



# Topology

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This section contains context-sensitive Online Help content for the **Web Client > Topology** tab.

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## Topology

The topology window shows color encoded nodes and links that correspond to various network elements including switches, links, fabric extenders, port-channel configurations, virtual port-channel, and more. For each of the elements, you can hover over to fetch some more information. Additionally, by clicking on the node for a switch or line for a link, a slide-out panel flies out from the right. This panel shows more detailed information about either the switch or link. Multiple tabs can be opened simultaneously and are intended to function side-by-side for comparison and troubleshooting.

## Status

The color encoding of each node and link corresponds to its state. The color states are:

- **Green**—Indicates the element is in good health and functioning as intended.
- **Yellow**—Element is in warning state and requires attention to prevent any further problems.
- **Red**—Element is in critical state and requires immediate attention.
- **Gray**—Indicates lack of information to properly identify the element or the element has just been discover.

## Scope

You can search the topology based on the scope. The default scopes available from the **SCOPE** drop-down list are: **DEFAULT\_LAN** and **DEFAULT\_SAN**. The search options differ based on the chosen scope.

The following search options are available for **DEFAULT\_LAN**:

- Quick Search
- Tags

- Host name (VDP)
- Host name (vCenter)
- Host IP
- Host MAC
- Segment ID
- Multicast Group
- VXLAN ID (VNI)
- VLAN
- VSAN ID/Name
- FabricPath
- VXLAN OAM

The following search options are available for **DEFAULT\_SAN**:

- Quick Search
- Tags
- VLAN
- VSAN ID/Name

For more information about these search options, see [Searching](#), on page 2.

## Searching

When the node number is large, it quickly becomes hard to find the intended switches and links. You can quickly find switches and links by performing a search. You are also able to search for VM tracker and generic setups. Searching feature enables you to see which leaf the host is connected to.

The following searches are available:

### Quick Search

Enables you to search for devices by *name*, *IP address*, *mode*, *serial number*, and *switch role*. This search returns immediately and results are highlighted as the user types.

To perform a search for multiple nodes and links, you can separate multiple keywords by a comma.

For example, one search might look like: *ABCD12345, N7K, sw-dc4-12345, core, 172.23.45.67*. Wildcards are also supported.

If you partially know a serial number or name, you can build a search like so: *ABCD\*, sw\*12345, core, \*23.45.\**.

If you want to limit your scope to a particular field, you can for example do: *name=sw\*12345, serialNumber=ABCD12345*.

The following fields are available to search on: **Name**, **ipAddress**, **serialNumber**, **model**, and **switchRole**.

This search is applicable to both the default LAN and SAN scopes.

## Tags

Tagging is a very powerful and easy way to organize and provide a "shared-thread" across your various switches. To search by tags, simply click on the tags and results will be filtered to match your selected tag(s).

Tagging supports two logical operations:

- **OR-ing**—selects all switches that match any of the selected tags.
- **AND-ing**—selects all switches that match all of the selected tags.

This search is applicable to both the default LAN and SAN scopes.

## Host name (VDP)

Enables you to search for hosts by using VDP.

## Host name (vCenter)

Enables you to search for hosts by using vCenter.

## Host IP

Search will go and talk to your switches in the scope to find any hosts (VMs or bare metal) that match your given IP address.

The Host IP search supports both IPv4 and IPv6 addresses.

## Host MAC

Search will go and talk to your switches in the scope to find any hosts (VMs or bare-metal) that match your given MAC address.

## Segment ID

Search will go and talk to your switches in the scope to find any hosts (VMs or bare-metal) that match your given segment ID.

## Multicast Group

Search by a given multicast group.

**Note**

Multicast group is limited to VXLAN context (VTEP switches) for searching the switches to get VNIs associated with this multicast address. Click the **Details** link next to the search box to get the detailed multicast address table. The table displays the switches which have searched Multicast address configured on them along with associated VNI, VNI status and mapped VLAN.

## VXLAN ID (VNI)

Search by a given VNI. Click the **Details** link next to the search box to get the detailed VNI table. The table displays the switches which have searched VNI configured on them along with associated multicast address, VNI status and mapped VLAN.

## VLAN

Search by a given VLAN ID. VLAN search provides the search for the VLAN configured on the switch or the links. If STP is enabled, then it provides information related to STP protocol and the STP information for links.

This search is applicable to both the default LAN and SAN scopes.

## VSAN ID/Name

Search by a given VSAN ID. VSAN search provides the search for VSAN configured on the switch or the links. In order to view the STP details associated with the VSAN, click on **STP Details** link.

This shows the STP details, if STP is enabled. If the link is blocked, it is marked as red, green in case of forwarding link and Orange if the link is blocked for one VSAN range and forwarding for the other VSAN range.

This search is applicable to both the default LAN and SAN scopes.

## FabricPath

Search on the FabricPath topology ID, typically 0 or 1. After search, FabricPath topology links are displayed with purple colored links. You can use the **FabricPath Panel** below the search box to fetch various FabricPath graphs.

Click the drop-down arrow next to **FabricPath Panel**, select below type of graph:

- **Multi destination**—Select the switch from the **Anchor** drop-down list, and select the graph ID from the **Graph ID** drop-down list to get multi destination or broadcast graph.
- **Reachability**—Select the switch in the **From** drop-down list to get the reachable devices in FabricPath topology from the selected switch.
- **Unicast**—Select the switch from the **Source** and **Destination** drop-down list to get equal cost multi paths from source to destination switch in FabricPath topology.
- **Multicast**—Select from the **Anchor**, **Ftag ID** and **IGMP Addr** drop-down list to get the FabricPath multicast tree. The selected anchor switch is the root of the tree.

## VXLAN OAM

You can track details such as reachability and actual path of the flows in a VXLAN EVPN based-fabric topology by choosing the **VXLAN OAM** option from the **Search** drop-down list or by entering **VXLAN OAM** in the **Search** field. This displays the **Switch to switch** and **Host to host** tabs. DCNM highlights the route on the topology between the source and destination switch for these two options.

The **Switch to switch** option provides the VXLAN OAM ping and traceroute test results for the VTEP-to-VTEP use-case. Provide the following values to enable search by using the **Switch to switch** option:

- From the **Source Switch** drop-down list, choose the source switch.
- From the **Destination Switch** drop-down list, choose the destination switch.
- From the **VRF** drop-down list, choose or enter the VRF details.
- Check the **All Path Included** check box to include all the paths in the search results.

The **Host to host** option provides the VXLAN OAM pathtrace results for the exact path taken by a given flow from the VTEP or switch that is connected to the source host to VTEP or switch that is connected to the destination host. For the **Host to host** use-case, there are two suboptions:

- VRF or SVI for a network is instantiated on the switches in the VXLAN EVPN fabric. In such a scenario, the IP address information of the end hosts is required.
- Layer 2 configuration for a given network is instantiated on the switches in the VXLAN EVPN fabric. In such a scenario, both the MAC and IP address information of the end hosts are required.

Provide the following values to enable search using the **Host to host** option:

- In the **Source IP** field, enter the IP address of the source host.
- In the **Destination IP** field, enter the IP address of the destination host.
- In the **VRF** field, choose VRF from the drop-down list or enter the VRF name that is associated with the hosts.
- (Optional) In the **Source Port** field, choose Layer 4 source port number from the drop-down list or enter its value.
- (Optional) In the **Destination Port** field, choose destination port number or enter its value.
- (Optional) In the **Protocol** field, choose the protocol value from the drop-down list or enter its value. This is the Layer 4 protocol, usually TCP or UDP.
- Click the **Interchange/Swap Source and Destination IPs (and MACs if applicable)** icon to interchange the source and destination IP addresses. This interchange allows a quick trace of the reverse path without re-entering the host IP addresses or MAC addresses.
- Check the **Layer-2 only** check box to search the VXLAN-EVPN fabric that is deployed in Layer 2 only mode for some networks, that is, Layer 2 VNIs. Note that no SVIs or VRFs should be instantiated in the fabric for these networks when you use this search option.

Enter values for the following additional fields:

- In the **Source MAC** field, enter the MAC address of the source host.
- In the **Destination MAC** field, enter the MAC address of the destination host.

- In the **VNI** field, choose the Layer 2 VNI from the drop-down list or enter the appropriate Layer 2 VNI value corresponding to the network to which the hosts belong.

## Show Panel

You can choose to view your topology based on the options below:

- **Auto Refresh**—Check the check box to automatically refresh the topology.
- **Switch Health**—Check the check box to show the switch health status.
- **FEX**—Check the check box to show the Fabric Extender.

FEX feature is available on LAN devices only. Therefore, checking this check box will display only the Cisco Nexus Switches that support FEX.



### Note

If a Cisco Nexus Switch is discovered as part of SAN fabric, FEX feature is not available. FEX is also not supported on Cisco Nexus 1000V devices. Therefore, such devices will not be displayed in the topology when you check the FEX check box.

- **Links**—Check the check box to show links in the topology. The following options are available:
  - **Errors Only**—Click this radio button to display only links with errors.
  - **All**—Click this radio button to display all links in the topology.
  - **VPC Only**—Check this check box to display only vPC peer-links and vPCs.
  - **Bandwidth**—Check this check box to show the color coding based on the bandwidth consumed on links.
- **OTV**—Check the check box to show Overlay Transport Virtualization (OTV) topology with cloud icon and dotted links from the OTV edge devices. Hovering the mouse over the cloud and links shows the relevant information for OTV topology such as control group, extended VLANs, etc. The OTV search box appears below the filter box which can be used to search the shown OTV topology based on **Overlay ID** and **Extended VLAN ID**. Searched virtual links based on the **Overlay ID** and **Extended VLAN ID** are marked green.
 

A **Details** link appears after checking the **OTV** box. Clicking the links shows the OTV topology data. The **Overlay Network** column shows whether the particular topology is multicast or unicast based. The **Edge Device** column gives the edge switches in the particular OTV topology. Other columns give the corresponding overlay interface, extended VLANs, join interface and data group information.
- **UI controls**—Check the check box to show or hide the various controls on the topology screen.
- **Refresh**—You can also perform a topology refresh by clicking the refresh icon in the upper right of this panel.

## Layouts

The topology supports various different layouts as well as a **Save Layout** option which remembers how you positioned your topology.

- **Hierarchical/Hierarchical Left-Right**—Provides an architectural view of your topology. Various Switch Roles can be defined that will draw the nodes on how you configure your CLOS topology.

**Note**

When running a large scale setup, being able to easily view all your switches on a leaf-tier can become difficult. To mitigate this, DCNM will split your leaf-tier every 16 switches.

- **Random**—Nodes will be placed randomly on the screen. DCNM will try to make a guess and intelligently place nodes that belong together in close-proximity.
- **Circular/Tiered-Circular**—Draws nodes in a circular or concentric circular pattern.
- **Custom saved layout**—You can drag nodes around to your liking. Once you have the positions as how you like, you can click the save button to remember the positions. Next time you come to the topology, DCNM will draw the nodes based on your last saved layout positions.

Before a layout is chosen, DCNM checks if a custom layout is applied. If a custom layout is applied, DCNM uses it. If a custom layout is not applied, DCNM checks if switches exist at different tiers, and chooses Hierarchial layout or Hierarchial Left-Right layout. Force-directed layout is chosen if all other layouts fail.

## Zooming, Panning and Dragging

You can zoom-in and zoom-out using the controls provided at the bottom left of the screen or using the mouse wheel.

To pan, click and hold anywhere in the whitespace and drag up, down, left, or right.

To drag switches, click, hold, and move around in the whitespace region of the topology.

## Switch Slide-Out Panel

You can click on the switch to display the configured switch name, IP address, switch model, and other summary information like status, serial number, health, last polled CPU utilization, and last polled memory utilization.

### Switch Roles

Various switch roles can be defined on the switch. When you set a role, the topology will be refreshed to reflect the role that was assigned. Switch roles are great for defining architectural views such as the hierarchy represented by CLOS topologies. You can set the switch role based on your network topology.

**Note**

This configuration is not pushed to the device. It is only a DCNM construct to help with rendering and organization.

## Beacon

This button will only be shown for switches that support the beacon command. Once the beaconing starts, the button will show a countdown. By default, the beaconing will stop after 60 seconds but you can stop it immediately by clicking **stop beacon**.

**Note**

The default time can be configured in `server.properties`. Search for `beacon.turnOff.time`. The time value here is in milliseconds. Note that this requires a server restart to take effect.

## Tagging

Tagging is a very powerful yet easy way to organize your switches. Tags can be virtually any string and an example of tags includes: *building 6, floor 2, rack 7, problem switch* and *Justin debugging*.

You can use the search to perform searches based on tags.

## More Details

Click on **Show more details** and the detailed information pops out [Switch Dashboard](#).

## Link Slide-Out Panel

You can click on a link to view the status and the port or switches that describe the link.

## 24 Hour Traffic

This feature requires **Performance Monitoring** be turned **ON**. When **Performance Monitoring** is **ON**, traffic information is collected and aggregate information is displayed along with a graph showing the traffic utilization.