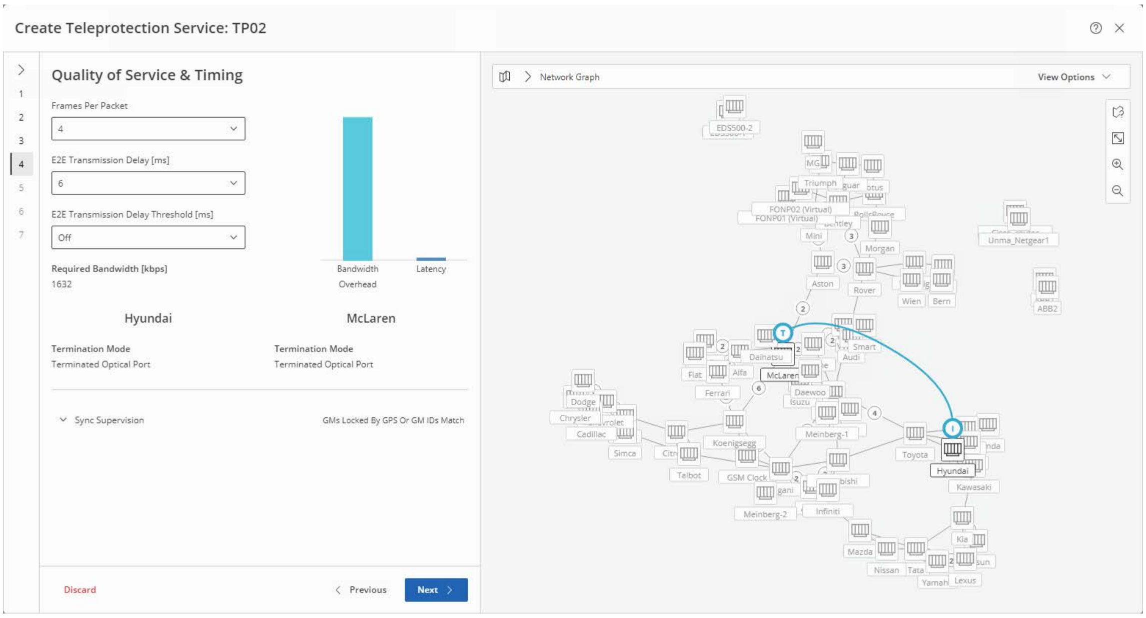
Max Allowed Delay [ms]: 10

Excessive Packet Lost Error Threshold: 1.0 %

Required Bandwidth [kbps]: 288

or select the requied settings for

- Frames Per Packet
- E2E Transmission Delay
- E2E Transmission Delay Threshold
- Sync Supervision:
  - GMs Locked by GPS
  - GMs Locked by GPS Or GM IDs Match
  - GMs Locked by GPS And GM IDs Match
  - GM IDs Match
  - None (Sync Supervision Disabled)



Create Teleprotection Service: TP02

Quality of Service & Timing

Frames Per Packet: 4

E2E Transmission Delay [ms]: 6

E2E Transmission Delay Threshold [ms]: Off

Required Bandwidth [kbps]: 1632

Hyundai

Termination Mode: Terminated Optical Port

McLaren

Termination Mode: Terminated Optical Port

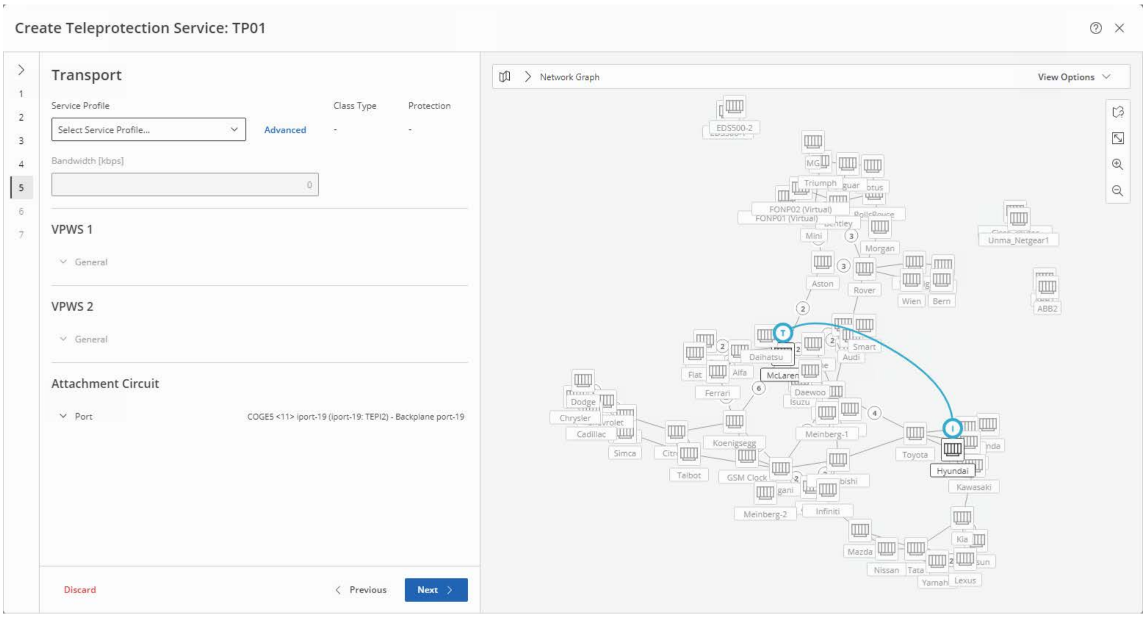
Sync Supervision: GMs Locked By GPS Or GM IDs Match

or accept the proposed QoS and timing settings. The required bandwidth is automatically calculated and displayed.

Click “Next >” to proceed to step 5 “Transport”.

Step 5 Transport

Select the appropriate service profile from the list of available service profiles. Click “Show All” to include service profiles in the list that are unsuitable for the selected service charcteristics.



Create Teleprotection Service: TP01

Transport

Service Profile: Select Service Profile... | Advanced | Class Type: - | Protection: -

Bandwidth [kbps]: 0

VPWS 1
- General

VPWS 2
- General

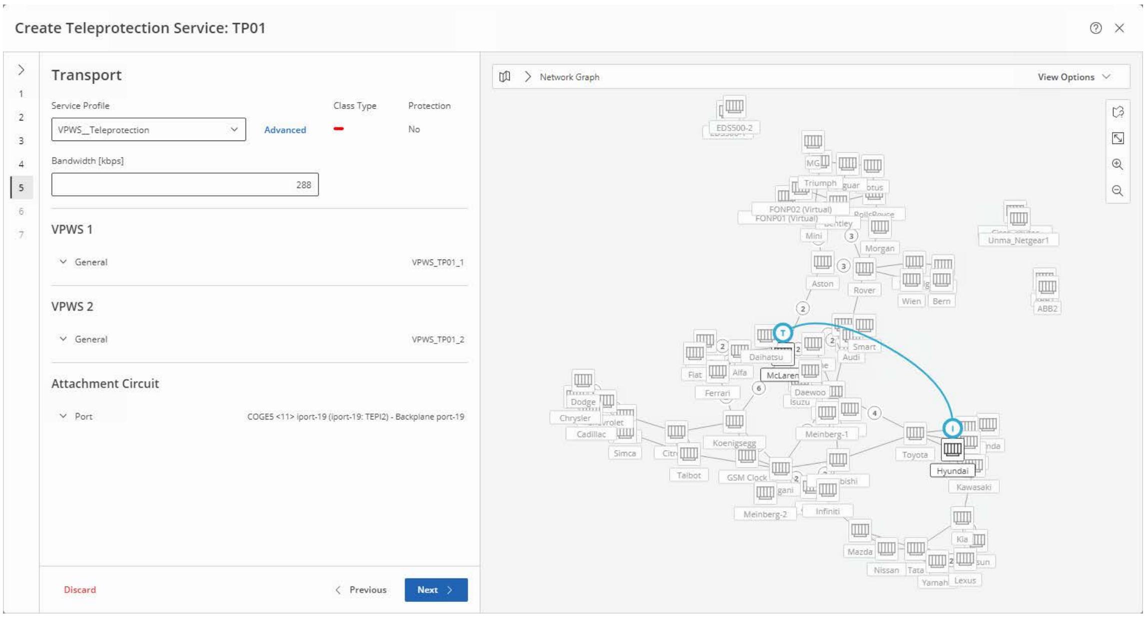
Attachment Circuit
- Port: COGE5 <11> iport-19 (iport-19: TEPI2) - Backplane port-19

Discard | < Previous | Next >

Once a suitable service profile is selected, the Class Type color, protection support, bandwidth, appropriate VPWS 1 and VPWS 2 and the AC (attachment circuit) are porposed if avilable.

The bandwidth can be modified if required.

The attachment circuit (AC) ports can be edited if required. Their port type is shown when expanding the port name using the expand arrow. Port changes need to be deployed and will take effect immediately, i.e. before service deployment.



Create Teleprotection Service: TP01

Transport

Service Profile: VPWS__Teleprotection | Advanced | Class Type: 🟥 | Protection: No

Bandwidth [kbps]: 288

VPWS 1
- General: VPWS_TP01_1

VPWS 2
- General: VPWS_TP01_2

Attachment Circuit
- Port: COGE5 <11> iport-19 (iport-19: TEPI2) - Backplane port-19

Discard | < Previous | Next >

If none are available they need to be created before proceeding.

Click “Next >” to proceed to step 6 “Tunnel”.

Step 6 Tunnel

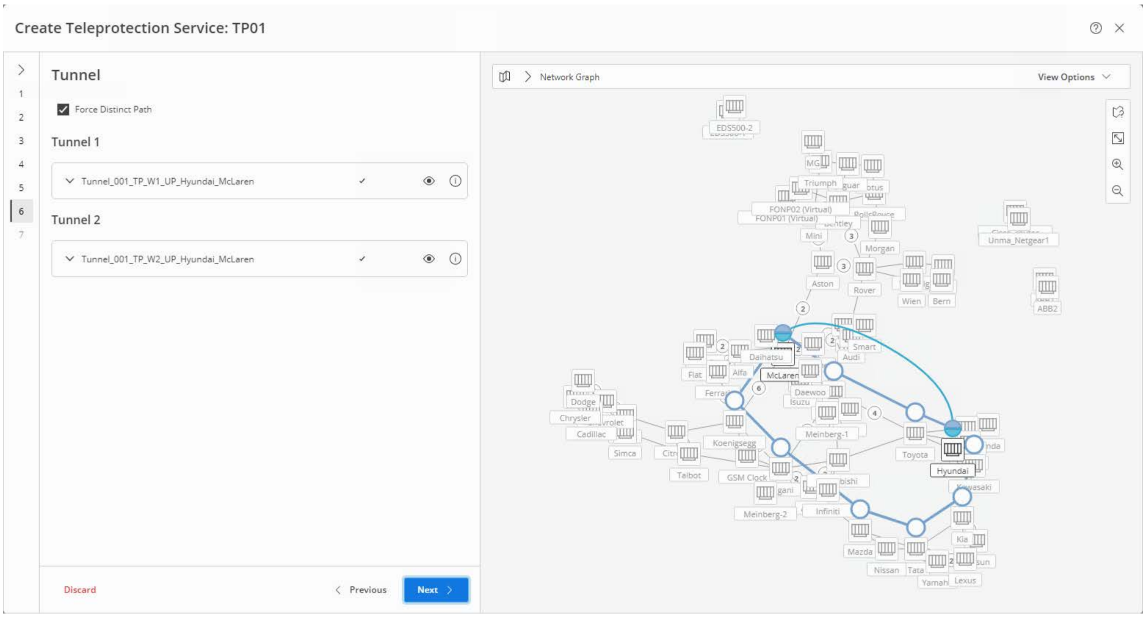
If appropriate tunnels already exist, their names are proposed as “Tunnel 1” and “Tunnel 2”. The tunnels also appear on the map.

In case of disabling the “Froce Distinct Path” option, only one tunnel is proposed.

If no appropriate tunnels exist, a new tunnel must be created for each path before proceeding. New tunnels can be routed manually or automatically.

If a selected tunnel needs to be modified before applying it for the service, click on the pen icon right to the tunnel name and make the necessary changes. The “info” icon right to the tunnel name shows detailed information about the selected tunnel.

If protection shall be applied, make sure to define a tunnel for both Working and Protecting path.



Create Teleprotection Service: TP01

Tunnel

☑ Force Distinct Path

Tunnel 1

Tunnel_001_TP_W1_UP_Hyundai_McLaren ✓

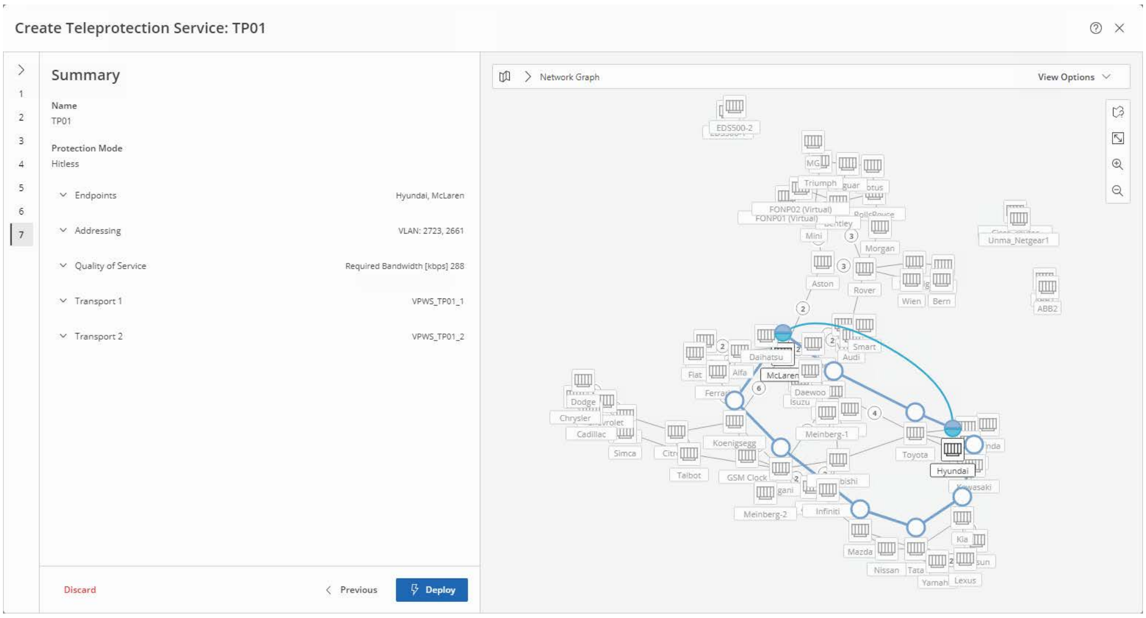
Tunnel 2

Tunnel_001_TP_W2_UP_Hyundai_McLaren ✓

Click “Next >” to proceed to step 7 “Summary”.

Step 7 Summary

The summary will show tha main service characteristcs specified in the different steps. Details can be shown by expanding the inidivdual step sections



Create Teleprotection Service: TP01

Summary

Name
TP01

Protection Mode
Hitless

Endpoints	Hyundai, McLaren
Addressing	VLAN: 2723, 2661
Quality of Service	Required Bandwidth [kbps] 288
Transport 1	VPWS_TP01_1
Transport 2	VPWS_TP01_2

Click “Deploy” to deploy the service to the network.

Once deployed successfully, click “Finish” to close the wizard.

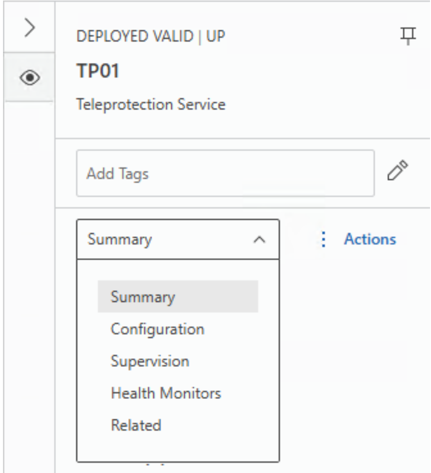
→ The new service will now be listed in the Teleprotection Service table and, upon selection in the list, will be highlighted in the map.

3.4 Teleprotection Service Information

An existing Teleprotection service, when selected from the table or in the map, provides Summary information in the right panel, such as

- Admin State
- Issues, with the number of issues per severity (Critical, Major, Minor and Warning)
- Status information about Transport entities and tunnel entities
- General information, such as
  - Name,
  - Initiator,
  - Terminator,
  - Protection Mode.

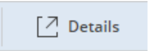
Further details are provided in the right panel either from the drop-down field with


DEPLOYED VALID | UP

TP01

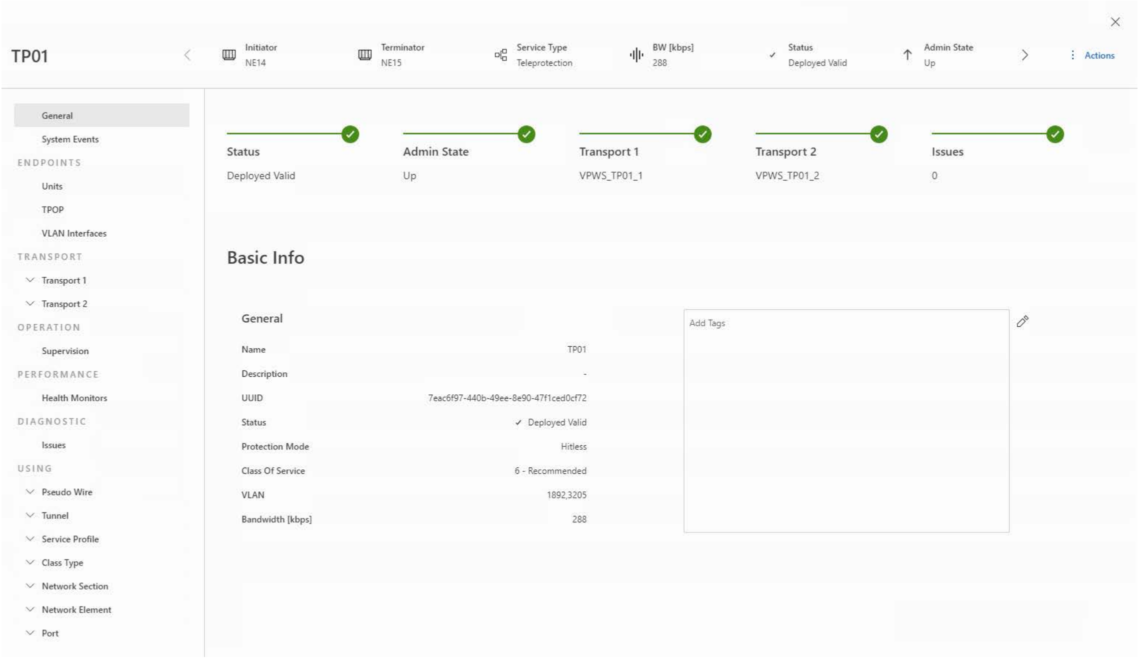
Teleprotection Service

- Summary (see above),
- Configuration,
- Supervision,
- Health Monitors,
- Related, with
  - Summary (shows the number of involved sections, NEs, units, and ports),
  - Using (shows the number of involved VPWS, PWs, tunnels, service profiles, class types, sections, NEs, and ports; each of which can be further expanded for more detailed information and collapsed again to get back to the overview),
  - Used by (shows the number of circuit services; can be further expanded for more detailed information and collapsed again to get back to the overview).

For a complete overview on the selected service, click the “Details” button 

in the ribbon.

This will open the details page with a structured view of all service details.



Initiator	Terminator	Service Type	BW [kbps]	Status	Admin State
NE14	NE15	Teleprotection	288	Deployed Valid	Up

Status	Admin State	Transport 1	Transport 2	Issues
Deployed Valid	Up	VPWS_TP01_1	VPWS_TP01_2	0

Basic Info

General

Name	TP01
Description	-
UUID	7eac6f97-440b-49ee-8e90-47f1ced0cf72
Status	✓ Deployed Valid
Protection Mode	Hitless
Class Of Service	6 - Recommended
VLAN	1892,3205
Bandwidth [kbps]	288

The details page can be closed by clicking on the close (×) icon in the upper right corner. This will return you to the Teleprotection app.

For a single selected Teleprotection from the entity browser, via the context menu, you can also

- Pin the selected service to add it to the icon bar of the details panel.
- Open the Initiator or Terminator NE in the local craft terminal (FOXCST) with the required user class, or open the Initiator or Terminator alarm list.
- Modify the service.
- Delete the service.
- Change the service admin state.
- Refresh the key (if transmitted over an encrypted tunnel).
- Enable, disable, resume or pause service supervision.

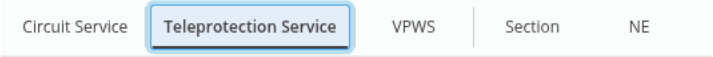
For multiple selected items from the left-hand list, via the context menu, you can also

- Delete the services.
- Change the services admin state.
- Refresh the key (if transmitted over an encrypted tunnel).
- Enable, disable, resume or pause service supervision.

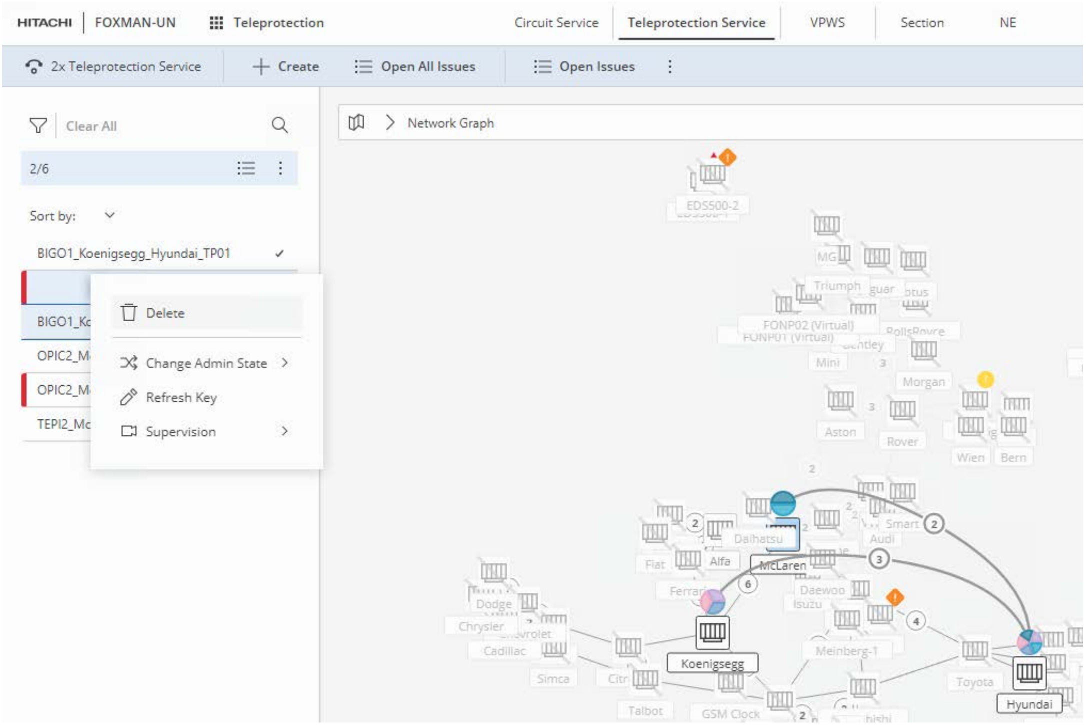
3.5 Teleprotection Service Removal

Any created Teleprotection Service can be removed. Proceed as follows:

- Navigate to the Teleprotection Services tab:



- Select service to be removed in the table. It will be highlighted in the map. Optionally many services can be removed at once. To do that select several Teleprotection services in the table.
- Use the action menu with the three dots symbol - or the context menu - and trigger the Delete action:



- Confirm the service deletion, or cancel. Optionally you can choose whether or not to also delete the underlying transport service(s), i.e. the VPWS being used by the service(s).
- If confirmed, this will delete the service from the table and from the network. By default, 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 Teleprotection Services table and in the map.

3.6 VPWS (Virtual Private Wire Services) Details

All VPWS that are used for Teleprotection 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 expanding the right-hand details bar. The detailed information for a selected VPWS includes

Top information:

- Deployed state | Operational state
- Item name
- Item type (=VPWS)

Summary

- Config Status,
- Admin State,
- Issues, with the number of issues per severity (Critical, Major, Minor and Warning),
- Tunnel status,

General

- VPWS name (with hyperlink to the details page),
- Description,

- Bandwidth,
- Initiator,
- Terminator,
- Class Type,
- Service Profile,
- Status of deployment,
- Tunnel name (with hyperlink to the details page).

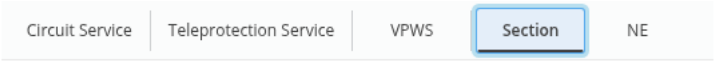
For a single selected item from the left-hand list, via the context menu, you can also

- Pin the selected VPWS to add it to the icon bar of the details panel.
- Open Legacy Details (this will open the legacy ENP dialog window and the service details window for the selected VPWS).
- Modify the VPWS.
- Align the VPWS if required.
- Synchronize the VPWS service or refresh the PW oper state.
- Open the Initiator or Terminator NE in the local craft terminal (FOXCST) with the required user class, or open the Initiator or Terminator alarm list.
- Change the VPWS admin state.
- Enable, disable, resume or pause service supervision.

For multiple selected items from the left-hand list, via the context menu, you can also

- Align the VPWS if required.
- Synchronize the VPWS service.
- Change the VPWS admin state.
- Enable, disable, resume or pause service supervision.

3.7 Section Details



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 expanding the right-hand icon bar. The detailed information for a selected section includes

Top information:

- Deployed state | Operational state
- Item name
- Item type (=Network Section and physical layer type)

Summary

- Admin State,
- Highest Alarm Severity,
- Performance State.

Issues (with total number)

- Issues, with the number of issues per severity (Critical, Major, Minor and Warning),
- Initiator status, Terminator status.

General

- Section name,
- Initiator (with hyperlink to the details page),
- Terminator (with hyperlink to the details page),

- Type (physical port),
- Layer Rate,
- Bandwidth.

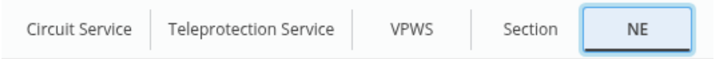
For a single selected item from the left-hand list, via the context menu, you can also

- Pin the selected section to add it to the icon bar of the details panel.
- Open Legacy Details (this will open the legacy ENP dialog window and the service details window for the selected section).
- Open the Initiator or Terminator NE in the local craft terminal (FOXCST) with the required user class, or open the Initiator or Terminator alarm list.
- Synchronize the MPLS link, reset the MPLS link bandwidth, or enable or disable the “use for routing” option.
- Enable, disable, resume or pause service supervision.

For multiple selected items from the left-hand list, via the context menu, you can also

- Enable, disable, resume or pause service supervision.

3.8 NE (Network Elements) Details



All Network Elements that are member of the NP (TDM) and/or ENP (MPLS) domains and have the capability to support Teleprotection 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 expanding the right-hand icon bar. The detailed information for a selected NE includes

Top information:

- Operational state | Supervision state
- Item name
- Item type (=Network Element), Number of Domains

Summary

- Highest Alarm Severity,
- Performance State.

Issues (with total number)

- Issues, with the number of issues per severity (Critical, Major, Minor and Warning),

General

- NE name (with hyperlink to the details page),
- Operational State,
- Supervision State,
- Highest Alarm Severity,
- Highest Alarm Severity (not acknowledged),
- Force Poll status,
- Last Force Poll Duration,
- Last Force Poll OK date and time,
- Last Force Poll Fail date and time.

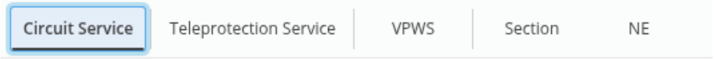
For a single selected item from the left-hand list, via the context menu, you can also

- Pin the selected NE to add it to the icon bar of the details panel.
- Create
  - Teleprotection service starting on the selected NE.
  - Circuit service starting on the selected NE.

- Open the NE in the local craft terminal (FOXCST) with the required user class.
- Synchronize the MPLS objects handled by the NE.
- Execute a Force Poll.
- Open the NE alarm list in Web UI.
- Open the NE alarm list (Legacy)

For multiple selected items from the left-hand list, no context menu selection is available.

3.9 Creating end-to-end Circuit

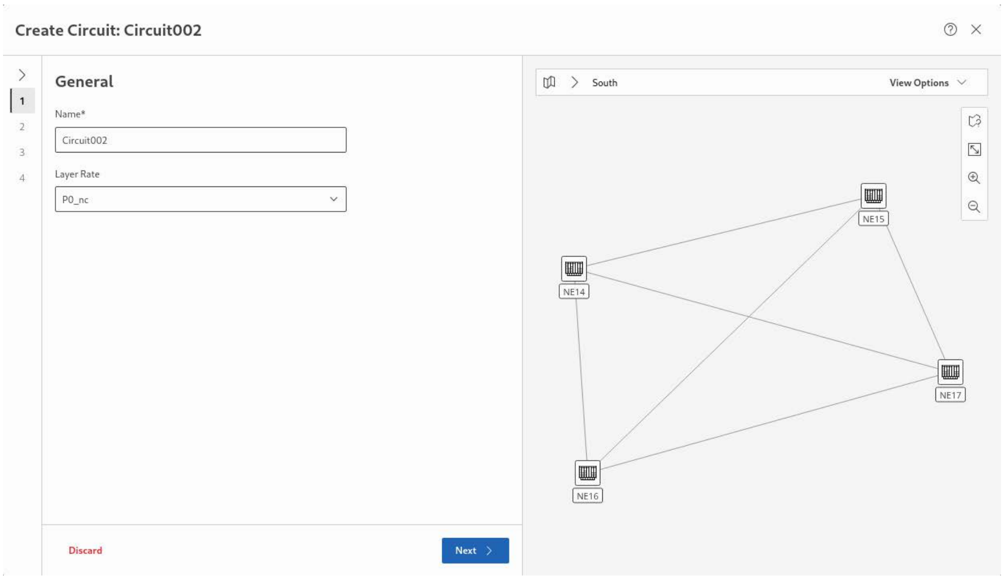


To create an end-to-end TDM service using one of the previously created Teleprotecton services, a specific Circuit Service creation wizard is available.

Once you have an appropriate Teleprotecton service configured (and deployed), click on the "+ Create" button in the ribbon of the "Circuit Service" tab. This will start the Circuit Service creation wizard.

Follow the steps in the wizard:

1 General


Create Circuit: Circuit002

General

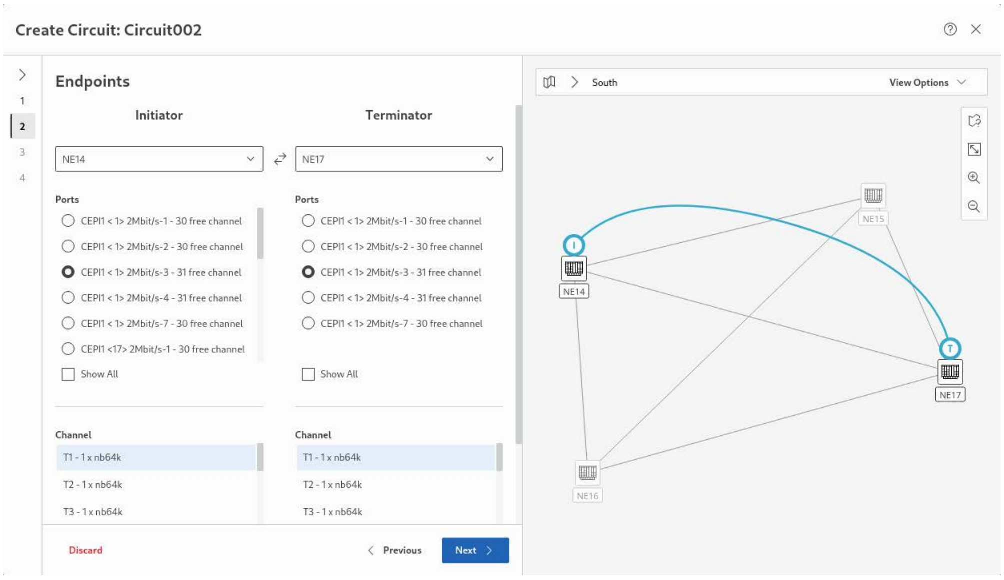
Name*: Circuit002

Layer Rate: P0_nc

- Enter a service name.
- Select the required layer Rate (P0_nc, P12)

→ click "Next >" to proceed.

2 Endpoints



Create Circuit: Circuit002

Endpoints

Initiator	Terminator
NE14	NE17

Ports

Initiator	Terminator
○ CEPI1 < 1> 2Mbit/s-1 - 30 free channel	○ CEPI1 < 1> 2Mbit/s-1 - 30 free channel
○ CEPI1 < 1> 2Mbit/s-2 - 30 free channel	○ CEPI1 < 1> 2Mbit/s-2 - 30 free channel
● CEPI1 < 1> 2Mbit/s-3 - 31 free channel	● CEPI1 < 1> 2Mbit/s-3 - 31 free channel
○ CEPI1 < 1> 2Mbit/s-4 - 31 free channel	○ CEPI1 < 1> 2Mbit/s-4 - 31 free channel
○ CEPI1 < 1> 2Mbit/s-7 - 30 free channel	○ CEPI1 < 1> 2Mbit/s-7 - 30 free channel
○ CEPI1 <17> 2Mbit/s-1 - 30 free channel	
□ Show All	□ Show All

Channel

Initiator	Terminator
T1 - 1 x nb64k	T1 - 1 x nb64k
T2 - 1 x nb64k	T2 - 1 x nb64k
T3 - 1 x nb64k	T3 - 1 x nb64k

− Select the Initiator and Terminator NEs.

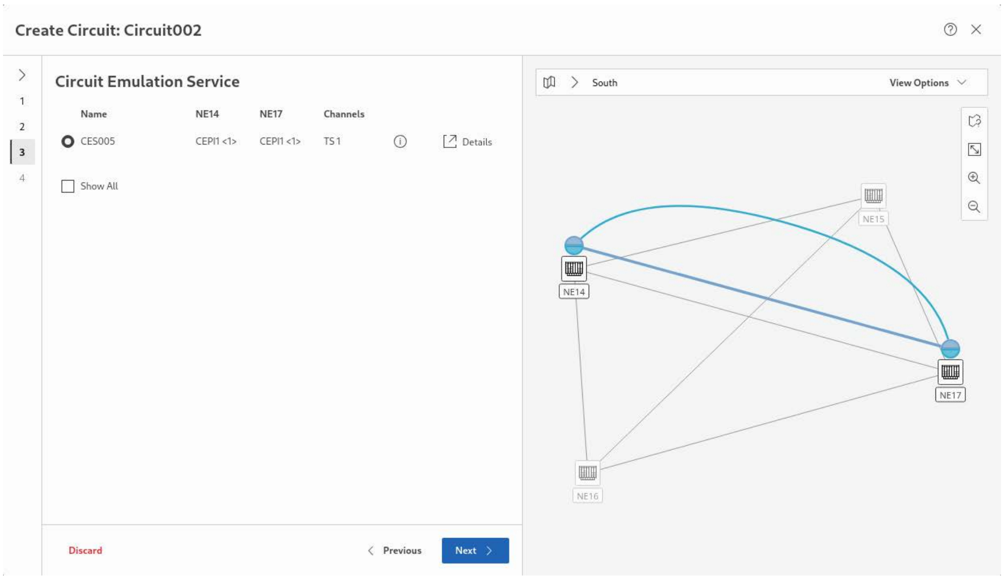
− Select a port from the list of suitable ports for Initiator and Terminator NEs.

Note that only ports with matching termination mode can be selected. If enable “Show All”, ports include such with any termination mode 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 Teleprotection Service



Create Circuit: Circuit002

Circuit Emulation Service

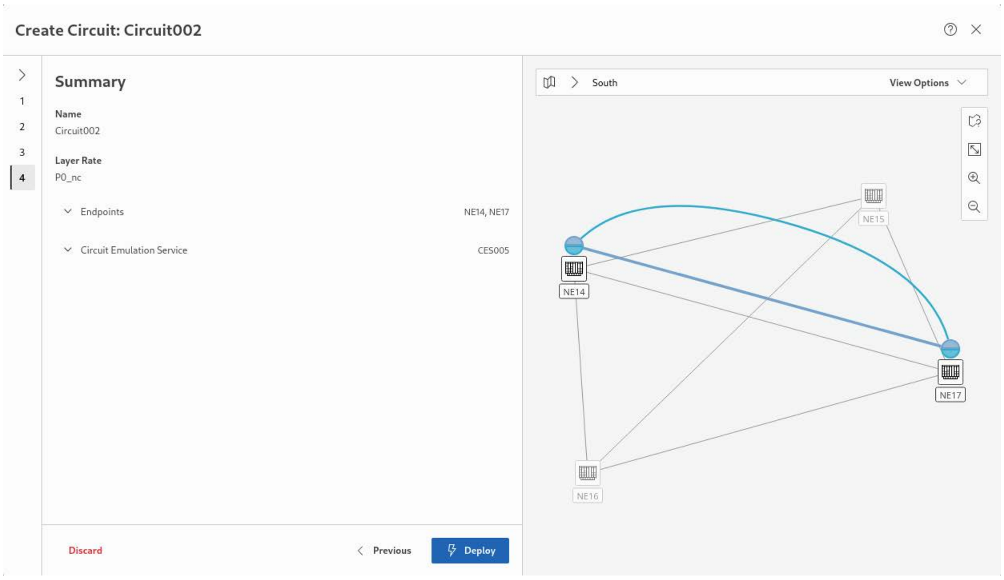
	Name	NE14	NE17	Channels		
●	CES005	CEPI1 <1>	CEPI1 <1>	TS 1	ⓘ	Details

□ Show All

− From the list of available services, select the required service. Note that only services with a checkmark in the “Available” column can be selected.

→ click “Next >” to proceed.

4 Summary



Create Circuit: Circuit002

Summary

Name
Circuit002

Layer Rate
P0_nc

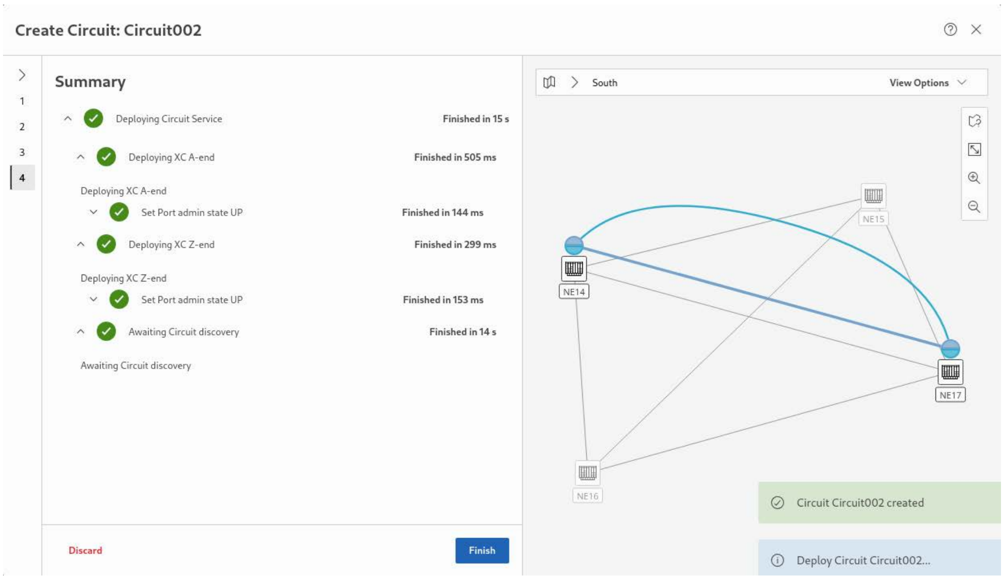
Endpoints NE14, NE17

Circuit Emulation Service CES005

− 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 status while the button in the lower right corner will display “Deploying...”



Create Circuit: Circuit002

Summary

Deploying Circuit Service Finished in 15 s

Deploying XC A-end Finished in 505 ms

Deploying XC A-end

Set Port admin state UP Finished in 144 ms

Deploying XC Z-end Finished in 299 ms

Deploying XC Z-end

Set Port admin state UP Finished in 153 ms

Awaiting Circuit discovery Finished in 14 s

Awaiting Circuit discovery

Circuit Circuit002 created

Deploy Circuit Circuit002...

→ 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.

4 Annex

4.1 Associated Documents

[1KHW002499]	Release Note “FOXMAN-UN”
[1MRC000084]	User Manual “Web UI”

4.2 Document History

Table 1: Document History

Document ID	FOXMAN-UN Release	Rev	Date	Changes since previous version
1MRC000133	R18	A	Sep 2025	Reworked and updated version for R18, including: - update of screenshots and descriptions for CES creation wizard, - update of screenshots and descriptions for Circuit creation wizard.

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