



Plan Your Network Using Cisco Optical Network Planner

This document provides instructions on how to deploy an NCS 1010 based network, using Cisco ONP, ZTP, and Cisco ONC. Cisco ONP helps with designing a topology with the required specifications, analyze it, and generate the planning data. ZTP, then sets up and brings up the devices. Cisco ONC uses the planning data from Cisco ONP to configure and manage the devices.

This chapter describes the Design and Analysis of Networks and how to Export Planning data from Cisco Optical Network Planner.

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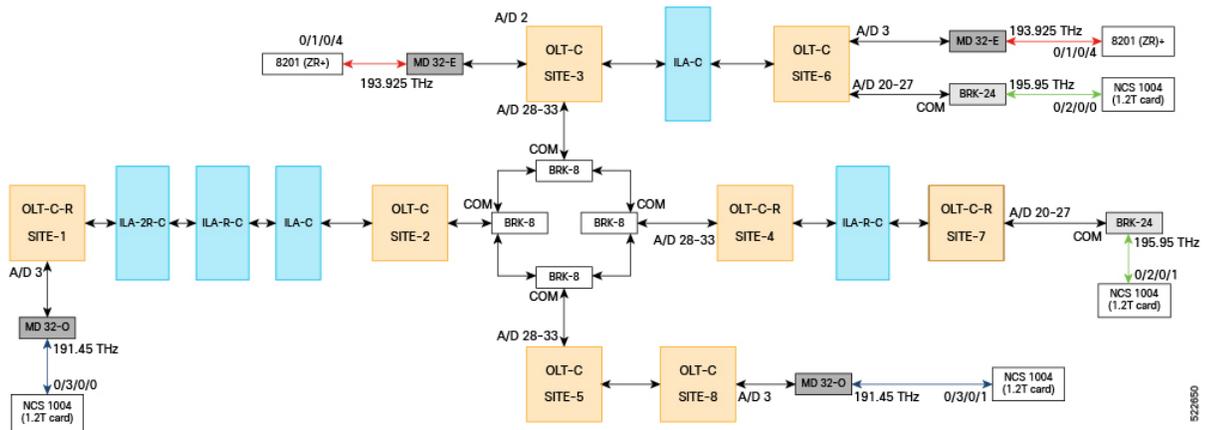
Plan Your Network

The following sections describe how to plan an NCS 1010 based network, using Cisco ONP. Cisco ONP helps with designing a topology with the required specifications, analyze it, and generate the planning data.

Reference Network Topology

The network topology that is shown in this section has been used to explain the NCS 1010 bring-up scenarios. It is a four-degree topology that uses 13 NCS 1010 nodes. The BRK-8 modules are used to create express interconnects among SITE-2, SITE-3, SITE-4, and SITE-5 using MPO cables.

Figure 1: Multi-degree Topology



Design the Topology Using Cisco ONP

Use the following steps to design the topology in Cisco ONP:

Step 1 Log in to Cisco ONP Web Interface.

Step 2 Choose **File > New**.

The **Create New Network** dialog box appears.

Step 3 From the **L0 Network Platform** drop-down list, choose **NCS1010**.

Step 4 Click **Create**.

You can view the map and the design palette.

Step 5 Click the **Drawing Tool** icon (pencil and ruler crossed).

Step 6 Add sites to the map using the drawing tool.

- Zoom into the map to the desired level.
- Click any of the site icons (ROADM, OLA) and drag it to the sites on the map. Drag or click the map where a site has to be placed, when the cursor changes to the site icon.

To create this topology:

- Add four ROADM sites and name them as Site1, Site6, Site7, and Site8.
 - Set the site property, **Structure** as **Terminal** for all the sites.
 - Add five OLA sites as shown in the topology.
 - Add a ROADM site in the middle of the topology and name it as Multidegree.
- Click the Fiber icon and drag it to connect from one site to another site. Continue this for all sites.

Note By default, the fiber length is updated as 1 km for all the fibers. If you want the length to be auto updated based on the x, y coordinates, then enable the Use Coordinates Distance property under the network Properties.

Note In CONP topology, Site-2, Site-3, Site-4 and Site-5 are not separate nodes. These are all part of a single 4-degree node and represented as Sides of a 4-degree node. In case of NCS 1010, each side is considered as a device. After you connect the site with fiber, four sides are created. Rename the sides as Site-2, Site-3, Site-4, and Site-5.

Step 7 Set the properties of OLA nodes added in the topology to convert them into ILA- C, ILA-R-C, or ILA-2R-C nodes.

- a) Expand the OLA site in the network tree and drill-down until the C-band.
- b) Under the C-Band properties, choose **Raman** from the **Raman Amp** drop-down list.
- c) For ILA-2R-C, repeat steps B and C for another side under the site.

To summarize:

- ILA-C: No Raman is selected.
- ILA-R-C: Raman is selected in one side.
- ILA-2R-C: Raman is selected in two sides.

Step 8 Create circuits between Site-6 to Site-7, Multidegree Site to Site 6, and Site 1 to Site 8.

- a) Click the **Drawing Tool** icon, and select **Circuit** (purple in color).
- b) Add the circuit between the sites on the map.

Step 9 To add the MD-32-E and MD-32-O Mux/Demux patch panels, set the following properties:

- a) Choose **Network > Entity Editor**, and click the **Service** tab.
- b) In the left tree panel, expand the circuit connecting the site to which patch panel is connected, and drill-down to the trail properties.
- c) Under the trail properties, set the **Add/Drop** Type as **Colored**.
- d) Click **Select Similar** to apply the properties in bulk to all the trails.
- e) Click **Update**.
- f) Click the **Site** tab.
- g) Expand the site interface and drill-down to the Add/Drop properties of the side and set the **Colored Add/Drop** as **MD-32-Even** or **MD-32-Odd** as per the topology.
- h) Click **Select Similar** to apply the properties in bulk to all the add/drops.
- i) Click **Update**.

Step 10 To add BRK-24 and BRK-8 breakout panels, set the following properties:

- a) Choose **Network > Entity Editor**, and click the **Service** tab.
- b) In the left tree panel, expand the circuit connecting the site to which the breakout panel is connected, and drill-down to the trail properties.
- c) Under the trail properties, set the **Add/Drop** Type as **Colorless**.
- d) Click **Select Similar** to apply the properties in bulk to all the trails.
- e) Click **Update**.
- f) Click the **Site** tab.
- g) Expand the site interface and drill-down to the Add/Drop properties of the side and set the **Colorless Add/Drop** as **BRK-8** or **BRK-24** as per the topology.
- h) Click **Select Similar** to apply the properties in bulk to all the add/drops.
- i) Click **Update**.

Step 11 To add NCS 1004 (1.2T card), set the following properties:

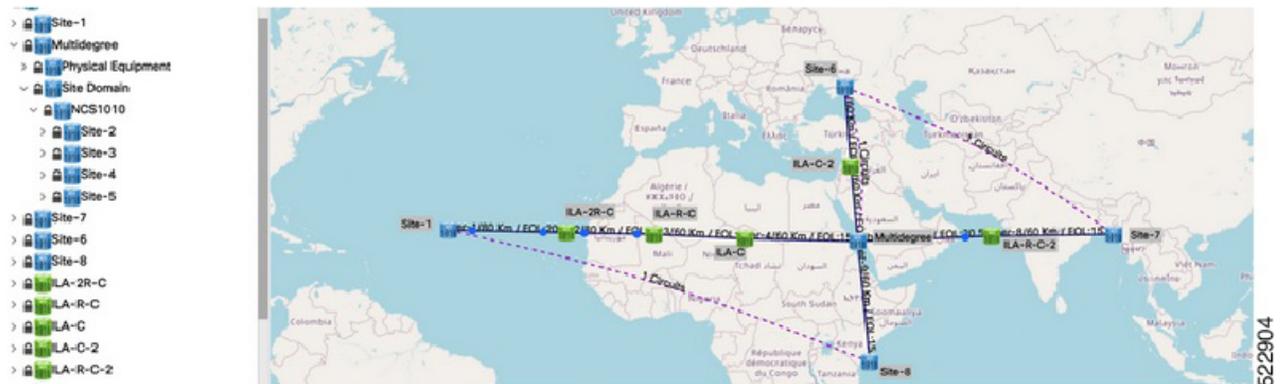
- Expand the circuit connecting the site to which NCS 1004 (1.2T card) is connected, in the left tree panel, and drill-down to the trail properties.
- Under the trail properties, set the **Card Type** as **NCS1004_16QAM_400G_27%SDFEC_69GBd**.
- Click **Select Similar** to apply the properties in bulk to all the trails.
- Click **Update**.

Step 12 To add 8201 (ZR+) pluggable, set the following properties:

- Expand the circuit connecting the site to which the 8201 (ZR+) pluggable is connected, in the left tree panel, and drill-down to the trail properties.
- Under the trail properties, set the **Card Type** as **CFP2_400ZR+_TXP_GUA18_OFEC_15_DE_ON_16Q_OS_BR60_1**.

The topology looks like the following in the Cisco ONP UI.

Figure 2: Cisco ONP Topology



Step 13 Choose **File > Save As**.

Step 14 Enter a network name in the **Give a Network Name** dialog box.

Step 15 Click **Save**.

Analyze the Network

Analyze the designed sample network to check the feasibility of the network using the following steps:

Step 1 Log in to Cisco ONP Web Interface.

Step 2 Choose **File > Open**.

The **Select Network To Open** dialog box appears.

Step 3 Click the sample topology network that you have created, from the list of networks.

Step 4 Choose **Network > Analyze**.

The Cisco ONP analysis progress indicator indicates the analysis status.

If there is any failure in the analysis stage, a pop-up window appears with the message, “Analysis Failed.”

- Step 5** Choose the **Elements > Messages** tab to see the list of error details in the analyzed network.
- By default, it shows only the key messages when the Critical Only toggle button is enabled. If you want to view the entire network message, disable the Critical Only toggle button.
- Step 6** If you find an error message under the **Messages** tab, resolve the error and analyze the network again. Repeat this step until all errors are resolved.
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What to do next

Export Planning Data for Cisco Optical Network Controller

Export the network planning data which is in the form of JSON file from Cisco ONP using the following steps. This JSON file is uploaded into Cisco ONC to configure the managed devices.

- Step 1** Log in to Cisco ONP Web Interface.
- Step 2** Choose **File > Open**.
- The **Select Network To Open** dialog box appears.
- Step 3** In the network tree panel, right-click the network name.
- Step 4** Click **Generate CONC JSON**.
- Step 5** In the **Export File** dialog box, enter the name of the JSON file.
- Step 6** Click **Export** to download the JSON file into your local system.
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