



Configure Circuits

The OTN circuits allow you to setup end to end circuits from the origin to a destination network element. The Optical Channel Trail circuits allow you to create circuits in a network where the NCS 4000 series node is connected to a ONS 15454, ONS 15454 M2, or ONS 15454 M6 nodes. This chapter provides the CTC procedures to configure the circuits.

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Understand OTN Circuits

An OTN circuit provides the ability to aggregate different types of traffic such as Ethernet, SONET or SDH, and packet over OTN at different data rates such as 1.25, 2.5, 10, or 100 GBit per second. This aggregated traffic is transported by network elements that acts as OTN cross connections.

ODUk controllers can be cross connected with controllers of the same rate in an OTN circuit by a fabric card. The following network applications are associated with OTN network elements:

- End-to-end circuits from any rate or any payload client service
- End-to-end circuit from a client service versus the OTN (OTUk) network
- Aggregation of OTN traffic (OTUk)

Understand Circuit Diversity

This feature enables the user to create a circuit diverse of another circuit. A diverse circuit is a circuit that takes a path based on certain diversity conditions.

When request for creating a diverse circuit is received the system first tries to find a SRLG diverse path. If SRLG diverse path is not available then it falls to Node and Link diversity and if this also fails then basic Link diverse path is used. It is also possible to enable diversity on an existing circuit but this will trigger re-signaling of the circuit.

Following are the restrictions applicable to this feature (not applicable for UNI circuits) :

- The diverse circuit has the same head node.
- The feature is supported only for 1+0 circuits.
- Strict diversity is supported i.e. if a diverse path is not found, the circuit is not created.

Understand OSPF

Open Shortest Path First (OSPF) is a routing protocol designed to run an autonomous system. It maintains an identical database describing the topology of an autonomous system. From the identical database, a shortest path-tree calculates the routing table. OSPF-TE allows controlling the data packet's path.

OSPF provides following features:

- Routing of area.
- Routing of protection.
- Minimizing the routing protocol traffic.

Understand MPLS TE

MPLS TE learns the topology and resources available in a network and then maps traffic flows to respective paths based on resource requirements and network resources, for example, bandwidth. MPLS TE builds a

unidirectional tunnel from a source to a destination in the form of a label switched path (LSP), which is then used to forward traffic. Tunnel head end or tunnel source is the point where the tunnel begins, the tunnel tail end or tunnel destination is the node where the tunnel ends .

Understand Tandem Connection Monitoring

Tandem Connection Monitoring (TCM) layer is used for protection applications, for example, APS. In traditional SONET/SDH applications, the path layer is used for this purpose, however, it can be influenced by errors that occur outside a given operators network and cause undesired protection switch events to occur within their network. Since TCM can isolate a service to a given domain, it can be used to trigger protection applications and avoid such issues.

Understand ISSU Upgrade

In-Service Software Upgrade (ISSU) is a technique that updates the software packages on a network element without affecting the traffic. By using ISSU, you can deploy new Cisco IOS XR Software images that supports new software features and services. The Cisco IOS XR ISSU capability extends Cisco high availability innovations for minimizing planned downtime for service provider networks.

Understand GCC Management

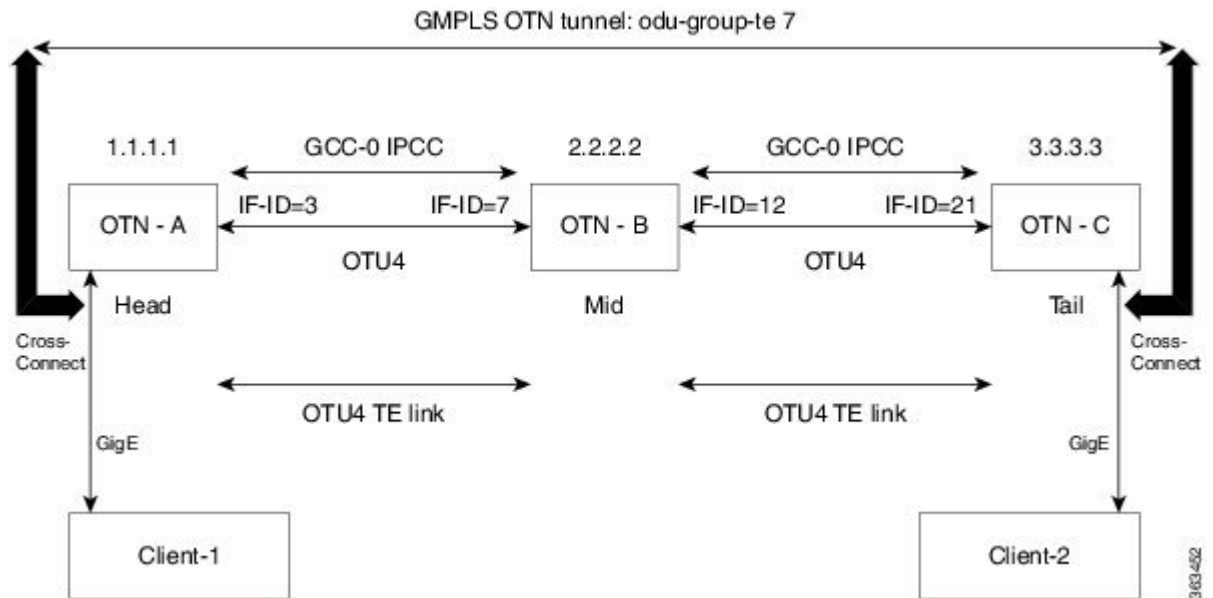
General Communication Channel (GCC) is an in-band side channel that carries transmission management and signaling information within optical transport network elements.

There are two types of GCC links:

- GCC0 - two bytes within OTUk overhead.
- GCC1 - two bytes within ODUk overhead.

Understand GMPLS

Generalized Multi-Protocol Label Switching (GMPLS) extends the packet based MPLS protocol to allow creation and maintenance of tunnels across the networks that consist of non-packet switching devices. GMPLS tunnels can traverse the Time-Division Multiplex (TDM) interface and switching types.



The following protocols are associated with GMPLS:

- OSPF
- OSPF-TE
- RSVP-TE
- MPLS-TE
- LMP

Understand Explicit Path

Explicit path refers to a user defined path taken by a circuit. GMPLS dynamically determines the path to be taken by a circuit but user can override this path by configuring an explicit path.

NTP-K2 Pre-requisite for OTN Circuits Using CTC

| | |
|--------------------------------|--|
| Purpose | This procedure configures the pre-requisite procedures of OTN circuit. |
| Tools/Equipment | None |
| Prerequisite Procedures | None |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |
| Security Level | Provisioning or higher |

Procedure

Perform any of the following procedures as needed to configure the OTN circuit:

- [DLP-K61 Provision Management IP Address, on page 5](#)
- [DLP-K62 Provision Loopback Interface, on page 14](#)
- [DLP-K9 Configure the Loopback on an Interface Using CTC, on page 6](#)
- [DLP-K10 Add OSPF on an Interface Using CTC, on page 7](#)
- [DLP-K11 Configure the OSPF-TE on an Interface Using CTC, on page 8](#)
- [DLP-K12 Configure an MPLS-TE Instance Using CTC, on page 9](#)
- [DLP-K13 Configure the Refresh Optical Interval on OTN Controllers Using CTC, on page 11](#)

End of procedure.

DLP-K61 Provision Management IP Address

| | |
|--------------------------------|---|
| Purpose | This procedure provisions the management IP address for the node. |
| Tools/Equipment | None |
| Prerequisite Procedures | DLP-G46 Log into CTC |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite |
| Security Level | Provisioning or higher |

Procedure

-
- Step 1** In the **Node View**, click the **Provisioning > Network > General** tabs.
Active RP—Displays the details of the active route processor.
- Step 2** In the **RP0-Mgmt IP** and **RP1-Mgmt IP** areas, complete the following information:
- IP—Enter the IPv4 address assigned to RP0/RP1.
 - Mask—Enter the IPv4 subnet mask.
 - Mac Address—Displays the MAC address of RP0/RP1.
 - IPv6 Address—Enter the IPv6 address assigned to RP0/RP1 if IPv4 address is not set.

- **Prefix Length**—Enter the prefix length for the provisioned IPv6 address. The value must be between 0 and 128.

Step 3 In the **Mgmt IP** area, complete the following information:

- **IP**—Enter an IP address drawn from the management IP address pool that supersedes the IP addresses of RP0 and RP1.
- **Mask**—Enter the subnet mask for the IP address.

Step 4 In the **Gateway** area, enter IPv4 or IPv6 address and enter the prefix length if you use IPv6 address. The prefix length must be between 0 and 128.

Step 5 Click **Apply**.

Step 6 Return to your originating procedure (NTP).

DLP-K9 Configure the Loopback on an Interface Using CTC

| | |
|--------------------------------|---|
| Purpose | This procedure provides instructions to configure the loopback on an interface using CTC. It also helps in management logging and authentication of a user on an interface. |
| Tools/Equipment | None |
| Prerequisite Procedures | Login to CTC in <i>System Setup and Software Installation Guide for Cisco NCS 4000 Series</i> DLP-K1 Configure an OTN Controller Using CTC |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |
| Security Level | Provisioning or higher |

Procedure

Step 1 In the **Node View**, double-click the line card (NCS4K-20T-O-S/ NCS4K-2H-O-K/ NCS4K-2H-W/NCS4K-24LR-O-S).

Step 2 Click the **Maintenance > Loopback** tab.

Step 3 To configure loopback on OTN controllers, perform the following steps in the screen that appears:

- Click the **Controller** column and select a name of the controller.
- Click the **Admin State** Column.
- Choose an administrative state for the controller. For more information, see [Administrative and Service States](#).

- d) From the **Loopback Type** drop-down list, choose **Internal**, **Line** or **None**.
- e) Click **Apply**.
- f) Click **Refresh** to refresh all the controllers.

Step 4 Return to your originating procedure (NTP).

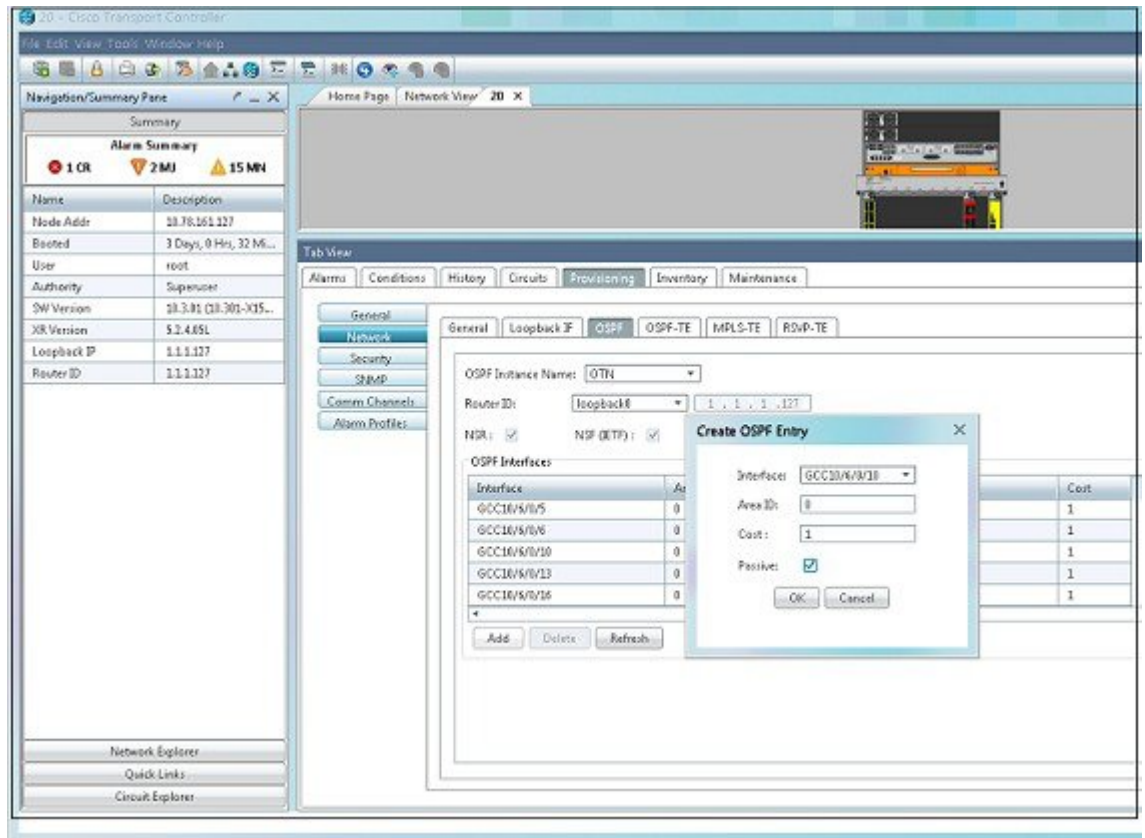
DLP-K10 Add OSPF on an Interface Using CTC

| | |
|--------------------------------|--|
| Purpose | The Adding OSPF allows to setup link between two different router and maintain the connectivity interface. This procedure provides instructions to configure the OSPF on an interface using CTC. |
| Tools/Equipment | None |
| Prerequisite Procedures | Login to CTC in <i>System Setup and Software Installation Guide for Cisco NCS 4000 Series</i> DLP-K9 Configure the Loopback on an Interface Using CTC , on page 6 |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |
| Security Level | Provisioning or higher |

Procedure

- Step 1** In the **Node View**, double-click the **line card** (NCS4K-20T-O-S/ NCS4K-2H-O-K/NCS4K-24LR-O-S).
- Step 2** Click the **Provisioning > Network > OSPF** tab.
- Step 3** Click **Add**. The Create OSPF Entry dialog box appears.
- Step 4** Perform the following steps in the Create OSPF Entry dialog box:
 - a) In the **Interface** field, enter OTN. It can not be edited further.
 - b) In the **Area ID** field, enter a value between 0 to 4294967295
Note It supports the IP format as 255.255.255.255. Area ID cannot be edited. Single OSPF Area ID is supported in OTN.
 - c) Check the **Passive** check box to ensure the updates are not sent beyond an OSPF interface.

d) Click **OK**.



Step 5 Return to your originating procedure (NTP).

DLP-K11 Configure the OSPF-TE on an Interface Using CTC

| | |
|--------------------------------|---|
| Purpose | OSPF-TE allows controlling the path of data packets. This procedure provides instructions to configure the OSPF-TE using CTC. |
| Tools/Equipment | None |
| Prerequisite Procedures | <p>Login to CTC in <i>System Setup and Software Installation Guide for Cisco NCS 4000 Series</i></p> <p>DLP-K1 Configure an OTN Controller Using CTC</p> <p>DLP-K10 Add OSPF on an Interface Using CTC, on page 7</p> |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |
| Security Level | Provisioning or higher |

Procedure

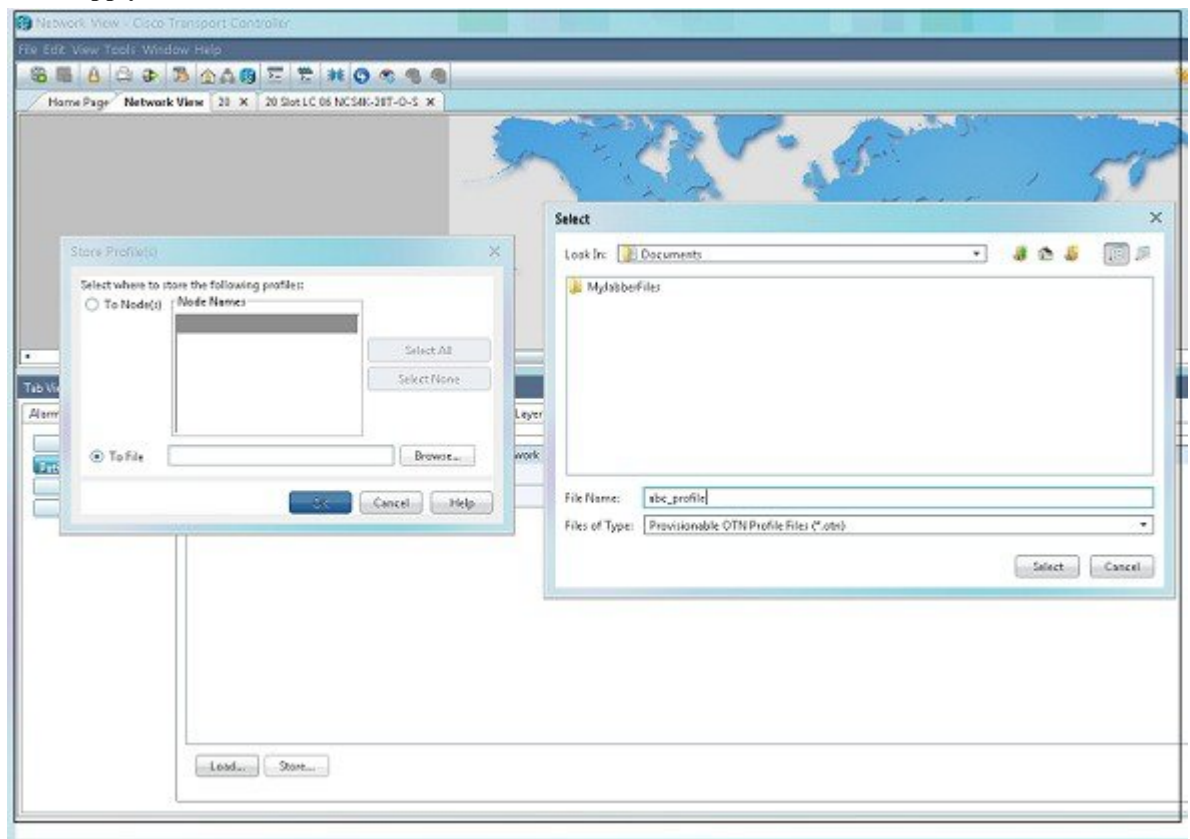
-
- Step 1** In the **Node View**, double-click the **line card** (NCS4K-20T-O-S/ NCS4K-2H-O-K/ NCS4K-24LR-O-S).
- Step 2** Click the **Provisioning > Network** tab.
- Step 3** Click the **OSPF-TE** tab.
- Step 4** To configure the OSPF-TE on an Interface, complete the following:
- In the Area ID field, enter a value between 0 to 4294967295.
 - Check the **Autoconfig** check box to enable all the interfaces of the OSPF-TE.
 - Click **Apply**.
- Step 5** Return to your originating procedure (NTP).
-

DLP-K12 Configure an MPLS-TE Instance Using CTC

| | |
|--------------------------------|--|
| Purpose | Traffic engineering enables route network traffic to offer the best service to the users and reduces the cost of the network. This procedure provides instructions to configure an MPLS-TE instance that helps to route network traffic using CTC. |
| Tools/Equipment | None |
| Prerequisite Procedures | Login to CTC in <i>System Setup and Software Installation Guide for Cisco NCS 4000 Series</i> DLP-K1 Configure an OTN Controller Using CTC DLP-K10 Add OSPF on an Interface Using CTC, on page 7 |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |
| Security Level | Provisioning or higher |

Procedure

- Step 1** In the **Node View**.
- Step 2** Click the **Provisioning > Network** tab.
- Step 3** Click the **MPLS-TE** tab.
- Step 4** Click **Create**.
- Step 5** Click **Ok**.
- Step 6** Click the row containing the slot for which you want to configure MPLS-TE.
- Step 7** Perform the following steps in the dialog box that appears containing the default parameters for that controller:
- From the **Enable** column choose **true** or **false**.
- Step 8** Click **Apply**.



- Step 9** Return to your originating procedure (NTP).

DLP-K13 Configure the Refresh Optical Interval on OTN Controllers Using CTC

| | |
|--------------------------------|---|
| Purpose | Refresh Optical Interval allows displays the time that system takes to automatically refresh the controllers. Refresh Optical Missed displays the number of refresh optical missed messages. This procedure provides the instructions to configure the refresh optical interval on OTN controllers using CTC. |
| Tools/Equipment | None |
| Prerequisite Procedures | Login to CTC in <i>System Setup and Software Installation Guide for Cisco NCS 4000 Series</i> DLP-K1 Configure an OTN Controller Using CTC |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |
| Security Level | Provisioning or higher |

Procedure

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- Step 1** In the **Node View**, double-click the **line card** (NCS4K-20T-O-S/ NCS4K-2H-O-K/ NCS4K-24LR-O-S).
- Step 2** Click the **Provisioning > Network** tab.
- Step 3** Click the **RSVP-TE** tab.
- Step 4** Click the row that contains the slot to define refresh optical interval. All the controllers appear.
- Step 5** To define RSVP-TE, complete the following:
- Click **LC** to set the refresh optical intervals.
Note All the controllers of the selected node appears.
 - In the **Enable** column, choose **true** or **false**.
 - Click the **Refresh Optical Interval** column.
 - Enter the time to automatically refresh the controllers.
Note The refresh interval value ranges from 180-86400 seconds.
 - Number of missed messages ranges from 1 to 110000
- Step 6** Click **Apply** to save the changes.
- Step 7** Return to your originating procedure (NTP).
-

NTP-K3 Configure OTN Circuits Using CTC

| | |
|--------------------------------|--|
| Purpose | This procedure configures an OTN circuit Using CTC. |
| Tools/Equipment | None |
| Prerequisite Procedures | DLP-K1 Configure an OTN Controller Using CTC |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |
| Security Level | Provisioning or higher |

Procedure

Step 1 Perform any of the following procedures as needed to create, load, and store the path protection profile:

- [DLP-K14 Add a Path Protection Profile Using CTC, on page 13](#)
- [DLP-K15 Load a Path Protection Profile Using CTC, on page 14](#)
- [DLP-K16 Store a Path Protection Profile Using CTC, on page 17](#)

Step 2 Perform any of the following procedures as needed to configure an OTN circuit:

- [DLP-K17 Configure an OTN Circuit Using CTC, on page 18](#)
- [DLP-K18 Discover a Circuit Using CTC, on page 22](#)
- [DLP-K19 Edit General Parameters of a Circuit Using CTC, on page 23](#)
- [DLP-K20 Edit ODU Configuration of a Circuit Using CTC, on page 24](#)

Step 3 Perform any of the following procedures as needed to create, load, and store the explicit path:

- [DLP-K22 Add an Explicit Path Using CTC, on page 26](#)
- [DLP-K23 Store an Explicit Path Using CTC, on page 27](#)
- [DLP-K24 Load an Explicit Path Using CTC, on page 27](#)
- [DLP-K27 Create an LMP Using CTC, on page 28](#)

End of procedure.

DLP-K14 Add a Path Protection Profile Using CTC

| | |
|--------------------------------|---|
| Purpose | This procedure provides instructions to add a path protection profile using CTC. |
| Tools/Equipment | None |
| Prerequisite Procedures | Login to CTC in <i>System Setup and Software Installation Guide for Cisco NCS 4000 Series</i> |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |
| Security Level | Provisioning or higher |

Procedure

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- Step 1** In the **Network View**, click the **OTN > Path Protection Profiles**.
- Step 2** Click **Add**. Perform the following steps in the editable row:
- Enter the Path Protection Profile name.
 - In the **Wait to Restore (WTR)** field (in seconds), enter the duration of time (in seconds).

Note It defines the time the system must wait to restore a circuit. The valid range is 0 or from 300 to 720 seconds. WTR value is in multiple of 60. Default value for WTR is 300.
 - From the **Sub Network Connection Mode** drop-down list, choose any from the following: SNC_N (default), SNC_I and SNC_S.

Note A new entry will be created with Sub Network Connection Mode value as **SNC_N** and TCM-ID value as **NONE**.
 - In the **Hold Off (sec)** field, enter the duration of time (in seconds) .

Note It defines the time the system waits before switching to the alternate path. The valid range is 0 or from 100 to 10000 seconds. Hold off value is in multiple of 100. Default value is 0.
 - From the **Protection Type** drop-down list, choose a protection type from the available options 1+1-BIDIR-APS (Default) or 1+1-UNIDIR-APS or 1+1-UNIDIR-NO-APS or 1+1+R-BDIR-APS.
 - From the **Revertive** drop-down list, choose **Yes** or **No**. Default is **No**.
- Step 3** From the Sub Network Connection mode drop-down list, choose **SNC_S**.
- Step 4** From the TCM drop-down list, choose an option.
- Note** By default, **TCM-4** is selected once you select **SNC-S** as Sub Network Connection mode. You can change the TCM-ID column value from **TCM4** to TCM1-TCM6 for SNC-S.
- Note** For SNC-I and SNC-N, You are not allowed to change the TCM-ID value. It should be set to **None**.
- Step 5** Return to your originating procedure (NTP).
-

DLP-K62 Provision Loopback Interface

| | |
|--------------------------------|---|
| Purpose | This procedure provisions the loopback interface on the node. |
| Tools/Equipment | None |
| Prerequisite Procedures | DLP-G46 Log into CTC |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite |
| Security Level | Provisioning or higher |

Procedure

-
- Step 1** In the node view, click the **Provisioning > Network > Loopback IF** tabs.
- Step 2** If you want to create a loopback interface, complete the following:
- Click **Create**. The Create Loopback Interface dialog box appears.
 - Enter the Interface ID, IP address, and network mask in the respective fields and click **OK**.
- Step 3** If you want to edit a loopback interface, complete the following:
- Click **Edit**. The Edit Loopback Interface dialog box appears.
 - Modify the values of the IP Address and network mask as required and click **OK**.
- Step 4** Return to your originating procedure (NTP).
-

DLP-K15 Load a Path Protection Profile Using CTC

| | |
|--------------------------------|---|
| Purpose | This procedure provides instructions to load a path protection profile using CTC. |
| Tools/Equipment | None |
| Prerequisite Procedures | Login to CTC in <i>System Setup and Software Installation Guide for Cisco NCS 4000 Series</i> |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |

| | |
|-----------------------|-----------------------------------|
| Security Level | Provisioning, higher or retriever |
|-----------------------|-----------------------------------|

Procedure

- Step 1** In the **Network View**, click the **OTN > Path Protection Profiles** tab.
- Step 2** Click **Load**. Perform one of the following in the Load Profile (s) dialog box that

- a) From the **From Node (s)** pane, select a name of the node to load the path protection profiles.
- b) Click **OK**.
- c) In the **From File** field enter the path of the file or browse to the file, to load the path protection profile.

Note You can load the profiles from a file that has OTN extension.
- d) Click **OK**.

Step 3 Return to your originating procedure (NTP).

DLP-K16 Store a Path Protection Profile Using CTC

| | |
|--------------------------------|---|
| Purpose | Storing a Path Protection Profile allows to store cross connection on the same chassis. This procedure provides instructions to store a path protection profile using CTC. |
| Tools/Equipment | None |
| Prerequisite Procedures | <ul style="list-style-type: none"> • Login to CTC in <i>System Setup and Software Installation Guide for Cisco NCS 4000 Series</i>. • DLP-K14 Add a Path Protection Profile Using CTC, on page 13 • DLP-K15 Load a Path Protection Profile Using CTC, on page 14 |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |
| Security Level | Provisioning or higher |

Procedure

- Step 1** In the **Network View**, click the **OTN > Path Protection Profile** tab.
- Step 2** Click **Store**. Perform one of the following in the Load Profile (s) dialog box that appears.
- a) From the **To Node (s)** pane, select a name of the node to store the path protection profiles.
 - b) Click **Select All**.
 - c) Click **OK**.

- d) In the **To File** field enter the path of the file that has an OTN extension or browse to the file, to store the path protection profile.

Step 3 Click **OK**

Step 4 Return to your originating procedure (NTP).

DLP-K17 Configure an OTN Circuit Using CTC

| | |
|--------------------------------|--|
| Purpose | OTN circuit allows the end user to set up an open end circuit from an origin to a destination Network Element. This procedure provides instructions to configure an OTN circuit using CTC. |
| Tools/Equipment | None |
| Prerequisite Procedures | You can load the profiles from a file that has OTN extension. |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |
| Security Level | Provisioning or higher |

Procedure

Step 1 In the **Network View**, click the **OTN > Circuits** tab.

Step 2 Click **Create**. The Circuit Creation wizard appears.

Step 3 In the **Circuit Type** screen of the wizard, choose a circuit type **ODU TUNNEL** from the list.

Step 4 Click **Next**.

Step 5 In the Circuit Attributes screen of the wizard:

- From the **Source Node** drop-down list, choose a source node for the circuit.
- From the **Destination Node** drop-down list, choose a destination node for the circuit.
- Enter the circuit name. The length must not exceed 64 characters.
- Check the **Diversity** checkbox and choose the circuit from the drop down list whose diverse circuit you want to create.

Note This step is applicable only when diverse circuit is created.

The drop down list will display <tunnel id>: <circuit name>

- From the **Bandwidth** drop-down list, choose a bandwidth.

- Click the **Bandwidth Configuration** hyperlink.

Note This hyperlink is enabled when you select the bandwidth type as **ODUFLEX**.

Perform the following steps in the Bandwidth Configuration dialog box that appears.

- In the **Bit Rate** field enter the bit rate. The valid range is from 1 to 100.
 - From the **Framing Type** drop-down list, choose **CBR** or **GFP-F-Fixed** (for 10 Gigabit Ethernet).
 - Click **OK**.
- g) From the **Protection Type** drop-down list, choose an option **1+0**, **1+1**, **1+R** or **1+1+R**.
- Note** Circuit diversity is supported only for 1+0 protection type.
- h) Click the **Path Option Configuration** hyperlink. The Path Option Configuration screen appears.
- Note** It is optional to configure the working path option. When you configure the path option using **Path Option Configuration** hyperlink, the selection made in the **Protection Type** drop-down list will be overridden.
- This hyperlink is disabled when the **Diversity** checkbox is checked.
- Click **Add**. Perform the following steps in the Create Path Option dialog box:
- In the **Index** field enter a unique index . The valid range is from 1 to 1000.
 - From the **Path Option Type** drop-down list, choose **Dynamic** or **Explicit**.
- Note** For using the option Explicit, make sure that an explicit path is already defined. You can define an explicit path using procedure [DLP-K22 Add an Explicit Path Using CTC](#), on page 26.
- From the **Path Name** drop-down list, choose an explicit path name.
- Note** The **Path Name** field is disabled, if the path option type is dynamic.
- From the **Protected By** drop-down list, choose a protected path option.
- Note** The **Protected By** drop-down list is disabled for Restored or Protected path options.
- From the **Restored By** drop-down list, select a restored path option. If any of the working or protected path fails, restored path replaces the failed path.
- Note** The **Restored By** drop-down list is disabled if you have selected path option as Restored.
- Click **OK**.
- i) From the **Path Protection Profile** drop-down list, choose an option.
- Note** This drop-down list is disabled if protection type is selected as **1+0**. If you have selected path protection profile as of 1+1+R, profiles related to 1+1+R only will be displayed. And, if you select 1+1 or 1+R, profiles related to 1+1+R will not be displayed.
- j) Check the **Record Route** check box.
- k) Click **Finish** to create the circuit.

Step 6 Return to your originating procedure (NTP).

DLP-K60 Configure an Open End OTN Circuit Using CTC

| | |
|--------------------------------|--|
| Purpose | OTN circuit allows the end user to setup end to end circuits from an origin to a destination Network Element. This procedure provides instructions to configure an open end OTN circuit using CTC. |
| Tools/Equipment | None |
| Prerequisite Procedures | Login to CTC in <i>System Setup and Software Installation Guide for Cisco NCS 4000 Series</i> |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |
| Security Level | Provisioning or higher |

Procedure

-
- Step 1** In the **Network View**, click the **OTN > Circuits** tab.
- Step 2** Click **Create**. The Circuit Creation wizard appears.
- Step 3** In the **Circuit Type** screen of the wizard, choose a circuit type **ODU UNI** from the list.
- Step 4** Enter a value between 1 to 80 for the number of circuits to be created.
- Step 5** Click **Next**.
- Step 6** In the Circuit Attributes screen of the wizard:
- From the **Source Node** drop-down list, choose a source node for the circuit.
 - From the **Destination Node** drop-down list, choose a destination node for the circuit.
 - Enter the circuit name.

Note The length must not exceed 64 characters.
 - From the **Bandwidth** drop-down list, choose a bandwidth.
 - Click the **Bandwidth Configuration** hyperlink.

Note This hyperlink is enabled when you select the bandwidth type as **ODUFLEX**.

Perform the following steps in the Bandwidth Configuration dialog box that appears.

 - In the **Bit Rate** field enter the bit rate. The bit rate per time slot is 1249177. Example for ODU2 we have 8 timeslots, so bit rate will be $1249177 * 8 = 9993416$.
 - From the **Framing Type** drop-down list, choose **CBR** or **GFP-F-Fixed** (for 10 Gigabit Ethernet).
 - Click **OK**.
 - From the **Protection Type** drop-down list, choose an option **1+0**, **1+1**, **1+R** or **1+1+R**.
 - Click the **Path Option Configuration** hyperlink. The Path Option Configuration screen appears.

Note It is optional to configure the working path option. When you configure the path option using **Path Option Configuration** hyperlink, the selection made in the **Protection Type** drop-down list will be overridden.

Click **Add**. Perform the following steps in the Create Path Option dialog box:

- In the **Index** field enter a unique index. The valid range is from 1 to 1000.
- From the **Path Option Type** drop-down list, choose **Dynamic** or **Explicit**.
- From the **Path Name** drop-down list, choose an explicit path name.
 - Note** The **Path Name** field is disabled, if the path option type is dynamic.
- From the **Protected By** drop-down list, choose a protected path option.
 - Note** The **Protected By** drop-down list is disabled for Restored or Protected path options.
- From the **Restored By** drop-down list, select a restored path option. If any of the working or protected path fails, restored path replaces the failed path.
 - Note** The **Restored By** drop-down list is disabled if you have selected path option as Restored.
- Click **OK**.

h) From the **Path Protection Profile** drop-down list, choose an option. This drop-down list is disabled if protection type is selected as **1+0**.

Note If you have selected protection type as of 1+1+R, profiles related to 1+1+R only will be displayed. And, if you select 1+1 or 1+R, profiles related to 1+1+R will not be displayed.

- i) Check the **Record Route** check box to record the route.
- j) (For ODU UNI) From the **Service Type** drop-down list, select an option. Service type values are populated based on the bandwidth selected.
- k) (For ODU UNI) Check the **Open End** check box to get the values populated in the Destination drop-down list.
- l) (For ODU UNI) From the **Source drop-down list**, choose a source port or controller. Source values are populated based on the service type or open end selected
- m) (For ODU UNI) From the **Destination** drop-down list, choose a destination port or controller. Destination values are populated based on the service type or open end selected..
- n) Click the **Path Option Configuration hyperlink** button.
 - Perform the following steps in the Create/Edit dialog box that appears.

- From the ODU Level drop-down list, choose an option. ODU Level values are populated based on the Destination. ODU level is one less than the Destination. If Destination is selected as ODU2, values in this drop-down list would be ODU1 and ODU0.
- Select a time slot highlighted in green color above, press Ctrl key and select the next time slot.
- Click **Channelize** to allocate the time slot to the lower order channelize controller. The lower order controller appears in the controller tree hierarchy.
- Click **OK**.

o) Click **Finish** to create the circuit.

Step 7 Return to your originating procedure (NTP).

DLP-K18 Discover a Circuit Using CTC

| | |
|--------------------------------|--|
| Purpose | This procedure provides instructions to discover a circuits from the list of OTN circuits using CTC. |
| Tools/Equipment | None |
| Prerequisite Procedures | Login to CTC in <i>System Setup and Software Installation Guide for Cisco NCS 4000 Series</i> DLP-K17 Configure an OTN Circuit Using CTC , on page 18 |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |
| Security Level | Provisioning or higher |

Procedure

-
- Step 1** In the **Network View**, click the **OTN > Circuitstab**.
- Step 2** Click **Query**. Perform the following steps in the OTN Services Query screen that appears.
- From the **Existing/New Query** drop-down list, choose **New** or **Existing**.
 - Enter the tunnel IDs if you have selected **New Query**.

Note For **Existing Query**, Tunnel IDs and Query Group fields are populated automatically.
 - Click **Query Group**. Perform the following steps in the User Query Group Chooser dialog box:
 - From the **Group** drop-down list, choose an option.
 - From the **Available Nodes** pane, choose a node.
 - Click **>>** to move the selected node from the Available Nodes to the Grouped Nodes pane.
 - Click **Save** to save this query group criteria. A dialog box appears, enter a name for the query group and click **Save**.
 - Click **Apply All** to select all the available nodes. These nodes appear in the field next to the **Query Group** button.
 - Click **Apply Selected** to select only the grouped nodes. These nodes appear in the field next to the **Query Group** button.
 - Click **Save** to save the query criteria.
 - Click **Run Query** to execute the query.

Note The **Run Query** button gets enabled only when you enter a value in the Query Group field. The search result appears in the Query Matches pane.
 - Enter a search criteria in the field adjacent to the **Find Next** button.

Note This button gets enabled only when you have a value in the Query Matches pane.

- g) Click **Find Next**.
Note The next value gets highlighted in the Query Matches pane based on the search criteria.
 - h) From the **Query Matches** pane, choose a **circuit**.
 - i) Click >> to move the selected circuit from the **Query Matches** pane to the **Selected Services to Discover** pane.
 - j) Click **Discover All** to display all the circuits of the **Query Matches** pane on the **Circuits** tab.
 - k) Click **Discover Selected** to display all the selected circuit of the Selected Services to Discover pane on the **Circuits** tab.
- Step 3** Return to your originating procedure (NTP).

DLP-K19 Edit General Parameters of a Circuit Using CTC

| | |
|--------------------------------|---|
| Purpose | This procedure provides instructions to edit general parameters of an OTN circuit using CTC. |
| Tools/Equipment | None |
| Prerequisite Procedures | Login to CTC in <i>System Setup and Software Installation Guide for Cisco NCS 4000 Series</i> |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |
| Security Level | Provisioning or higher |

Procedure

- Step 1** In the **Network View**, click the **OTN > Circuits** tab.
- Step 2** From this list, select a circuit.
- Step 3** Click **Edit**.
- Step 4** Click the **General** tab. Perform the following steps in the Edit Circuit screen that appears:
 - a) Modify the values of parameters such as **Name**, **Bandwidth**, **Path Protection Profile**, **Bandwidth Configuration**, **Diversity** and **Source and Destination** client interfaces as required.
 - Note** Details of source and destination client interfaces will be editable only when you are updating UNI circuits.
 - Note** The **Path Option Configuration** hyperlink is disabled when the **Diversity** checkbox is checked or when diverse circuit of the selected circuit exists.
 - b) Click **Apply** to save the changes.
 - Note** CTC will get hang for 1 min when multiple edit circuit windows are opened with multiple pluggable OIR.

Step 5 Return to your originating procedure (NTP).

DLP-K20 Edit ODU Configuration of a Circuit Using CTC

| | |
|--------------------------------|---|
| Purpose | This procedure helps to edit the ODU configuration of a circuit. |
| Tools/Equipment | None |
| Prerequisite Procedures | Login to CTC in <i>System Setup and Software Installation Guide for Cisco NCS 4000 Series</i> DLP-K17 Configure an OTN Circuit Using CTC , on page 18 DLP-K18 Discover a Circuit Using CTC , on page 22 |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |
| Security Level | Provisioning or higher |

Procedure

- Step 1** In the **Network View**, click the **OTN > Circuits** tab.
- Step 2** Select a circuit from the list.
- Step 3** Click **Edit**.
- Step 4** Click **ODU Configuration** tab.
- Step 5** From the left pane, click the **ODU Line Configuration** tab. Perform the following steps in the Edit ODU Line Configuration screen that appears:
- Select a controller from the list.
 - From the **Admin State** drop-down list, choose **Automatic in Service**, **Maintenance** or **Normal**.
Note This field displays the current status of a controller.
 - From the **Loopback** drop-down list, choose an option **Internal**, **Line** or **None**.
 - From the **GCC1** drop-down list, choose **Enable** or **Disable**.
 - Click **Apply**.
- Step 6** From the left pane, click the **ODU TTI Configuration** tab. Perform the following steps in the Edit ODU TTI Configuration screen that appears:
- Note** TTI configuration is not supported on HO ODU.
- From the **Controller Name** drop-down list, choose controllers for the **Source** and **Destination** pane respectively.

Note The values that you enter in the **Transmit** area of the **Source** pane are displayed in the corresponding fields of the **Expected** area of the **Destination** pane. Similarly, the values that you enter in the **Expected** area of the **Source** pane are displayed in the corresponding fields of the **Transmit** area of the **Destination** pane. The values of the **Received** area of the **Source** and **Destination** pane must be the same.

- b) In the **Transmit** area, click **ASCII** or **Hex (1 byte)** to specify the data type for the operator string.
- c) Click **ASCII Mode**. The operator string is converted to ASCII data type.
- d) Enter a new operator string. This string replaces the operator specific string when you click **Apply**.
- e) Repeat steps (b) through (d) to select a data type in the **Expected** area of the **Source** pane.
- f) Check the **Auto-Refresh** check box to refresh the received operator specific value automatically in every 5 seconds.
- g) Click **Apply**.

Step 7 From the left pane, click the **TCM Line Configuration** tab. Perform the following steps in the Edit TCM Line Configuration screen that appears:

- a) From the **Controller Name** drop-down list, choose a node.
- b) Check the **Enable** check box to enable the TCMs appearing in the list.
- c) Click **Apply**.

Step 8 From the left pane, click the **TCM TTI Configuration** tab. Perform the following steps in the Edit TCM TTI Configuration screen:

- a) From the **Controller Name** drop-down list, choose controller for the **Source** and **Destination** pane respectively.

Note The values that you enter in the **Transmit** area of the **Source** pane are displayed in the corresponding fields of the **Expected** area of the **Destination** pane. Similarly, the values that you enter in the **Expected** area of the **Source** pane are displayed in the corresponding fields of the **Transmit** area of the **Destination** pane. The values of the **Received** area of the **Source** and **Destination** pane must be the same.

- b) From the TCM drop-down list, choose TCM on the **Source** and **Destination** pane respectively.
- c) In the **Transmit** area, click **ASCII** or **Hex (1 byte)** to specify the data type for the operator string.
- d) Click **Hex Mode**. The operator string is converted to hexadecimal data type.
- e) Enter a new operator string.
- f) Click **Apply** to replaces the operator specific string.
- g) Repeat steps (c) through (e) to select a data type in the **Expected** area of the **Source** pane.
- h) Check the **Auto-Refresh** check box to refresh the received operator specific value automatically in every 5 seconds.
- i) Click **Apply**.

Step 9 From the left pane, click the **PM Thresholds** tab.

- a) Click the **ODU Controller** tab. Perform the following steps in the ODU controller screen that appears:

Note Permon should be enabled for ODU controllers.

- From the **Controller Name** drop-down list, choose a **controller**.
- From the **Layer Name** drop-down list, choose an option **Path** or **GFP**. The PM threshold values get populated in the table appears on the screen.
- Click either **15 Min** or **1 Day** interval to get the PM interval.
- Click **Refresh** to get the updated PM threshold values in the table from the legacy node.

b) Click the **TCM** tab. Perform the following steps in the TCM screen that appears:

Note Permon should be enabled for TCM controllers.

- From the **Controller Name** drop-down list, choose a controller. The PM threshold values get populated in the table appears on the screen.
- Click either **15 Min** or **1 Day** interval to get the PM thresholds interval.
- Click **Refresh** to get the updated TCM PM threshold values from the legacy node.

Step 10 Return to your originating procedure (NTP).

DLP-K22 Add an Explicit Path Using CTC

| | |
|--------------------------------|--|
| Purpose | This procedure provides instructions to create an explicit path using CTC. |
| Tools/Equipment | None |
| Prerequisite Procedures | Login to CTC in <i>System Setup and Software Installation Guide for Cisco NCS 4000 Series</i> . DLP-K2 Configure an OTUk Controller Using CTC |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |
| Security Level | Provisioning or higher |

Procedure

Step 1 In the **Network View**, click the **OTN > Explicit Paths**.

Step 2 Click **Add**. Perform the following steps in the Create Explicit Path screen:

a) Enter a name of the explicit path.

Note Strict path type is selected by default.

b) Click **Add**. Perform the following steps in the Add Node dialog box. Alternately, select a node from the map, and click **Add**.

- From the **Node** drop-down list, choose **node**.
- From the **Interface** drop-down list, choose an **interface**.
- Click **Apply**.

c) Click **Apply** to save the explicit path.

Step 3 Return to your originating procedure (NTP).

DLP-K23 Store an Explicit Path Using CTC

| | |
|--------------------------------|---|
| Purpose | This procedure provides instructions to store an explicit path using CTC. |
| Tools/Equipment | None |
| Prerequisite Procedures | Login to CTC in <i>System Setup and Software Installation Guide for Cisco NCS 4000 Series</i> . DLP-K22 Add an Explicit Path Using CTC, on page 26 |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |
| Security Level | Provisioning or higher |

Procedure

Step 1 In the **Network View**, click the **Explicit Paths > Explicit Paths** tab.

Step 2 Click **Store**. Perform the following steps in the Store Explicit Path (s) dialog box:

- a) Check the check box adjacent to a node name.
- b) Click **OK** to store the explicit path.

Step 3 Return to your originating procedure (NTP).

DLP-K24 Load an Explicit Path Using CTC

| | |
|--------------------------------|---|
| Purpose | This procedure provides instructions to load an explicit path using CTC. |
| Tools/Equipment | None |
| Prerequisite Procedures | Login to CTC in <i>System Setup and Software Installation Guide for Cisco NCS 4000 Series</i> . DLP-K23 Store an Explicit Path Using CTC, on page 27 |

| | |
|---------------------------|------------------------|
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |
| Security Level | Provisioning or higher |

Procedure

-
- Step 1** In the **Network View**, click the **OTN > Explicit Path**.
- Step 2** Click **Load**. Perform the following steps in the Load Explicit Path (s) dialog box:
- Check the check box adjacent to a node name.
 - Click **OK** to load the explicit path.
- Step 3** Return to your originating procedure (NTP).
-

DLP-K27 Create an LMP Using CTC

| | |
|--------------------------------|---|
| Purpose | Link Management Protocol (LMP) is used to manage Traffic Engineering (TE) link. It allows multiple data link into a single Traffic Engineering (TE) link that runs between a pair of node. This procedure provides instructions to create an LMP using CTC. |
| Tools/Equipment | None |
| Prerequisite Procedures | Login to CTC in <i>System Setup and Software Installation Guide for Cisco NCS 4000 Series</i> . |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |
| Security Level | Provisioning or higher |

Procedure

-
- Step 1** In the **Network View**, click the **Provisioning > LMP** tab.
- Step 2** Click **Create**.
- From the **Originating Node** drop-down list, choose the starting node of the LMP.
 - Enter the IP address of the communication channel remote end point.
 - From the **Local Interfaces** drop-down list, select an option.
 - Click the **UnNumbered** radio button if you want to create an unnumbered LMP.

e) Enter the interface IP of the originating node if the **Numbered** radio button is enabled.

Step 3 Click **Next**. Perform the following steps in the LMP Termination screen that appears in the LMP creation wizard

- a) From the **Terminating Node** drop-down list, choose the ending node of the LMP.
- b) Choose the **Type, Shelf, Slot, and Port** values for the **Rx** and **Tx** port selection section respectively.
- c) From the **Local Interfaces** drop-down list, select an option.
- d) Enter the interface IP of the terminating node.

Note The Interface IP field is disabled if the UnNumbered radio button is enabled while selecting the Originating Node.

Step 4 Click **Next**. Perform the following steps in the Optical Parameters screen that appears in the LMP creation wizard:

- a) Check the **Allow Regeneration** check box (optional).

Note Flag this checkbox only if the UNI circuit may need to pass over regeneration sites.

- b) From the **UNI State** drop-down list, select **Enable** or **Disable**.

Note

Select **Enable** if you want to create optical service network.

- c) Enter the description of the UNI interface (optional).

Note It can be a maximum of 256 characters.

- d) In the **Downstream** and **Upstream** fields, set the channel power offset value for the incoming and outgoing path of the circuit (optional).

- e) Enter an alphanumeric string for the Label. Label is a unique circuit identifier (optional).

- f) From the **Validation** drop-down list, choose an option for the optical path validation to be done by WSON during circuit creation.

Note

The above sub-step **a**, **e** and **f** can be easily overridden with new values during the OCH circuit creation. It is recommended to provide consistent value during the circuit creation instead of the LMP creation phase.

Step 5 Click **Next**. Perform the following steps in the Alien Wavelength screen that appears in the LMP creation wizard:

- a) From the **Alien Wavelength** drop-down list, choose an alien wavelength class.
- b) From the **FEC** drop-down list, choose an option. The following options are available:

- ◦ Disable
- Standard
- Enhanced
- Enhanced 1.4
- Enhanced 1.7
- 20% High Gain FEC
- 7% High Gain FEC

Note

This step will be applicable when LMP is created between NCS4K and MSTP.

Step 6 Click **Finish** to create the LMP.

Step 7 Return to your originating procedure (NTP).

DLP-K90 Configuring OTN Circuits Using Node Configuration Wizard

| | |
|--------------------------------|---|
| Purpose | This procedure configures the OTN circuits using Node Configuration Wizard. |
| Tools/Equipment | None |
| Prerequisite Procedures | DLP-K59 Log in CTC |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |
| Security Level | Provisioning or higher |

Procedure

Step 1 In the **Node View** or **Card View**, right-click anywhere and choose the **Node Configuration Wizard**

Step 2 In the **IP Configuration** pane, if you want to provision the Virtual IP, Management IP, EMS IP, Craft IP, Gateway IP and the corresponding mask, complete the following :

- a) Enter the **Virtual IP Address** drawn from the management IP address pools that supersede the IP address of RP0 and RP1.
- b) Enter the **Subnet Mask** for the Virtual IP address previously entered.
- c) In the **RP0-Mgmt IP** and **RP1-Mgmt IP** areas, complete the following information:
 - IPv4—Enter a unique IPv4 address assigned to RP0/RP1. It displays blank if not configured.
 - IPv4 Mask—Enter the IPv4 subnet mask.
 - MAC Address—Displays the MAC address of RP0/RP1.
 - IPv6 —Enter the IPv6 address assigned to RP0/RP1.
 - IPv6 Prefix Length—Enter the prefix length for the provisioned IPv6 address. The value must be between 1 and 128.
 - EMS Interface --- Displays the IP address of RP0/RP1 that connects to a device via serial or LAN port.
 - EMS Submask --- Displays the subnet mask corresponding to the EMS IP.

- Craft Interface --- Displays the IP address of RP0/RP1 that connects to a device via serial or LAN port.
- Craft Submask --- Displays the subnet mask corresponding to the Craft IP.
- Service state --- Choose the appropriate state of the craft interface from the drop-down list.

Note If your node is having dual RP, then you must configure both the RP0 and RP1 to avoid discrepancy while performing switchover.

d) In the Gateway area, complete the following information :

- IPv4 --- Enter a unique IPv4 address.
- IPv6 --- Enter a unique IPv6 address.
- IPv6 Prefix Length --- Enter the prefix length for the provisioned IPv6 address. The value must be between 1 and 128.

Step 3 Click the **Next** button to save the changes and open the **OTN Topology** pane.

Step 4 Click **Close** to save the changes and close the Node Configuration Wizard.

Step 5 In the loopback interface area, Complete the following :

- Interface Type/ID --- Displays the loopback0 and it cannot be modified.
- IP Address --- Configure the Loopback IP Address.
- Sub Net Mask -- Enter the Subnet Mask for the Loopback IP Address.

You cannot delete the Loopback information once configured.

Step 6 If you want to create the controller, configure GCC interface, MPLS-TE, RSVP-TE on a particular card, complete the following :

- a) In the Port Controller Configuration area, Click the **Slot** to see the already configured ports with its corresponding data. The ports which are not configured on the node display the value None. Only those ports are displayed which are the OTN ports or has not been configured.
- b) Once port is selected, choose a **Service Type** from the drop-down list to create the controller.
- c) Check the **GCC0/GCC1** check box if you want to enable GCC on OTU or ODU in each slot.
- d) Check the **Unnumbered GCC0/1** check box to assign unnumbered loopback only on the enabled GCC interfaces.
- e) Check the **MPLS** check box if you want to configure the specific controller as a part of MPLS configuration. Complete [DLP-K12 Configure an MPLS-TE Instance Using CTC, on page 9](#) as needed.
- f) Check the **RSVP** check box if you want to configure the specific controller as a part of RSVP configuration. Complete [DLP-K13 Configure the Refresh Optical Interval on OTN Controllers Using CTC, on page 11](#) as needed.
- g) Configure the value of **Admin weight** only if MPLS is enabled. This weight ranges from 0 to 65535. The default value of Admin weight is 0.
- h) Configure the value of **TTI Mode** only if MPLS is enabled.
- i) Configure the value of **Timer** only if RSVP is enabled. It ranges from 180 to 86400 seconds.
- j) Configure the value of **Missed messages** field only if RSVP is enabled. It displays the number of refresh optical missed messages and ranges from 1 to 8.

Step 7 If you want to delete the controller, perform the following:

- a) Click the **Next** button to save the current changes and open the **OTN Topology** pane.
- b) Choose the **Service Type** as **None** to delete the already configured controller.
- c) Click the **Previous** button to save the changes and display the previous configuration pane.
- d) Click the **Close** button to save the changes and close the Node Configuration Wizard.
Delete the controller manually from the MPLS or RSVP, If you have configured the controller as part of MPLS or RSVP configuration.

Step 8 In the **OSPF** area, Complete the following :

- OSPF Process ID --- Displays OTN and cannot be modified.
- Router ID --- Displays the virtual IP of the node.
- Enable NSR --- Displays the field as checked once the OSPF process ID and Router ID is created.
- Enable NSF --- Displays the field as checked once the OSPF process ID and Router ID is created
- Add --- Click this button to create an OSPF entry.
- Delete --- Click this button to delete a selected OSPF entry.
- Interface --- Choose the OSPF interface from the drop-down list.
- Area ID --- Displays 0 as area ID and cannot be modified.
- Cost --- Enter the cost used by OSPF routers to calculate the shortest path.
- Passive --- Choose the state of the OSPF interface from the drop-down list.

Step 9 Click **Previous** to save the current changes and display the previous configuration pane.

Step 10 Click **Close** to save the changes and close the Node Configuration Wizard.

Step 11 Return to your originating procedure (NTP).

GMPLS Optical Channel Trail

The user can create a GMPLS optical channel trail (OCH Trail) in a network where the NCS 4000 series node is connected to a ONS 15454, ONS 15454 M2, or ONS 15454 M6 nodes. The OCH trail circuit originates from a NCS4k-2H-W interface on the source NCS 4000 node and terminates on the NCS4k-2H-W interface on the destination NCS 4000 node to create an optical connection. The prerequisite for the OCH trail circuit is to create a Link Management Protocol (LMP) link between the NCS4k-2H-W interface on the NCS 4000 node and the optical channel Add/Drop interface on the ONS 15454, ONS 15454 M2, or ONS 15454 M6 nodes.

The OCH Trail circuit is used to transmit traffic over a long distance. The traffic transmitted by the OCH Trail circuit is used as a OTU link by the OTN layer to route the OTN circuit.

DLP-G708 Create a GMPLS Optical Channel Trail

| | |
|--------------------------------|---|
| Purpose | <p>This task creates a GMPLS OCH trail circuit between NCS4K-2H-W and NCS4K-2H10T-OP-KS cards when provisioned in L2-over-NCS4k-2H-W mode.</p> <p>For OCH trails connecting NCS4K-2H-W and NCS4K-2H10T-OP-KS cards in L2-over-NCS4k-2H-W mode, the OCH trail provides the links associated to the SVLAN entities.</p> <p>In Release 10.0.1, as regards OCH trails connecting CRS routers, the OCH trail provides end-to-end circuit connectivity between the CRS routers passing through an MSTP network.</p> <p>This task creates a GMPLS OCH trail circuit between NCS 4000 series nodes that are connected to the ONS 15454 nodes.</p> |
| Tools/Equipment | None |
| Prerequisite Procedures | <p>This task creates a GMPLS OCH trail circuit between NCS4K-2H-W and NCS4K-2H10T-OP-KS cards when provisioned in L2-over-NCS4k-2H-W mode.</p> <p>For OCH trails connecting NCS4K-2H-W and NCS4K-2H10T-OP-KS cards in L2-over-NCS4k-2H-W mode, the OCH trail provides the links associated to the SVLAN entities.</p> <p>In Release 10.0.1, as regards OCH trails connecting CRS routers, the OCH trail provides end-to-end circuit connectivity between the CRS routers passing through an MSTP network.</p> <p>This task creates a GMPLS OCH trail circuit between NCS 4000 series nodes that are connected to the ONS 15454 nodes.</p> |
| Required/As Needed | None |
| Onsite/Remote | <ul style="list-style-type: none"> • DLP-G46 Log into CTC • "Login to CTC" in <i>System Setup and Software Installation Guide for Cisco NCS 4000 Series</i> • DLP-K27 Create an LMP Using CTC |
| Security Level | Provisioning or higher |



Note

OCH trail circuits are created automatically when you provision OCHCC circuits between TXP and MXP cards or TXP or MXP cards and router PLIM interfaces (10G ethernet controllers).



Note When the user creates a GMPLS OCH Trail circuit on the VTXP port, it is possible to retune the wavelength under these conditions:

- When the circuit is configured as restorable.
- When the same wavelength is not available on the secondary path during the circuit failure.

Procedure

- Step 1** From the View menu, choose **Go to Network View** and click the **Network Functional View** icon in the toolbar. The Circuit Maintenance View opens.
- Step 2** From the Change Perspective drop-down list in the toolbar, choose **Circuit Creation**. The Circuit Creation view opens.
- Step 3** In the Circuit Parameters pane, provision the OCH Trail circuit attributes:
- a) Name—Assign a name to the circuit. The name is limited to 80 characters, which can be a combination of alphanumeric (a-z, A-Z, 0-9) and special characters (-, _). When a circuit includes a network element with release prior to ONS 15454 release 9.60, the circuit name is limited to 48 characters.
 - b) Label—Type a name for the circuit label. The label can be an alphanumeric string up to 14 characters.
 - c) Type—Choose **OCHTrail**.
 - d) Bidirectional—This parameter does not apply to OCH trail circuits.
 - e) Protected—This parameter does not apply to OCH trail circuits.
 - f) UNI VTXP— This parameter creates a UNI VTXP circuit; otherwise a VTXP circuit is created without UNI. This check box appears only when VTXP is selected as an end point.
 - g) IS—Check to place the trunk ports of the TXP /MXP card in service.
 - h) Wavelength Configuration — Select the check box to configure the wavelength for the circuit.
 - i) GMPLS/WSON Wavelength Parameters — Choose a wavelength from the first field.
 - j) Check the **Required** check box to specify the original wavelength.

Note

If the **Required** wavelength is available then only system will assign it else system will assign any of the available wavelength.

- k) Select **C band** in the second field. In the third field, indicate whether odd or even C-band wavelengths appear.
 - The even C-band wavelength supports 48 channels ranging from 1528.77 nm (196.10 THz) to 1566.31 nm (191.40 THz).
 - The odd C-band wavelength supports 48 channels ranging from 1529.16 nm (196.05 THz) to 1566.72 nm (191.35 THz).

Note MSTP legacy package supports 40 odd (1530.30 to 1561.42 nm) and 0 even (1530.72 to 1561.83) channels only.

- l) Validation—Set the validation mode. For more information about the validation modes, see the "Validation Modes" section in "Node Reference" chapter. The validation modes are:
 - Full—The circuit gets created when the circuit validation result is greater than or equal to the acceptance threshold value.

- None—The circuit is created without considering the acceptance threshold value. The Opt Valid column in the Circuits tab displays the value, “No Valid”.
 - Inherited—The restoration circuit inherits the validation and acceptance threshold values from the primary circuit.
- m) Acceptance threshold—Set the optical validation threshold value for the GMPLS circuit. The circuit is created if the actual optical validation result is greater than or equal to the value set in this field. For more information about the acceptance threshold value, see the "Acceptance Thresholds" section in "Node Reference" chapter.
- The GMPLS control plane validates the optical feasibility of an OCH circuit to ensure that the circuit is operational after provisioning. The optical feasibility is represented by the following colors:
- Green—Indicates that the channel failure risk is 0%.
 - Yellow—Indicates that the channel failure risk is between 0% and 16%.
 - Orange—Indicates that the channel failure risk is between 16% and 50%.
 - Red—Indicates that the channel failure risk is greater than 50%.

Step 4 In the GMPLS/WSOON Optional Configuration pane, specify the attributes:

- a) Ignore path Alarms—Check this check box to ignore the alarms on the path and create the circuit. This parameter is used to verify whether the circuit can be created on the path.
- b) Allow Regeneration—Select this check box to allow the control plane to find a regenerator deployed in the network. The regenerators are used when an optical LSP between two endpoints is not optical or lambda feasible with a single NCS4k-2H-W channel.
- c) Circuit Diversity—Select this option to provision a diversity path for the circuit. Choose a diversity condition from the **Type** drop down list and from the **Reference** drop down list, choose the circuit whose diverse circuit you want to create.

Note The selected reference circuit gets highlighted in the Network Functional View Map.
- d) Priority—Select the priority level for the circuit. The priority is used in resolving resource allocation when two or more circuits require the same resource during circuit creation or restoration concurrently. The priority levels are 0 (High) to 7 (Low).
- e) Channel Power Offset:
 - Upstream (dBm)—Set the value of offset in dBm, negative or positive, which the COM_TX of the card uses on its PerChannelPower default value. Upstream applies to the card in the outgoing path of the circuit.
 - Downstream (dBm)—Set the value of offset in dBm, negative or positive, which the COM_TX of the card uses on its PerChannelPower default value. Downstream applies to the card in the incoming path of the circuit.

Step 5 In the GMPLS/WSOON Wavelength Parameters pane, choose a wavelength from the field.

Step 6 Configure the restoration parameters for the OCH trail circuit in the GMPLS/WSOON Restoration Configuration pane. For more information about configuring the restoration parameters, see the "GMPLS Restoration Configuration" section in "Node Reference" chapter.

Table 1: GMPLS Restoration Parameters

| Option | Description |
|---------------|---|
| Restoration | Check this check box to switch the circuit from the original path to an alternate path because of failure in the original path. |
| Revert | Check this check box to revert the circuit from the restored path to the original path after the failure is fixed. |
| Auto Revert | Click this radio button to automatically revert the circuit from the restored path to the original path after the failure is fixed, WSON alarms are acknowledged, and the soak time expires. |
| Manual Revert | Click this radio button to manually revert the circuit from the restored path to the original path after the failure is fixed, the WSON alarms are acknowledged, and the soak time expires. |
| Soak Time | Enter the time (in hours, minutes, and seconds) in the Soak Time field. Soak time is the period that the circuit on the restored path must wait before switching to the original path after the failure is fixed. The circuit can revert to the original path after the soak time expires. The minimum value of soak time must be 00:00:01. |

- Step 7** Configure the source and destination ports at the circuit endpoints in the map. For more information about configuring the source and destination ports, see the "Source and Destination Port Configuration" section in "Node Reference" chapter. Right-click the node in the map and select the source and destination ports from the drop-down list.
- Step 8** Define the working or protect port parameters. For more information, see the "Working and Protect Port Parameters" section in "Node Reference" chapter. Click **Apply** in the Working Port Parameters pane and Protected Port Parameters pane, to apply the settings.
- Step 9** Click **Apply** in the Circuit Parameters pane.
- Step 10** Click **Yes** in the Create Circuits confirmation dialog box. The OCH trail appear in the Circuits tab in the Network Data pane. After the circuit status has been verified, the DISCOVERED status appears in the Status column. Depending on the size of the network, the circuit might take a few minutes to come up.
- Step 11** Return to your originating procedure (NTP).

GMPLS Path Constraints

During GMPLS circuit creation or wavelength rerouting, it is possible to force specific nodes and links to be included or excluded in the circuit path by applying specific constraints. The GMPLS circuit is created if a feasible path is found that complies with the specified constraints. You can also modify the constraints of an existing circuit in the circuit maintenance view. The circuit constraints are displayed as icons on the circuit map in the graphical view. The icons also contain an ordinal number that indicates the order in which the constraint will be applied to the link or node.

In the NCS4k-2H-W network functional view, the W&P Constraints Config drop-down list in the toolbar provides the constraint options listed in the following table. Choose the required option and select the node or span in the graphical view to which the constraint must be applied.

Table 2: Working and Protect Path Constraint Options

| Option | Description |
|------------------|---|
| exclude W Node | The working path does not pass through the selected node. |
| exclude P Node | The protect path does not pass through the selected node. |
| exclude W&P Node | The working and protected path do not pass through the selected node. |
| include W Node | The working path passes through the selected node. |
| include P Node | The protect path passes through the selected node. |
| exclude W Link | The working path does not use the selected span. |
| exclude P Link | The protect path does not use the selected span. |
| exclude W&P Link | The working and protected path do not use the selected span. |
| include W Link | The working path uses the selected span. |
| include P Link | The protect path uses the selected span. |

In the Wavelength re-routing view, the Constraints Config drop-down list provides constraint options listed in the following table. Choose the required option and select the node or span in the graphical view to which the constraint must be applied.

Table 3: Reroute Path Constraint Options

| Option | Description |
|--------------|--|
| exclude Node | The rerouted path does not pass through the selected node. |
| include Node | The rerouted path passes through the selected node. |
| exclude Link | The rerouted path does not use the selected span. |
| include Link | The rerouted path uses the selected span. |



Note

The constraint options can also be accessed by right-clicking the node or span.

DLP-G710 Re-route Wavelength of GMPLS Circuits

| | |
|--------------------------------|---|
| Purpose | This task reroutes an existing GMPLS circuit through an alternate path based on the specified path constraints. |
| Tools/Equipment | None |
| Prerequisite Procedures | <ul style="list-style-type: none"> • DLP-G46 Log into CTC • "Login to CTC" in <i>System Setup and Software Installation Guide for Cisco NCS 4000 Series</i> |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |
| Security Level | Provisioning or higher |



Note GMPLS OCHCC circuits cannot be rerouted. Only the OCH Trail associated with the OCHCC circuit can be rerouted.

Procedure

- Step 1** From the View menu, choose **Go to Network View** and click the **FV** icon in the toolbar. The NFV view opens.
 - Step 2** From the Change Perspective drop-down list in the toolbar, choose **GMPLS**. The GMPLS view opens.
 - Step 3** Click the Wavelength re-routing button.
 - Step 4** In the confirmation dialog box, click Yes to enter the wavelength re-routing view. The Wavelength re-routing pane is displayed.
 - Step 5** In the Circuits tab, select the GMPLS circuit to be rerouted.
 - Step 6** From the Constraint Config drop-down list, select the required constraint type. For more information about the various constraint types, see the Reroute Path Constraint Options table.
 - Step 7** In the map, select the node or link to which the constraint is to be applied.
 - Step 8** Repeat [Step 5](#) and [Step 6](#) to apply more constraints, as needed.
- Note** While applying constraint to include a node or link on the alternate path, the selection of the nodes or links must be done sequentially, starting from the source to the destination of the circuit.

- Step 9** Click **Apply**. The circuit is rerouted if a feasible path is found that complies with the specified constraints. After a successful reroute, a confirmation message is displayed. Otherwise, a failure notification is displayed.
- Step 10** Repeat the reroute process in case the reroute fails in [Step 9](#). Click **Clear** in the Wavelength re-routing pane to clear the previous selections. Repeat the [Step 6](#) through [Step 9](#).
- Step 11** Click the Wavelength re-routing button on the toolbar to close the Wavelength re-routing pane. In the confirmation dialog box, click Yes.
- Step 12** Return to your originating procedure (NTP).

DLP-G54 Create a Local User on a Single Node Using CTC

| | |
|--------------------------------|---|
| Purpose | This task creates a local user on a single node. |
| Tools/Equipment | None |
| Prerequisite Procedures | <ul style="list-style-type: none"> • DLP-G46 Log into CTC • "Login to CTC" in <i>System Setup and Software Installation Guide for Cisco NCS 4000 Series</i> |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |
| Security Level | Superuser only |

Procedure

- Step 1** In node view or network view, click the **Provisioning > Security > Users** tabs.
- Step 2** In the Users window, click **Create**.
- Step 3** In the Create User dialog box, enter the following:
- Name—Type the user name. The user name must be a minimum of six and a maximum of 40 characters (only up to 39 characters for the TACACS and RADIUS authentication). It includes alphanumeric (a-z, A-Z, 0-9) characters and the allowed special characters are @, " - " (hyphen), and " . " (dot). For TL1 compatibility, the user name must be of 6 to 10 characters.
 - Password—Type the user password.
- Note** The password change of root user is not supported from CTC.
- The minimum password length for CTC is six and maximum of 127 characters. To set the maximum length of a password, refer to . The password must be a combination of alphanumeric (a-z, A-Z, 0-9) and special (+, #, %) characters, where at least two characters are not alphabetic and at least one character

is a special character; or the password can contain any character. The password must not contain the user name.

- **Confirm Password**—Type the password again to confirm it.
- **Security Level**—Choose a security level for the user: **RETRIEVE**, **MAINTENANCE**, **PROVISIONING**, or **SUPERUSER**.
- **Retrieve**—Users can retrieve and view CTC information but cannot set or modify parameters.
- **Maintenance**—Users can access only the maintenance options.
- **Provisioning**—Users can access the provisioning and maintenance options.
- **Superusers**—Users can perform all of the functions of the other security levels as well as set names, passwords, and security levels for other users.

Step 4 Click **OK**.

Step 5 Return to your originating procedure (NTP).

DLP-G501 Creating Notification Filters

| | |
|--------------------------------|---|
| Purpose | This procedure creates SNMPv3 notification filters. |
| Tools/Equipment | None |
| Prerequisite Procedures | DLP-G46 Log into CTC |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite |
| Security Level | Provisioning or higher |

Procedure

Step 1 In node view, click the **Provisioning > SNMP > SNMP V3 > Notification Filters** tabs.

Step 2 Click **Create**.

Step 3 In the Create Notify dialog box, enter the following information:

- **Filter Profile Name**—Specify a name for the filter.
- **Subtree OID**—The MIB subtree which, when combined with the mask, defines the family of subtrees.
- **Bit Mask**—A family of view subtrees. Each bit in the bit mask corresponds to a sub-identifier of the subtree OID.

- **View Type**—Select the view type. Options are Include and Exclude. Type defines whether the family of subtrees that are defined by the subtree OID and the bit mask combination are included or excluded from the notification filter.

Step 4 Click **OK** to save the information.

Step 5 Return to your originating procedure (NTP).

DLP-G124 Apply Alarm Profiles to Cards and Nodes

| | |
|--------------------------------|--|
| Purpose | This task applies a custom or default alarm profile to cards or nodes. |
| Tools/Equipment | None |
| Prerequisite Procedures | <ul style="list-style-type: none"> • DLP-G121 Create a New or Cloned Alarm Severity Profile Using CTC • "DLP-G46 Log into CTC" task in the "Connect the PC and Log into the GUI" document. |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |
| Security Level | Provisioning or higher |



Note

Alarm severity does not change for AR_MXP, AR_XP, and AR_XPE cards under the following conditions:

- When a card-level alarm profile is applied using the GFP payload
- When a node-level alarm profile is applied using the GE payload

Procedure

Step 1 In node view (single-shelf mode) or shelf view (multishelf mode), click the **Provisioning > Alarm Profiles > Alarm Behavior** tab.

Step 2 To apply profiles to a card:

- Click a selection from the Profile column for the card.
- Choose the new profile from the drop-down list.
- Click **Apply**.

Step 3 To apply the profile to an entire node:

- a) Click the **Force All Ports to Profile** drop-down arrow at the bottom of the window.
- b) Choose the new alarm profile from the drop-down list.
- c) Click **Force (still need to apply)**.

Step 4 Click **Apply** again.

Step 5 Return to your originating procedure (NTP).

DLP-G123 Apply Alarm Profiles to Ports

| | |
|--------------------------------|---|
| Purpose | This task applies a custom or default alarm severity profile to a port or ports. |
| Tools/Equipment | None |
| Prerequisite Procedures | <ul style="list-style-type: none"> • DLP-G121 Create a New or Cloned Alarm Severity Profile Using CTC. • "DLP-G46 Log into CTC" task in the "Connect the PC and Log into the GUI" document. |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |
| Security Level | Provisioning or higher |



Note You can also apply alarm profiles to cards using the [DLP-G124 Apply Alarm Profiles to Cards and Nodes](#), on page 41.

Procedure

- Step 1** In node view (single-shelf mode) or shelf view (multishelf mode), double-click the card that you want to change to open the card view.
- Note** The card view is not available for the TCC2/TCC2P/TCC3/TSC/TSCE card.
- Step 2** Click the **Provisioning > Alarm Profiles > Alarm Behavior** tabs. Go to next step to apply profiles to a port. Go to [DLP-G123 Apply Alarm Profiles to Ports](#), on page 42 to apply profiles to all ports on a card.
- Step 3** To apply profiles on a port basis:
- a) In card view, click the port row in the Profile column.

- b) Choose the new profile from the drop-down list.
- c) Click **Apply**. Confirm the profile updated to the port correctly.

Step 4 To apply profiles to all ports on a card:

- a) In card view, click the **Force all ports to profile** drop-down arrow at the bottom of the window.
- b) Choose the new profile from the drop-down list.
- c) Click **Force (still need to “Apply”)**.
- d) Click **Apply**. Confirm that the profile updated to all ports correctly.
In node view, the Port Level Profiles column indicates port-level profiles with a notation such as “exist (1)”.

Step 5 To reapply a previous alarm profile after you have applied a new one, select the previous profile and click **Apply** again.

Step 6 Return to your originating procedure (NTP).

DLP-G55 Creating a New User on Multiple Nodes

| | |
|--------------------------------|---|
| Purpose | This task adds a new user to multiple ONS 15454NCS 2000 nodes managed by CTC. |
| Tools/Equipment | None |
| Prerequisite Procedures | DLP-G46 Log into CTC |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |
| Security Level | Superuser only |



Note All nodes where you want to add users must be accessible in network view.

Procedure

Step 1 From the View menu, choose **Go to Network View**.

Step 2 Click the **Provisioning > Security > Users** tabs.

Step 3 In the Users window, click **Create**.

Step 4 In the Create User dialog box, enter the following:

- **Name**—Type the user name. The user name must be a minimum of six and a maximum of 40 characters (only up to 39 characters for the TACACS and RADIUS authentication). It includes alphanumeric (a-z,

A-Z, 0-9) characters and the allowed special characters are @, " - " (hyphen), and " . " (dot). For TL1 compatibility, the user name must be of 6 to 10 characters.

- Password—Type the user password.

The password length, by default, is set to a minimum of six and a maximum of 127 characters. To set the maximum length of a password, refer to [Setting Maximum Password Length Using CTC, on page 44](#). The minimum length can be set to two, four, eight, ten or twelve characters, and the maximum length to 127 characters. The password must be a combination of alphanumeric (a-z, A-Z, 0-9) and special (+, #, %) characters, where at least two characters are not alphabetic and at least one character is a special character; or the password can contain any character. The password must not contain the user name.

- Confirm Password—Type the password again to confirm it.
- Security Level—Choose a security level for the user: **RETRIEVE**, **MAINTENANCE**, **PROVISIONING**, or **SUPERUSER**.

Note Each security level has a different idle time. The idle time is the length of time that CTC can remain idle before it locks up and the password must be reentered. The defaults are: Retrieve user = unlimited, Maintenance user = 60 minutes, Provisioning user = 30 minutes, and Superuser = 15 minutes. To change the idle times, refer to the [NTP-G88 Modify Users and Change Security](#) procedure.

- Step 5** In the Select Applicable Nodes area, deselect any nodes where you do not want to add the user (all network nodes are selected by default).
- Step 6** Click **OK**.
- Step 7** In the User Creation Results dialog box, verify that the user was added to all the nodes chosen in [Step 5](#). If not, click **OK** and repeat Steps [2](#) through [6](#). If the user was added to all nodes, click **OK** and continue with the next step.
- Step 8** Return to your originating procedure (NTP).

Setting Maximum Password Length Using CTC

| | |
|--------------------------------|--|
| Purpose | This task sets the maximum password length for a local user. |
| Tools/Equipment | None |
| Prerequisite Procedures | <ul style="list-style-type: none"> • DLP-G46 Log into CTC |
| Required/As Needed | As needed |
| Onsite/Remote | Onsite or remote |
| Security Level | Superuser only |

Procedure

-
- Step 1** In node view, click the **Provisioning > Security > Policy** tabs.
- Step 2** In the **Password Complexity** area, click **Maximum Length** drop-down list and choose the desired maximum length for password.
- Note** The maximum password length for CTC is of 20, 80, or 127 characters.
- Step 3** Click **Apply**.
- Step 4** Return to your originating procedure (NTP).
-

NTP-G22 Verifying Common Card Installation

| | |
|--------------------------------|---|
| Purpose | <p>This procedure verifies the following:</p> <ul style="list-style-type: none"> • Cisco ONS 15454 shelf has two TCC2/ TCC2P/TCC3 cards installed. • Cisco ONS 15454 M6Cisco NCS 2006 and the Cisco ONS 15454 M2Cisco NCS 2002 shelves have TNC/TNCE/TSC/TSCE cards installed. • Cisco ONS 15454 M6 and the NCS 2015 shelves have TNCS/TNCO cards installed. <p>It also verifies the installation of the AIC-I and MS-ISC-100T cards, if they are installed.</p> |
| Tools/Equipment | None |
| Prerequisite Procedures | Chapter 1, "Install the Cisco ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelf" in the Cisco ONS 15454 Hardware Installation Guide <i>Cisco NCS 2000 Series Hardware Installation Guide</i> |
| Required/As Needed | Required |
| Onsite/Remote | Onsite |
| Security Level | Retrieve or higher |

Procedure

-
- Step 1** Verify the following:
- TCC2/TCC2P/TCC3 cards are installed in Slots 7 and 11 on the ONS 15454 shelf.
 - Two TNC/TNCE/TSC/TSCE/TNCS/TNCS-O cards are installed in Slots 1 and 8 on the ONS 15454 M6NCS 2006 shelf.

- A stand-alone TNC/TNCE/TSC/TSCE card is installed in Slot 1 on the ONS 15454 M2NCS 2002 shelf.
- Two TNCS/TNCS-O cards are installed in Slots 1 and 17 on the NCS 2015 shelf.

Step 2 Verify that the FAIL LED is off on both the control cards.

Step 3 Verify that the green ACT (active) LED is illuminated on one control card and that the amber STBY (standby) LED is illuminated on the other control card.

Note If the control cards are not installed, or if their LEDs are not operating as described, do not continue. Complete the “DLP-G33 Install the TCC2, TCC2P, or TCC3 Card” or “Installing and Configuring the TNC, TNCE, TSC, TSCE, or TNCS/TNCS-O Card” task in the [Cisco ONS 15454 Hardware Installation Guide](#) *Cisco NCS 2000 Series Hardware Installation Guide*.

Step 4 (On 15454-DWDM shelf) If the AIC-I card is installed, verify that it is installed in Slot 9 and that its ACT (active) LED displays a solid green light.

Note If the AIC-I card is not installed and the card is required by the Cisco Transport Planner shelf layout, or if it is installed and its LEDs are not operating as described, do not continue. Complete the “DLP-G34 Install the AIC-I Card” task in the [Cisco ONS 15454 Hardware Installation Guide](#) or refer to the *Cisco ONS 15454 DWDM Troubleshooting Guide* to resolve installation problems before proceeding to the next step.

Step 5 Verify that the software release shown on the LCD matches the software release required for your network. On the LCD, the software release is shown under the platform (SONET or SDH) and date/temperature. If the release does not match, perform one of the following procedures:

- Perform a software upgrade using the software CD. Refer to the release-specific software upgrade document.
- On ONS 15454, replace the TCC2/TCC2P/TCC3 cards with cards containing the correct release.
- On ONS 15454 M6NCS 2006, replace the LCD and TNC/TNCE/TSC/TSCE/TNCS/TNCS-O cards with cards containing the correct release.
- On ONS 15454 M2NCS 2002, replace the power module and TNC/TNCE/TSC/TSCE cards with cards containing the correct release.
- On NCS 2015, replace the LCD and TNCS/TNCS-O cards with cards containing the correct release.

Stop. You have completed this procedure.

Step 6 (On ONS 15454 shelf) If the node will be configured as a multishelf node, verify that redundant MS-ISC-100T cards are installed (Slots 6 and 12 are recommended) and that the green ACT (active) LED is illuminated on both cards.

Note If the MS-ISC-100T card is not installed and the card is required by the Cisco Transport Planner shelf layout, or if the card’s LEDs are not operating as described, do not continue. Complete the “DLP-G309 Install the MS-ISC-100T Card” task in the [Cisco ONS 15454 Hardware Installation Guide](#) or refer to the *Cisco ONS 15454 DWDM Troubleshooting Guide* to resolve installation problems before proceeding to the next procedure.

Stop. You have completed this procedure.
