Internode Topology Discovery and Communication

This chapter describes how internode topology discovery and communication between NCS 1010 nodes takes place using Open Shortest Path First (OSPF).

Internode topology discovery and communication

Optical applications on the NCS 1010 and NCS 1020 nodes must discover the OLT-OLT link topology. Span-level applications must discover the adjacent nodes. Link-level applications must learn the complete OLT-OLT link topology. NCS 1010 and NCS 1020 use OSPF to discover and communicate link topology information.

The networking devices running OSPF detect topological changes in the network, flood link-state updates to neighbors, and quickly converge on a new view of the topology. Each OSPF router in the network quickly updates its topological view to match the network.

Optical applications on NCS 1010 and NCS 1020 must discover the link topology. They also need to identify the nodes, node types, and the optical spectral band on which the nodes operate. NCS 1010 and NCS 1020 use an enhanced version of OSPF. This version supports a new link-state advertisement attribute that advertises the node type and spectral band.

Configure OSPF

Use this task to include NCS 1010 and NCS 1020 in OSPF enabled networks.

Important You must configure the router ID during OSPF configuration on NCS 1010 nodes.

See Implementing OSPF for description of the concepts and tasks necessary to implement OSPF on Cisco IOS XR.

Procedure

Step 1 Use these commands to configure OSPF on an NCS 1010 OLT node.

Example:

```
configure
router ospf process-name
router-id router-id
distribute link-state
nsf
network point-to-point
redistribute connected
area area-id
interface Loopback1
interface GigabitEthernet0/0/0/0
```

Step 2 Use these commands to configure OSPF on an NCS 1010 ILA node.

Example:

```
configure
router ospf process-name
router-id router-id
distribute link-state
nsf
network point-to-point
redistribute connected
area area-id
interface Loopback1
interface GigabitEthernet0/0/0/0
interface GigabitEthernet0/0/0/2
```

Step 3 Use these commands to configure OSPF on an NCS 1020 OLT node.

Example:

```
configure
router ospf process-name
router-id router-id
distribute link-state
network point-to-point
area area-id
interface Loopback0
interface GigabitEthernet0/0/0/0
```

Step 4 Use these commands to configure OSPF on an NCS 1020 ILA node.

Example:

```
configure
router ospf process-name
router-id router-id
distribute link-state
network point-to-point
area area-id
interface Loopback0
```

```
interface GigabitEthernet0/0/0/0
interface GigabitEthernet0/0/0/2
```

NCS 1010 and NCS 1020 nodes will participate in OSPF routing, which enables inter-node topology discovery and communication.

Configure OSPF cost

Use this task to identify the best route when there are two equal-cost routes to the same destination.

Table 1: Feature History

Feature Name	Release Information	Description
Configure OSPF cost	Cisco IOS XR Release 7.11.1	To identify the best route, OSPF path computation uses the link cost. The system calculates the cost based on the available interface bandwidth. From this release onwards, you can set a user-defined cost value using the **cost***variable* in the **router ospf** command. As a result, this feature enables you to set a specific route when there are two equal-cost routes to the same destination.

Cost is the metric used by OSPF. You can use the **cost** command to explicitly specify the network interface for OSPF path calculation.

Note The cost of the link is inversely proportional to the bandwidth of the link.

Procedure

Use these commands to configure OSPF cost.

Example:

```
configure
router ospf process-name
router-id router-id
area area-id
interface Loopback1
interface GigabitEthernet0/0/0/0
cost cost
```

See cost (OSPF) for different command modes and usage guidelines to implement **cost** OSPF on Cisco IOS XR software.

The interface cost used by OSPF for path calculation is explicitly specified.