Visualizing the Topology

- AutoNetkit Visualization, page 1
- Live Visualization, page 10

AutoNetkit Visualization

The AutoNetkit visualization phase allows you to see how the nodes interact in terms of routing protocol connectivity, autonomous system (AS) numbers, Open Shortest Path First (OSPF) area, and so on. Before entering the AutoNetkit visualization phase, you must have designed the topology and generated the node configurations using parameters defined in AutoNetkit.

Note

AutoNetkit visualization is available before a simulation is launched. A valid Cisco Modeling Labs license is not required to run AutoNetkit visualization. AutoNetkit visualization is only viewable on an external Web browser; internal Web browsers are not supported.
The following figure shows an overview of the AutoNetkit Visualization phase as it appears in a browser window.

*Figure 1: Visualization Overview*

The following figure shows how the visualization compares to the topology design.

*Figure 2: Topology Design*
Access AutoNetkit Visualization

To access AutoNetkit visualization, complete the following steps:

**Step 1**
Generate a configuration for the topology.
Click **Build Initial Configurations** from the toolbar. Alternatively, from the menu bar, choose **Configuration > Build Initial Configurations**.

**Step 2**
View the configuration changes.
AutoNetkit displays a notification after it generates the configuration.

*Figure 3: View Configuration Change Notification*

- Click **No** to skip this step.
- Click **Yes** to open a comparison view of the configuration changes.

**Step 3**
Display the AutoNetkit visualization view of the topology.
When you close the comparison view, a notification prompts you whether to open AutoNetkit visualization.

*Figure 4: Open AutoNetkit Visualization*

- Click **No** to skip this step.
- Click **Yes** to display the visualization.
  AutoNetkit visualization opens in a browser window.

**Note** Choose **File > Preferences > Web Services > AutoNetkit Visualization** to control the prompts for visualization.
Figure 5: AutoNetkit Visualization Window
AutoNetkit View Options

The initial AutoNetkit visualization view that is displayed in the browser window is the physical model of the topology. The physical model shows the nodes and interface connections between the nodes. It is similar to the Cisco Modeling Labs topology view.

Figure 6: Initial View
To select another view, place the cursor over the **Physical** selection in the browser window.

*Figure 7: List of Available Views*
When you place the cursor over the Overlay view, several choices appear. For example, selecting **iBGP v4** will show the IPv4 iBGP topology.

*Figure 8: iBGP v4 View*
For example, selecting **eBGP v4** will show the IPv4 eBGP topology.

*Figure 9: eBGP v4 View*
For example, selecting **Layer 2** will show the IPv4 Layer 2 topology.

*Figure 10: Layer 2 View*

Placing the cursor over one of the nodes displays a pop-up view of information about that node. The type of information displayed depends on the selected option and node configuration.
You can also hover over the connections to see connection details.

*Figure 11: Node Information*

You can continue to select different protocol views to see how the protocol-centric view changes. In a complex topology, you can use the Physical views to verify that the protocols, nodes, and connections meet the design requirements.

**Live Visualization**

The Live Visualization phase provides a live, real-time visual representation of the running simulation in the Cisco Modeling Labs client.

*Note*

In order to use the Live Visualization feature, the topology must use an LXC management node when launched. Under Properties > Topology, check the Use an LXC Management Node check box when designing your topology. Then generate the node configurations using parameters defined in AutoNetkit.

For the running simulation, you can see the LXC management node in the Simulations view.
Live Visualization runs in a separate, external Web browser window. Ensure that you use a compatible browser, as described in Cisco Modeling Labs Server Requirements for the version of Cisco Modeling Labs that you are using.

Note

Live Visualization is independent of AutoNetkit. It does not require AutoNetkit to run. However, a valid Cisco Modeling Labs license is required in order to use this feature. Also, ensure that each node has started up successfully and has applied its configuration before attempting to run a Live Visualization. A running node is displayed in green on the canvas and is displayed in green with [ACTIVE] in the Simulations view.

The following figure shows an overview of the Live Visualization phase as it appears in a browser window.

Figure 12: Live Visualization Overview
The following figure shows how the Live Visualization compares to the topology design.

*Figure 13: Topology Design*

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**View the Live Visualization**

To access the Live Visualization for a running simulation, complete the following steps:
The simulation must be configured to use an LXC management node when launched. This is enabled under Properties > Topology view by checking the Use an LXC Management Node check box. Then generate the node configurations using AutoNetkit.

Step 1: In the Simulations view, right-click the simulation name.
Step 2: From the drop-down list displayed, click Launch Live Visualization.

Figure 14: Launch Live Visualization Option

A web browser opens.

Step 3: Enter your username and password and click Log In.
Step 4: From the Simulation ID drop-down list displayed, choose the applicable simulation to launch.
The Live Visualization opens in a web browser as shown.

*Figure 15: Live Visualization View*

You are only prompted for your user credentials the first time you launch a Live Visualization.

**Step 5**

You can also access the Live Visualization for a running simulation from the User Workspace Management interface. In the User Workspace Management interface, login and under My Simulations, choose the applicable running simulation. The details page for the running simulation is displayed.

*Figure 16: Accessing Live Simulations from the User Workspace Management Interface*

**Step 6**

Choose Live Visualization to launch the Live Visualization for the running simulation in a new web browser.
Live Visualization Overlay Options

The initial Live Visualization overlay that is displayed in the browser window is the physical model of the topology. The physical model shows the nodes and interface connections between the nodes based on the .virl file. It is similar to the Cisco Modeling Labs topology view.

Figure 17: Initial Overlay

![Initial Overlay]

The Physical drop-down list provides a series of overlays such as the physical live overlay, the OSPF live overlay, the iBGP live overlay and so on. When you select one of these options, Cisco Modeling Labs collects the live data from the nodes in the topology and draws the protocol map.

Figure 18: List of Physical Overlays

![List of Physical Overlays]

The Actions drop-down list provides a list of actions that are applied for each specific protocol. When an action is selected from the Actions drop-down list, this results in commands being executed on each active
virtual machine. The Actions drop-down list also provides other functions such as Shutdown Simulation, Show Interface Table, Clear Traceroute Paths.

*Figure 19: List of Actions Options*

Placing the cursor over a node displays a pop-up view of information about that node. The type of information displayed depends on the selected option and node configuration. You can also hover over the connections to see connection details.

*Figure 20: Node Information*
Selecting a node displays a pop-up menu of available options for the node.

**Figure 21: Node Options**

Available options are:

- **Shutdown Node**: Allows you to shutdown a running node, with the results reported in the Log view.

- **Telnet to Serial0/Serial1**: Allows you to Telnet to a node's serial ports 0 and 1. Opens a console port to serial or aux ports from within the web browser.

- **Collect Node Route Table**: Allows you to collect the route table from every node in the simulation, with the results reported in the Log view.

- **Plot Routes to Prefix (alpha)**: Allows you to select a node and the system will show the next hops taken by traffic to this node's loopback address. This only work for nodes that are Cisco IOSv instances.

- **Ping From/To**: Allows you to ping from one node to another node. A five packet ping is triggered from source to destination, with the results reported in the Log view.

- **Trace From/To**: Allows you to execute a traceroute between nodes, with the results reported in the Log view.
Selecting an interface displays a pop-up menu of available options for the interface.

**Figure 22: Interface Options**

![Interface Options](image)

Available options are:

- **Disable/Enable Interface**: Allows you to disable an interface, with the results reported in the Log view.
- **Setup Packet Capture**: Allows you to start a packet capture. Opens the User Workspace Management interface in a new web browser, where you can set the required capture limits.
- **Plot Routes to Prefix (alpha)**: Allows you to select an interface and the system will show the next hops taken by traffic to this interface's loopback address.
- **Trace From/To**: Allows you to execute a traceroute between interfaces, with the results reported in the Log view.
- **Ping From/To**: Allows you to ping from one interface to another interface, with the results reported in the Log view.

**Physical Connections**

To view the live physical data, place the cursor over the Physical list and select Physical Live from the drop-down list.
The collect interfaces action is run automatically when a Live Visualization session is first loaded.

**Note**

Hovering over an interface displays the information collected about the interface. The command **Actions > Collect Interfaces** is used to collect IP addressing information from the interfaces in order to perform reverse mappings, such as, IGP, BGP, and traceroute data processing. If the IPs are changed, you need to re-run this command. You can view the command applied in the **Log** view.

**OSPF**

To view the live OSPF data, do either of the following:

- Choose **Physical > OSPF Live** from the drop-down list; or
• Choose Actions > Collect OSPF. For both options, the Collect OSPF action runs the relevant show OSPF command on the nodes and then triggers the processor to parse and build the connectivity. The results are shown as adjacencies on the topology.

![Figure 25: OSPF Live Overlay](image)

You can view the show command applied in the Log view.

![Figure 26: OSPF Live Log Output](image)

**iBGP**

To view the live iBGP data, do either of the following:

• Choose Physical > iBGP Live from the drop-down list; or
• Choose **Actions > Collect BGP**. For both options, the **Collect BGP** action runs the relevant show BGP command on the nodes and then triggers the processor to parse and build the connectivity. The results are shown as adjacencies on the topology.

**Figure 27: iBGP Live Overlay**

You can view the show command applied in the **Log view**.

**Figure 28: iBGP Live Log Output**

**SYSLOG**

You can configure all nodes to send syslog messages to a syslog process. From the **Actions** drop-down list, click **Setup Syslog**. This sets up the virtual machines to send syslog messages to the LXC management node.
These messages are forwarded through a web socket to the front-end and can be seen under the **Syslog** option.

**Live Visualization Traceroute**

The traceroute functionality allows you to view the different routes used between the nodes in your topology.
In the Live Visualization, for the source node or source interface, left-click on the applicable node to access the drop-down menu and choose **Trace From**.

**Figure 31: Node Menu**

![Node Menu](image1)

Next choose a destination node (for the loopback), or destination interface and from the drop-down menu, choose **Trace To**.

**Figure 32: Interface Menu**

![Interface Menu](image2)
This is then matched to the appropriate IP address, using the interfaces IP addresses collected using the interfaces command. This, together with the node identifier, is then sent to the Live Visualization back-end for formatting and running of the command.

**Figure 33: Traceroute Path Displayed**

When a traceroute is executed, hovering the mouse over the path displays information on the path taken.

**Figure 34: Information on the Path Taken**
Details on the command executed for the traceroute are available in the Log view.

**Figure 35: Traceroute Log**

When an interface is disabled in the Live Visualization, the disabled interface name is shown in red. For a disabled node, all its interface names are shown in red. An interface that has link parameters set is displayed as a dashed line.

In the following example, the interface ge0/3 has been disabled so the path is rerouted. The interfaces ge0/1 and ge0/2 for node iosv-1 indicate that the node is disabled.

The interfaces ge0/4 and ge0/3 connecting nodes iosv-2 and iosxrv-2 indicate that link parameters have been set for this link.

Re-running the previous traceroute now shows a different path.

**Figure 36: Updated Image Showing Rerouted Path**
Additionally, the disabled interface is displayed in the Cisco Modeling Labs client with red text and a red dot on a broken line. The link parameters link is shown with a Tools icon. The disabled node is shown in grey with its interfaces displayed as dashed lines, as shown in the following image.

*Figure 37: Updated Details in the Cisco Modeling Labs Client*