Using Topology Maps

Cisco Prime Infrastructure provides a visual map of your network’s physical topology, including the network devices and the links that connect them. The topology maps have indicators that show the current alarm status of network devices and links. Using these network or datacenter topology maps, you can easily monitor your network by viewing alarms in the context of the interconnection between devices.

- Topology Overview
- Viewing Detailed Tables of Alarms and Links
- Determining What is Displayed in the Topology Map
- Getting More Information About Devices
- Getting More Information About Links
- Viewing Fault Information for Devices and Links
- Creating a Topology Dashlet
- Changing the Topology Map Layout
- Saving the Topology Map Layout
- Saving the Topology Map as an Image File
- Creating a Topology Dashlet
### Topology Overview

The two types of topology maps are:

- Network Topology
- Datacenter Topology

### Network Topology

Prime Infrastructure topology maps are based on Location and User Defined groups (see “Types of Groups” in Related Topics). Topology maps show the devices in the group as well as any links between the devices.

The links between devices are discovered using the Cisco Discovery Protocol (CDP). If Prime Infrastructure is unable to discover some links, for example, if CDP is disabled on an interface, you can manually add the link to the topology map, and the associate the link with a specific interface on the appropriate managed device.

You can also add “unmanaged devices” or “unmanaged network” icons to a topology map and add links between these unmanaged objects and managed devices in the topology map (see “Adding Unmanaged Devices and Links to Topology Maps” in Related Topics).

You can add autonomous APs to Prime Infrastructure topology maps, but you cannot add Unified APs.

The Network Topology window presents a graphical, topological map view of the devices, the links between them, and the active alarms on the devices or links. The Network Topology window also provides access to information and functions relating to device groups, alarms, and links, and allows you to drill down to get detailed information about the devices displayed in the topology map.

The Network Topology window is accessed from the left sidebar (Maps > Network Topology) and consists of the following panes:

- **Device Groups**—Lists the device groups that exist in the system, both Location-based groups and custom, user-defined Device groups. The groups pane is critical because the content of all the other panes in the Network Topology window (as shown in the figure below) is determined by the group that is selected in the Groups pane. From the Groups pane you can access the central device grouping functionality to create new groups, add devices to groups, and so on. For more information, see “Creating Device Groups” and “Creating Location Groups” in Related Topics.

- **Alarm Summary**—Shows all the current alarms for the selected group, categorized by alarm severity. You can access more detailed alarm information by clicking the Show Alarms Table link at the bottom of the pane or by clicking on an alarm severity category, in which case the alarms table is filtered by the selected severity.

- **Links**—Provides access to the Link Table that lists all the links between devices that relevant to the selected group and provides additional link information. Selecting a link in the table highlights the link in the topology map.

- **Topology Map**—The central, largest pane in the Network Topology window displays the topology of the selected device group in graphical form. It displays the group’s devices and sub-groups (if any) and the links between them. It also displays the active alarms on the devices or links so that you can easily identify problems in the network. You can drill down from the topology map to detailed information about a device or link in order to troubleshoot problems. You can customize, filter and manipulate the topology map to show exactly the information you need.
Datacenter Topology

The data center topology keeps no link idle. The next-generation data center provides the ability to use all links in the LAN topology by taking advantage of technologies such as virtual PortChannels (vPCs). vPCs enable full, cross-sectional bandwidth utilization among LAN switches, as well as between servers and LAN switches.

A port channel bundles up to eight individual interfaces into a group to provide increased bandwidth and redundancy. Port channeling also load balances traffic across these physical interfaces. The port channel stays operational as long as at least one physical interface within the port channel is operational.

A virtual PortChannel (vPC) allows links that are physically connected to two different devices to appear as a single PortChannel to a third device. The third device can be any other networking device. A vPC allows you to create redundancy by increasing bandwidth, enabling multiple parallel paths between nodes and load-balancing traffic where alternative paths exist.

After you enable the vPC function, you create a peer keepalive link, which sends heartbeat messages between the two vPC peer devices.

Virtual Device Context (VDC) enables the virtualization of a single physical device in one or more logical devices. Each of the provisioned logical devices is configured and managed as if it were a separate physical device.

Related Topics
- Types of Groups
• Creating a Topology Dashlet
• Creating Device Groups
• Creating Location Groups
• Understanding Topology Map Functions and Icons
• Navigating in Topology Maps
• Topology Map Icons
• Before Using Topology Maps
Understanding Topology Map Functions and Icons

From the Device Group selector on the left, expand the Location or User Defined group and click on a group. By default, the Location > All Locations > Unassigned group contains all devices that you have not assigned to any other location group.

When you select a device group, the topology map for the devices contained in that group is displayed, including any discovered links connecting the devices. Links to devices outside the map are not displayed.

The following options at the of the topology pane provide additional features:

- **Overview**—Displays an overview window in lower right corner of the topology window, which shows the full map and, if you have zoomed in on the map, the currently viewable portion of the map.
- **Search**—To find a specific device in your topology, enter a device hostname or IP address, or substring, for the device in the topology Search field. If a device was moved from its initial deployed location but is still on the network or datacenter, you can use the network or datacenter topology search to locate the device.
- **Layout**—Choose a layout option or specify one of these options:
  - **Incremental Layout**—Choose this option when creating a manual or custom layout to re-render links and clean up overlaps before saving it as a Manual Layout.
  - **Save Current Layout**—Choose this option to save the selected layout for the map.
  - **Load Saved Layout**—Choose this option to load a previously saved layout for this map
- **Create Element**—You can create an unmanaged device (represented by a generic icon) or an unmanaged network (represented by a cloud icon). You can also create links between objects.

To show the interface and link status for a created link, click on the created link that connects one more managed devices, then click **Edit Interface Assignment** to assign the link to the appropriate interface on the managed device.

Related Topics

- Navigating in Topology Maps
- Topology Overview

Navigating in Topology Maps

In a topology map, icons represent devices or groups of devices. You can click on the icon for a group to bring up the information summary, which shows the group name and alarm summary. You can view the contents of a group in two ways:

- Click on a device group icon, then in the summary panel that appears, click **Drill Down Group**.
- From the Device Group navigation pane, find the group in the hierarchy and click on the group name.

In addition to the summary information, you can also click on a device or group icon, or a link to get additional tools, such as the device 360° view.

Related Topics

- Understanding Topology Map Functions and Icons
- Topology Overview
Topology Map Icons

In topology maps, device icons reflect the device alarm state and correspond to the most severe alarm currently active for the device, which can be minor, major, or critical. Similarly, group icons indicate whether any devices within the group have active alarms.

Click on a device or group icon, or a link to display summary information and additional tools, such as the Device 360° View.

Icons on the topology maps display network fault information:
- If a device is currently down or unreachable, the device icon is gray.
- If a device has an alarm associated with it, an alarm badge is displayed on the device icon on the topology map. The color of the alarm badge corresponds with the alarm severity—minor (yellow), major (orange), or critical (red)—and matches the alarms displayed in the Alarm Browser.
- A link down alarm generates an alarm badge on the associated link in the topology map. After the link up alarm is received, the alarms and corresponding badges are cleared.
- The alarm badges on group icons represent the most severe alarm currently active for any object in the group.

Related Topics
- Topology Overview
- Viewing Fault Information for Devices and Links

Before Using Topology Maps

Before you create or view topology maps:
1. Make sure your devices were successfully added to Prime Infrastructure, as explained in “Validating That Devices Were Added Successfully”.
2. You have created one or more device or location groups. Any devices that you do not assign to a group will appear under the Unassigned device group.

Related Topics
- Validating That Devices Were Added Successfully
- Types of Groups
- Creating Device Groups
- Creating Location Groups
- Topology Overview
Viewing Detailed Tables of Alarms and Links

From the Network Topology window, you can access extended tables that list and provide more information about alarms and links. These extended tables open in a separate browser window.

To open the extended details tables, click the **Detach** icon below the Groups pane or click on the **Show Table** link in a specific pane.

The window displaying the extended tables has two tabs: Alarms and Links.

Be aware of the following when working with the extended tables:

- When the extended tables window is open, the Alarms and Links panes in the Network Topology window are disabled. If you click on a disabled pane, the extended tables window is brought to the front. When you close the extended tables window, the panes in the Network Topology window become fully functional again.
- There is synchronization between the data in the extended tables and the data in the corresponding panes in the Network Topology window.
- Alarms in both the Network Topology window and in the extended tables are refreshed based on user preference settings (see “Changing Alarm Display Behavior” and “Customizing the Alarm Summary” in Related Topics).

**Related Topics**

- Changing Alarm Display Behavior
- Customizing the Alarm Summary
- Topology Overview

Determining What is Displayed in the Topology Map

You have control over the elements displayed in the network topology map, and can customize it to show just the information you want, as explained in the following related topics.

**Related Topics**

- Displaying Network Elements in the Topology Map
- Viewing the Contents of a Sub-Group in the Topology Map
- Manually Adding Links to the Topology Map
- Adding Unmanaged Devices and Links to Topology Maps
- Changing the Link and Device Types Shown in the Topology Map
- Viewing Port Channel Links using LAG
- Showing and Hiding Alarms, Links, and Labels in the Topology Map
- Isolating Specific Sections of a Large Topology Map
Displaying Network Elements in the Topology Map

The topology map enables you to visualize the topology of a selected device group, which might cover a specific network segment, a customer network, or any other combination of network elements. To determine what is displayed in the topology map, you must select a group in the Groups pane to the left of the topology map. Since grouping is hierarchical, a group might be a “parent group,” meaning that it contains sub-groups. If the selected group contains sub-groups, icons representing the sub-groups are shown in the topology map. These icons can be expanded to display the devices within them.

The topology map only displays devices for which the logged in user has access privileges, based on the virtual domains assigned to that user.

If you encounter topology issues, such as topology components not rendering as expected or component data not being displaying on the map, we recommend that you clear your browser cache and try again.

---

**Step 1** Choose **Maps > Topology Maps > Network Topology or Datacenter Topology**.

**Step 2** In the Groups pane on the left, click on the group you want to display in the topology map.

**Step 3** Customize the topology map to show specific device/link types, add manual links, and so on, as explained in these related topics: “Change Which Link and Device Types are Shown in the Topology Map”, “Manually Add Links to the Topology Map” and “Change the Topology Map Layout”.

After you have displayed the required group in the topology map, you can access additional information about any device or link, as explained in these related topics: “Getting More Information About Devices” and “Getting More Information About Links”.

---

**Related Topics**

- Changing the Link and Device Types Shown in the Topology Map
- Viewing Port Channel Links using LAG
- Manually Adding Links to the Topology Map
- Changing the Topology Map Layout
- Getting More Information About Devices
- Getting More Information About Links
- Determining What is Displayed in the Topology Map
Viewing the Contents of a Sub-Group in the Topology Map

You can expand a sub-group to show its contents within the current context or you can drill down to see the contents of the sub-group independently of the current map context.

In the diagram below, the IL group is expanded.

When expanding sub-groups, be aware that if a device belongs to more than one group, the device will appear in one of the expanded groups only. It will not appear in all of the groups to which it belongs. If your setup has devices that belong to multiple groups, rather view the groups individually in the topology map by selecting them in the Groups pane. This will ensure that you will always see all the devices that belong to a specific group.

**Step 1** Choose Maps > Topology Maps > Network Topology or Datacenter Topology.

**Step 2** In the Groups pane on the left, click on the group you want to display in the topology map.

**Step 3** Click on a sub-group in the topology map.

**Step 4** In the displayed popup, click one of the following:

- Drill down group—Displays the sub-group on its own in the topology map, meaning that the currently displayed group is replaced with the selected sub-group. Note that the sub-group name is selected in the Groups pane.
- Expand group—Adds the contents of the sub-group to the current topology map display.

**Related Topics**

- Determining What is Displayed in the Topology Map
Manually Adding Links to the Topology Map

If you have a link in your network that Prime Infrastructure cannot discover, you can manually draw the link in your topology map. The manually created link is considered a managed link. This is because Prime Infrastructure retrieves the link status from the managed device interfaces to which it is connected.

After you have manually added a link to the topology map, the link will be shown by default whenever the relevant group is selected. The manual link cannot be hidden using the link type filter.

Step 1 Choose Maps > Topology Maps > Network Topology or Datacenter Topology.
Step 2 Click on Create in the topology toolbar and choose Create Link.
Step 3 Click and hold down the mouse on the first device in the topology map and drag it to the second device. A dotted line is created between the two devices indicating a manual link.

Related Topics
• Topology Overview
• Changing the Link and Device Types Shown in the Topology Map
• Viewing Port Channel Links using LAG
• Adding Unmanaged Devices and Links to Topology Maps
• Determining What is Displayed in the Topology Map

Adding Unmanaged Devices and Links to Topology Maps

You can add unmanaged devices and links to your topology maps in order to get a complete view of the network. For example, you can add an “unmanaged device” icon to your topology map to represent a network device that is not managed by Prime Infrastructure but is connected to a managed device, and then manually draw the link in your network topology. You can then assign the manually created link to a specific interface on the managed device so you can see the interface alarm status in the topology map.

Related Topics
• Manually Adding Links to the Topology Map
• Determining What is Displayed in the Topology Map
Changing the Link and Device Types Shown in the Topology Map

You can choose to display only certain types of links or devices in the topology map. Click the Filter icon to see a full list of link and device types and select the ones you want to display. If you want to temporarily show or hide links, alarms, or labels, see the related topics.

Step 1  Choose Maps > Topology Maps > Network Topology or Datacenter Topology.
Step 2  Select the required device group from the Groups pane on the left.
Step 3  Click the Filter icon in the topology toolbar and choose Link Types or Device Families.
Step 4  In the Show Link Types or Show Device Families dialog, select the types of links/devices that you want displayed in the topology map, for example, physical layer links, Ethernet layer links, routers, and so on.
   • If a device or link type exists in your network, it will be displayed in the dialog. However, it will be disabled if it is not relevant to the currently selected group.
   • If a device or link type does not exist in your network, it will not appear in the dialog.
Step 5  Click OK. Your settings are saved and only the link/device types you selected are displayed.

Related Topics
• Topology Overview
• Viewing Port Channel Links using LAG
• Showing and Hiding Alarms, Links, and Labels in the Topology Map
• Determining What is Displayed in the Topology Map

Viewing Port Channel Links using LAG

In Prime Infrastructure, after successful Inventory collection of devices, links are created between the devices forming the physical or Ethernet Interfaces. These Interfaces are aggregated and represented as one, thus forming Port channels. When these Port channels are connected, they form a Link Aggregation Group (LAG) link. You can view the topology representation of the Port channel links and its members.

To view the Port channel links, follow these steps:

Step 1  Choose Maps > Topology Maps > Network Topology or Datacenter Topology.
Step 2  Click the respective Device Group from the Groups pane on the left. The Unassigned Group page displays the topology representation of all the devices.
Step 3  Click the Filter icon in the topology toolbar and choose Link Types.
Step 4  Check the LAG check box in the Show Link Types dialog.
Step 5  Click OK. The topology map shows the Port channel links between the devices/members.
Step 6  Click the required link in the topology map to view the links summary information. A popup appears showing the basic link details (such as A side, Z side, Link Type and Alarm Severity).
Step 7  Click the information icon in the popup to launch the 360° Link view for detailed information about the members and port channel links.
Step 8  Click on the required device in the topology map to view the device summary information (such as host name, IP address, and alarm summary). A popup appears showing basic device information and alarm information for the device.

Step 9  Click **View 360** in the popup to launch the Device 360° view for detailed information about the device.

---

**Related Topics**

- Topology Overview
- Changing the Link and Device Types Shown in the Topology Map
- Determining What is Displayed in the Topology Map

---

### Showing and Hiding Alarms, Links, and Labels in the Topology Map

Use the Show/Hide settings to temporarily add or remove labels, links, and alarm information to your map.

**Step 1**  Choose **Maps > Topology Maps > Network Topology or Datacenter Topology**.

**Step 2**  Click the **Show** button in the topology toolbar.

**Step 3**  Select the items you want displayed in the topology map:

- **Labels**—Labels associated devices, such as device names.
- **Links**—Single links between devices.
- **Aggregated Links**—Links that represent more than one underlying link. They are represented by dotted lines.
- **Faults**—You can choose to hide fault information altogether, show all fault information or show only faults of a certain severity or higher, as it is a slider widget.

**Step 4**  Close the Show dialog. Your selections are applied to the topology map.

---

**Related Topics**

- Changing the Link and Device Types Shown in the Topology Map
- Determining What is Displayed in the Topology Map

---

### Isolating Specific Sections of a Large Topology Map

In cases where a topology map is displaying thousands of devices, you may want to focus on specific devices or sets of devices. The Overview pane shows you the entire topology map in miniature and lets you select the area you want to display in the large topology map. It also provides an at-a-glance view of the alarm status of the elements in the topology map.

**Step 1**  Choose **Maps > Topology Maps > Network Topology or Datacenter Topology**.

**Step 2**  Click the Overview icon in the topology toolbar. The Overview pane appears at the bottom right of the topology map and displays the following:
• Dot— indicates any network element. The color of the dot indicates the severity of alarms associated with the network element.
• Line— indicates a link. The color of the line indicates the severity of the associated alarm.
• Blue rectangle— indicates the selection area. The area within the rectangle is displayed in the map pane. Handles on the corners enable you to resize the selection area.
• Pan mode cursor— cursor displayed within the selection area. Use this cursor to move the selection area, and thereby view different elements in the map pane.
• Zoom mode cursor— displayed outside the selection area. Use this cursor to define a new selection area or to zoom in on an existing selection area.

Step 3
Draw a rectangle by dragging the mouse over the area you want to see in the topology map.

Step 4
Click the ‘x’ in the upper right corner to close the Overview pane.

Related Topics
• Changing the Link and Device Types Shown in the Topology Map
• Determining What is Displayed in the Topology Map

Getting More Information About Devices

From the topology map, you can drill down to get more information about a device.

Step 1
Choose Maps > Topology Maps > Network Topology or Datacenter Topology.

Step 2
Click on the required device in the topology map. A popup appears showing basic device information and alarm information for the device.

Step 3
Click View 360 to access the Device 360 view for detailed information about the device.

Related Topics
• Getting More Information About Links
• Viewing Fault Information for Devices and Links

Getting More Information About Links

The representation of links in the topology map provides some information about the link:
• A solid line represents any type of discovered link between two elements in the topology map.
• A dotted line represents an unmanaged link that has been manually drawn in the topology map.
• A dot-dash line represents an aggregated link (if Aggregated Links is selected in the Show popup).
• An alarm severity badge indicates the highest severity alarm currently affecting the link.

From the topology map, you can drill down to get more information about a link by clicking on the required link in the topology map.
• For simple links, the displayed popup shows the link type and the A-side and Z-side of the link.
Viewing Fault Information for Devices and Links

You can use the topology maps to see the device and link faults in your network. Viewing the physical topology helps you understand the potential impact of the fault on the rest of the network and helps you troubleshoot and fix the issues. Network topology maps also help you see the interconnection between network devices and view details about the interconnections, such as link speed and link types.

If a device or link has an alarm associated with it, an alarm badge is displayed on the device icon or on the link in the topology map. The color of the alarm badge corresponds with the alarm severity—minor (yellow), major (orange), or critical (red)—and matches the alarms displayed in the Alarm Browser.

For groups, the alarm badge represents the most severe alarm that is currently active for any of the group members.

Link-related alarms, such as Link Down, generate an alarm badge on the relevant link in the topology map. After the link up alarm is received, the link alarms and corresponding badges are cleared.

See Topology Map Icons for more information about the alarm information that is provided by the icons.

Step 1  Choose Maps > Topology Maps > Network Topology or Datacenter Topology.

Step 2  Select the device group, in either the Locations folder or the Custom folder, which you want to view the network topology. If you did not previously create device groups, all devices will appear in the Locations > Unassigned folder.

Icons appear on the devices and links indicating critical, major, minor alarms associated with that device or link.

Step 3  Click on a device to view the device summary information (such as host name, IP address, and alarm summary). You can also launch the Device 360° view for additional device information.
Step 4  Click on a link to view the summary information about the link, showing the devices and ports or interface to which the link is connected.

Related Topics
- Getting More Information About Devices
- Getting More Information About Links
- Topology Map Icons

Using Device 360° to View a Device's Topology

You can use the Device 360° view to see the local, or N-hop, topology for a device. This lets you visualize where in the network the device is located and see its context within the overall network. This can be helpful if you are viewing the Alarm Browser and want to see more information about a specific device associated with an alarm. By launching the Device 360° view, you can see the local topology for that selected device.

Step 1  From the Device 360° view, click the Topology icon.

By default, Prime Infrastructure displays all devices within two hops of the device and the alarm status of all displayed devices and links.

Step 2  To modify the hop count, click the Edit icon and select a new value from the Hops pulldown menu.

Related Topics
- Topology Overview
- Determining What is Displayed in the Topology Map
- Getting More Information About Devices
- Getting More Information About Links
- Viewing Fault Information for Devices and Links
Changing the Topology Map Layout

You can specify how the devices and other network elements (such as labels, nodes, and the connections between them) are arranged in the topology map:

- Symmetrical (default)—Maintains the symmetry that is inherent in the topology. This ensures that adjacent nodes are closer to each other and prevents node overlapping.
- Circular—Arranges the network elements in a circular style highlighting the clusters inherent in the network topology.
- Hierarchical—Ensures that the dependencies on the relationships and flows between elements are maintained.
- Orthogonal—Creates a compact view of the topology using horizontal and vertical lines to represent the edge routing elements and links. This style minimizes edge route lengths, provides overlap-free label placement, and ensures that edge crossings can be clearly viewed.
- Incremental—Maintains the relative positions of specific elements while adjusting the positions of newly added elements. Use this layout to re-render nodes/links and to clean up overlaps.

When you choose a map layout, the elements align accordingly. You can also drag and drop elements to change the layout manually. After you have changed the layout, you can save it so that it will be preserved when you next open the Network Topology window. See Saving the Topology Map Layout.

Step 1
In the left sidebar, choose Maps > Network Topology.

Step 2
Select the required device group from the Groups pane on the left.

Step 3
Click the Layout icon in the topology toolbar and choose the required layout. The topology map display will be adjusted accordingly.

Related Topics
- Topology Overview
- Determining What is Displayed in the Topology Map
- Saving the Topology Map Layout

Saving the Topology Map Layout

Prime Infrastructurer retains your layout changes and your selections for the current browser session only. Therefore, after you have changed the topology map layout to suit your needs, it is highly recommended that you save the layout so that you do not have to manually rearrange the topology map each time.

Choose Layout > Save Current Layout from the Topology toolbar. You can reload the layout at any time by choosing Layout > Load Saved Layout.

Related Topics
- Topology Overview
- Saving the Topology Map as an Image File
### Saving the Topology Map as an Image File

You can save the entire topology map or selected objects from the topology map as an image file. This will enable you to store copies of the topology map in a specific state which you can use as a point of reference in the future when multiple changes are made to the topology.

**Step 1** Choose **Maps > Topology Maps > Network Topology or Datacenter Topology**.

**Step 2** Select the required device group from the Groups pane on the left.

**Step 3** Make content and layout changes to the topology map as required.

**Step 4** Click the Save Image icon in the topology toolbar.

**Step 5** In the Save As Image dialog box, select the file type for the saved image.

**Step 6** Choose whether you want to save the entire topology or only the items currently selected in the topology map.

**Step 7** Choose a size setting for the image file.

**Step 8** Click **Save**. The image is saved in your local Temp folder and you return to the Network Topology screen.

### Creating a Topology Dashlet

You can add a topology dashlet to the Overview dashboard to make it easier to view your physical network.

**Step 1** Choose **Dashboard**, then select the dashboard to which you want to add the topology dashlet.

**Step 2** Click the Settings icon, then choose **Add Dashlet(s)**.

**Step 3** Click **Add** next to the Network Topology dashlet. You can drag and drop the topology dashlet to the desired location in the dashboard.

**Step 4** Edit the dashlet to enter a title and select the device group for which you want to display its topology.

### Related Topics

- Topology Overview
- Determining What is Displayed in the Topology Map
- Changing the Topology Map Layout
- Saving the Topology Map Layout
Viewing vPc Summary

You can view the vPc summary.

---

**Step 1**  Choose Maps > Topology Maps > Datacenter Topology.

**Step 2**  Select the required device group from the Groups pane on the left and click on the information icon.

**Step 3**  Click View VPC Summary.

**Step 4**  Select the desired VPC from the table and click View Inconsistency to view the VPC Configuration Consistency View.