

Bring-up the Node for Network Connectivity

After logging in to Cisco Transport Controller (CTC), bring up the node for network connectivity. This includes assigning a loopback IP address for the node, configure an Open Shortest Path Firth (OSPF) instance, and configuring the OSPF and Multiprotocol Label Switching (MPLS) traffic engineering parameters.

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Assign Loopback IP Address

After logging in to CTC, configure loopback interface. The loopback interface is a software-based logical interface, and is not associated with any physical interface, and are always in the up state. The packets routed to the loopback interface are rerouted back to the system and processed locally. The router ID must be same as the loopback address of the node.

Before you begin

Login to Cisco Transport Controller (CTC).

Procedure

Step 1 In node view, click **Provisioning** > **Network** > **Loopback IP** tab.

Step 2 In Interface ID field, set the loopback interface ID.

Example:

For example, set the ID as `Loopback0`.

Step 3 In IP Address field, enter the IP address for the loopback interface.

Step 4 In NetMask field, enter the subnet mask for the loopback interface.

Example:

For example, set the subnet mask as `255.255.255.255`.

What to do next

Configure Open Shortest Path First (OSPF) instance to establish a network topology.

Configure OSPF Instance

Configure an OSPF instance to include Network Convergence System (NCS) in OSPF-enabled networks. OSPF is used to discover the network. To enable OSPF, you need to create an OSPF routing process, specify the range of IP address associated with the routing process, and assign area IDs associated with that range of IP addresses.

An Area ID is an administrative identifier and has no relation to an IP address or IP network ID. Area IDs are not used to reflect routing data. Area 0 is the default. The area number can be changed to other number. All the nodes in the network can use the same area ID. You cannot have multiple areas inside the same instance.

Before you begin

You must have an Open Shortest Path First (OSPF) Area ID.

Procedure

Step 1 In node view, click **Provisioning** > **Network** > **OSPF** tab.

Step 2 In the Router ID field, select the address of the router.

Example:

For example, `1.0.0.44`

This step defines the IP addresses on which OSPF runs.

Step 3 In the OSPF interfaces field, set the interface and area ID for the instance.

This defines the area ID for that interface. Areas allow the subdivision of an AS into smaller, more manageable networks or sets of adjacent networks. OSPF hides the topology of an area from the rest of the AS. An area's network topology is visible only to routers inside that area; it is not visible to routers outside that area. If you changed the Area ID, the control cards reset, one at a time. The reset takes approximately 10 to 15 minutes. The router ID is determined as the highest active loopback address.

What to do next

Configure the OSPF and Multiprotocol Label Switching (MPLS) traffic engineering parameters.

Configure OSPF and MPLS Traffic Engineering

To discover network topology and allocate resources, the node implements a routing protocol to distribute and maintain the topology and resource information. To reliably propagate the information, use standard IP routing protocols, such as Open Shortest Path First (OSPF) with Multiprotocol Label Switching (MPLS)-Traffic Engineering (TE) extensions. Using a common MPLS-based control plane, all network elements work as

peers to dynamically establish optical paths through the network. To achieve this functionality, MPLS is assigned an ID that is same as the loopback ID and router ID. TE is enabled within a single OSPF area.

The network traffic engineering is configured using:

- OSPF-Traffic Engineering (OSPF-TE), an extension of OSPF, is a control plane protocol used to manage MPLS-based networks. OSFP-TE manages the traffic engineering information of all the nodes that are part of the same area. Any change in bandwidth availability or disruption is instantly shared between all the nodes. This helps to manage the network with accurate information.
- MPLS-TE maps traffic flows to a particular path based on the available resources. Since the router has to have the complete information about the topology and resources available in a network, OSPF is required for use with MPLS-TE. MPLS-TE builds uni-directional tunnels from a source to the destination in the form of Label Switched Paths (LSPs), which is then used for forwarding traffic.

Configure the area for which TE is enabled by issuing the mpls traffic-eng area x command, where refers to the area number Configure an IP address on the tunnel interface to forward IP packets. The IP address is configured as an unnumbered interface by using the address of a loopback interface.

To configure OSPF for OSPF-TE and MPLS-TE from Cisco Transport Controller (CTC), perform these steps:

Before you begin

Loopback ID is set, and is same as the router ID

Procedure

Step 1 Configure MPLS-TE:

a) In node view, click **Provisioning** > **Network** > **MPLS-TE** tab.
b) To flood the GMPLS Traffic Engineering link into a specific OSPF area and instance, specify values for these fields:
   - Flooding-igp field as **OSPF**
   - OSPF Instance Name field as **OTN**
   - Area field as *Area ID*. For example, `0`.

Step 2 Configure OSPF-TE:

a) In node view, click **Provisioning** > **Network** > **OSPF-TE** tab.
b) In MPLS_TE Router ID filed, select the loopback ID assigned to the system. For example, **`loopback0`**.
c) In Area ID field, specify the area ID for which the MPLS is configured.
d) In Autoconfig filed, select the checkbox to option to enable configuring Label Distribution Protocol (LDP) globally on each interface associated with a specific OSPF instance. LDP enables peer label switch routers (LSRs) to exchange label binding information for supporting hop-by-hop forwarding in an MPLS network.

Step 3 Click **Apply** to save the configuration.

What to do next

You have now setup the node for network connectivity. After the system is available for network connectivity, perform preliminary checks to verify that the system is setup correctly.