Juniper Networks | Engineering Simplicity

NorthStar Planner Web UI Guide

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NorthStar Planner Web UI Guide
6.2.5

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About This Guide

Use this guide to navigate the NorthStar Planner web UI for the purpose of simulating the effect of various scenarios on the network, without affecting the live network. The NorthStar Planner is currently in transition from a desktop application to a web UI. Until the transition is complete, both the full-featured desktop application and the in-development web UI are available and documented separately. This guide documents the features that are supported in the NorthStar Planner web UI.

1
CHAPTER

NorthStar Planner Web UI Introduction

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NorthStar Application UI Overview

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NorthStar has two user interfaces (UIs):

- NorthStar Controller—web UI for working with a live network.
- NorthStar Planner—Simulates the effect of various scenarios on the network, without affecting the live network. The Planner is currently in transition from a desktop application to a web UI. Until the transition is complete, both the full-featured desktop application and the in-development web UI are available and documented separately.

Comparison Between NorthStar Controller and NorthStar Planner

Table 1 on page 3 summarizes the major use cases for the NorthStar Controller and NorthStar Planner.

NOTE: All user administration (adding, modifying, and deleting users) must be done from the NorthStar Controller web UI.

NOTE: A subset of the Planner functionality shown here is currently available in the Planner web UI.

Table 1: Controller Versus Planner Comparison

NorthStar Controller (web client)	NorthStar Planner (Java client)
Manage, monitor, and provision a live network in real-time.	Design, simulate, and analyze a network offline.
Live network topology map shows node status, link utilization, and LSP paths.	Network topology map shows simulated or imported data for nodes, links, and LSP paths.
Network information table shows live status of nodes, links, and LSPs.	Network information table shows simulated or imported data for nodes, links, and LSPs.
Discover nodes, links, and LSPs from the live network using PCEP or NETCONF.	Import or add nodes, links, and LSPs for network modeling.
Provision LSPs directly to the network.	Add and stage LSPs for provisioning to the network.
Create or schedule maintenance events to re-route LSPs around the impacted nodes and links.	Create or schedule simulation events to analyze the network model from failure scenarios.
Dashboard reports shows current status and KPIs of the live network.	Report manager provides extensive reports for simulation and planning.
Analytics collects real-time interface traffic or delay statistics and stores the data for querying and chart displays.	Import interface data or aggregate archived data to generate historical statistics for querying and chart displays.

Browser Compatibility

For accessing the NorthStar Controller web UI, we recommend using Google Chrome and Mozilla Firefox browsers for Windows and Mac OS. We also recommend that you keep your browser updated to a recent version.

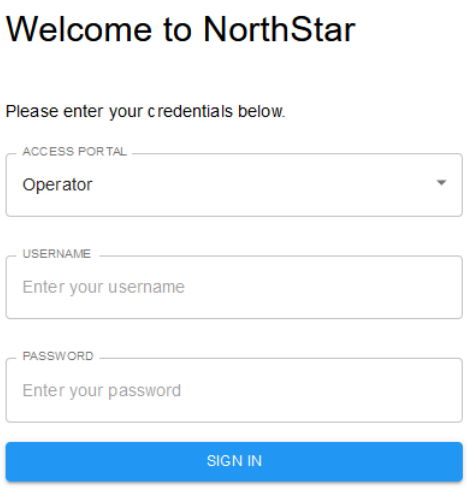
Logging in to NorthStar

Use this procedure to log in to the NorthStar controller. You can launch the NorthStar Planner (both web UI and desktop) from within the NorthStar Controller.

1. Enter your external IP address and port number that was provided to you when you installed NorthStar (for example, `https://10.0.1.29:8443`).

   The NorthStar login window is displayed, as shown in Figure 1 on page 4.

   Figure 1: NorthStar Login Window



2. Select **Operator**.
3. Enter your username and password, and click **SIGN IN**.

   You have now logged in to the NorthStar Controller.

4. If you want to log in to the NorthStar Planner, click the four-square icon in the top right corner and select **Planner** for the web UI or **Planner Desktop** for the desktop application. If you choose the web UI, a new tab opens in your browser. If you choose the desktop application, you will be prompted to download and run the desktop .jnlp executable.

NOTE: If you attempt to reach the login window, but instead, are routed to a message window that says, “Please enter your confirmation code to complete setup,” you must go to your license file and obtain the confirmation code as directed. Enter the confirmation code along with your

administrator password to be routed to the web UI login window. The requirement to enter the confirmation code only occurs if the installation process was not completed correctly and the NorthStar application needs to confirm that you have the authorization to continue.

WARNING: To avoid a Browser Exploit Against SSL/TLS (BEAST) attack, whenever you log in to NorthStar through a browser tab or window, make sure that the tab or window was not previously used to surf a non-HTTPS website. A best practice is to close your browser and relaunch it before logging in to NorthStar.

User Inactivity Timer

(System Administrator only) You can configure an inactivity timer and apply it to any user who is idle (and has not performed any actions (keystrokes or mouse clicks), so they are automatically logged out of NorthStar after a specified number of minutes. By default, the timer is disabled. To set the timer, select **System Settings** from the **Administration** menu.

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The NorthStar Planner web UI has five main views that are summarized here and discussed in detail in later topics. The menu icon (stacked bars) in the upper left corner of the Planner window offers all of

- Network Browser

- Topology
- Dashboard
- Simulation
- Report Manager

Network Browser View

When you first log into the Planner, the Network Browser view is displayed as shown in Figure 2 on page 6. There are four tabs: Sessions, My Networks, Shared, and Archives, described in Table 2 on page 7.

Once you have opened a network or session, the other main views become available; they are network-specific.

Figure 2: Network Browser View

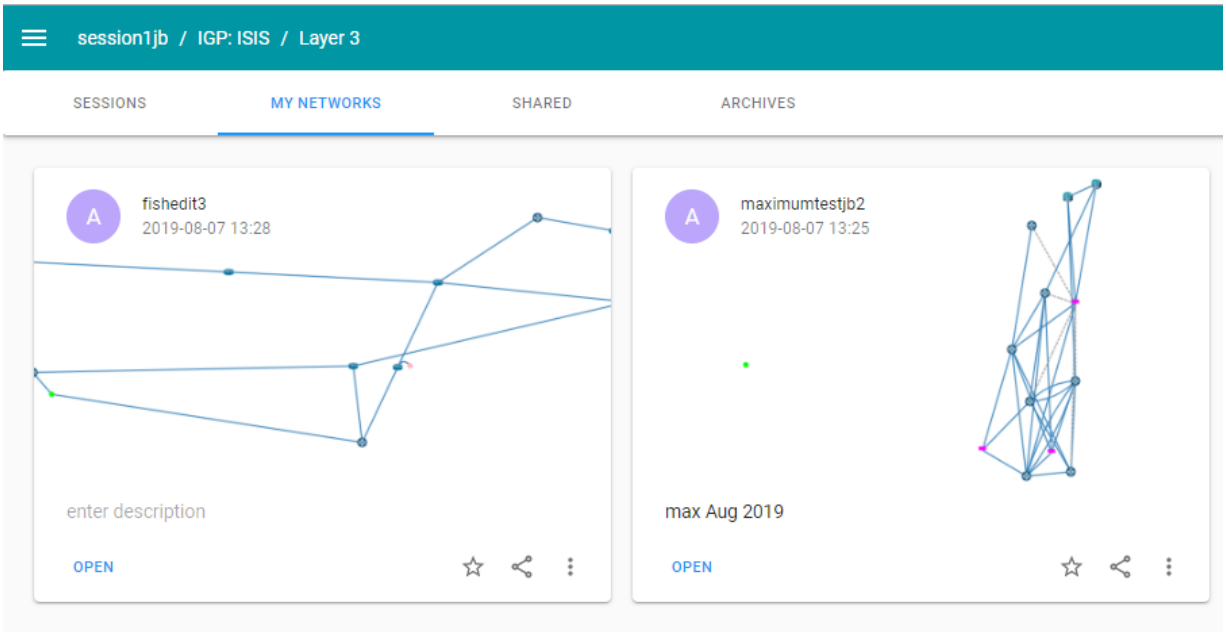


Table 2: Network Browser Tabs

Network Browser Tab	Description
Sessions	A session is like an instance of a network. You can think of it as your working directory. When you open a network, a session instance is created, along with a session file and directory path on the server. In the session, you can make changes to the network, run reports, and run simulations. When you're finished with your work, you can close the session with or without saving. If you save it, it then becomes available in the My Networks tab. If you don't save it, the changes you made are not preserved.
My Networks	Also called Specification (Spec) files, the networks listed in the My Networks tab are collections of system files on the server, each collection representing a network model. These networks are stored on the server, not just in memory like sessions.
Shared	Spec files that you have access to, but don't own. If you open a shared network and save it (Save As), it becomes available in My Networks. To make a spec file into a shared network for other users, click the Share icon in the lower right corner of the network's "tile" in the Network Browser.
Archives	Archived networks are generated in the NorthStar Controller (**Administration** > **Task Scheduler**), after which, they are available in the Network Browser under the Archives tab.

Each network has a "tile" in the Network Browser with the following key features:

- The user group that opened the network is indicated by the letter in the colored circle. For example, in Figure 2 on page 6, the letter "A" beside the network name and timestamp refers to the Admin group. The availability of some of the other features in the tiles are dependent on user group permissions.
- A thumbnail of the network topology is included.
- For networks you own, you can enter a network description by clicking where it says, "enter description".
- In the lower left corner are links for any available actions such as Open, Resume, or Close.
- In the lower right corner are icons that allow you to:
  - Tag the network as a favorite (star icon). Favorites are displayed first in the Network Browser.
  - Share the network with others, in which case, it appears in the Shared tab of the Network Browser.

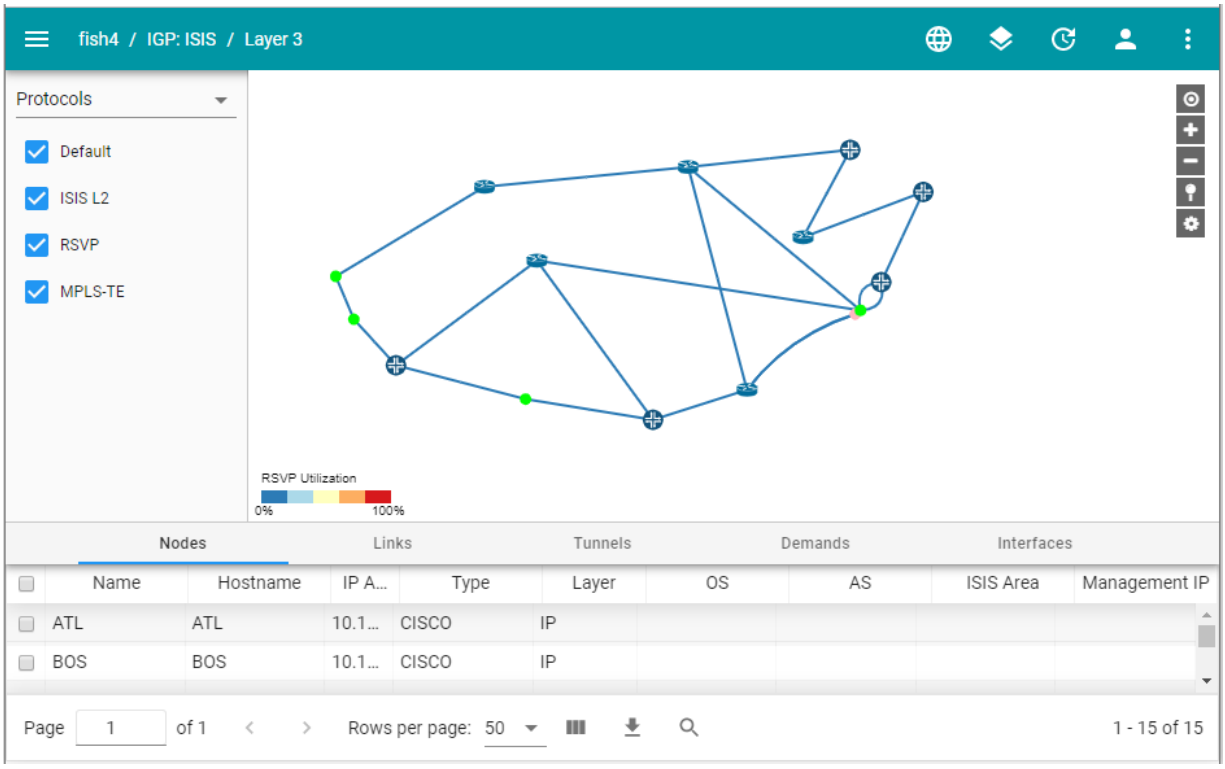
- From the More Items icon (vertical dots), you can download the network to your local machine or delete the network.

When you open a network, it opens in Topology view, as shown in Figure 3 on page 8. Click on the menu icon (horizontal bars) in the upper left corner of the Planner to select one of the other main views for the open network or to return to the Network Browser.

NOTE: See "Web Planner Top Menu Bar" on page 12 for information about the features of the top menu bar.

Topology View

Figure 3: Topology View



There are three main sections to the Topology view, similar to those in the NorthStar Controller UI:

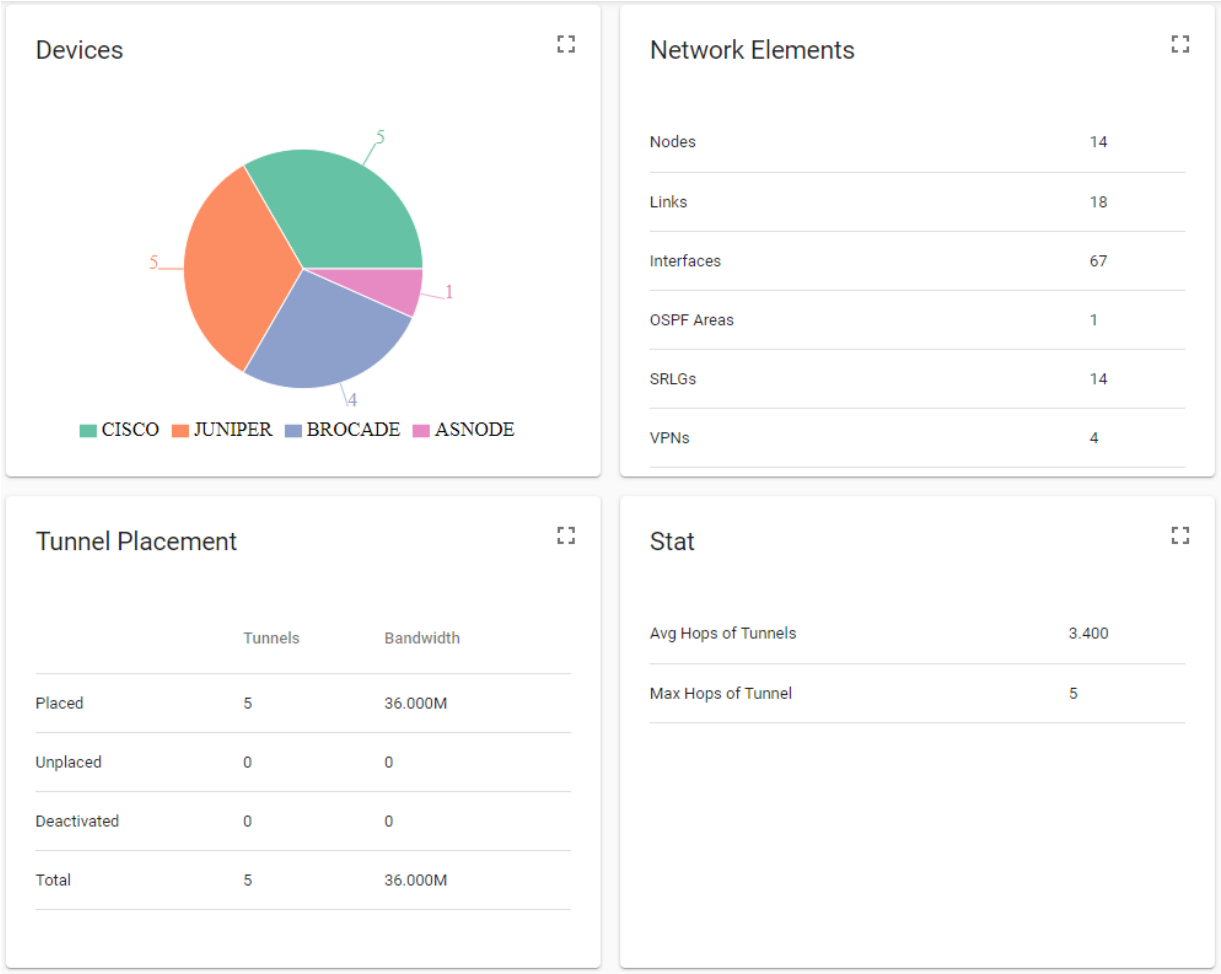
- The left pane offers a number of display options that are selectable using the drop-down menu.
- The center area is devoted to the topology map of the network.

- Across the bottom of the display is the network information table with five available tabs: Nodes, Links, Tunnels, Demands, and Interfaces.

Dashboard View

The Dashboard view presents a variety of status and statistics information related to the network, in the form of widgets as shown in Figure 4 on page 9. To enlarge a widget to full screen, click the full screen icon in the upper right corner of the widget.

Figure 4: Dashboard View



The widgets currently available are:

Widget	Description
Devices	Shows the number of devices of each type included in the network, color coded.
Network Elements	Shows the number of nodes, links, interfaces, OSPF areas, SRLGs, and VPNs in the network.
Tunnel Placement	Shows how many tunnels are placed, unplaced, and deactivated, and their bandwidths.
Stat	Shows the average and maximum hops of tunnels in the network.

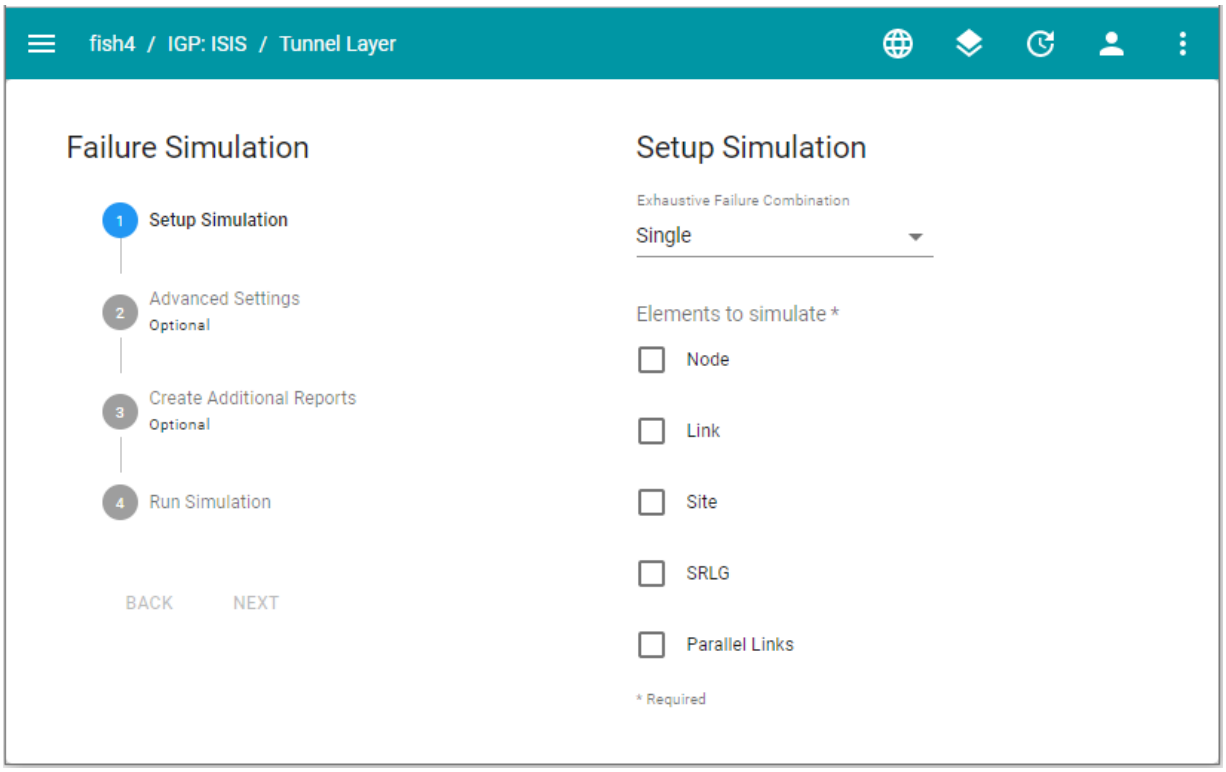
Simulation View

The Simulation View, one step of which is shown in Figure 5 on page 11, presents a tool for designing and executing failure simulations.

NOTE: You can run simulations at either Layer 3 or Tunnel/Layer 2 which you select from the top menu bar.

See "Simulation" on page 75 for more information about running simulations.

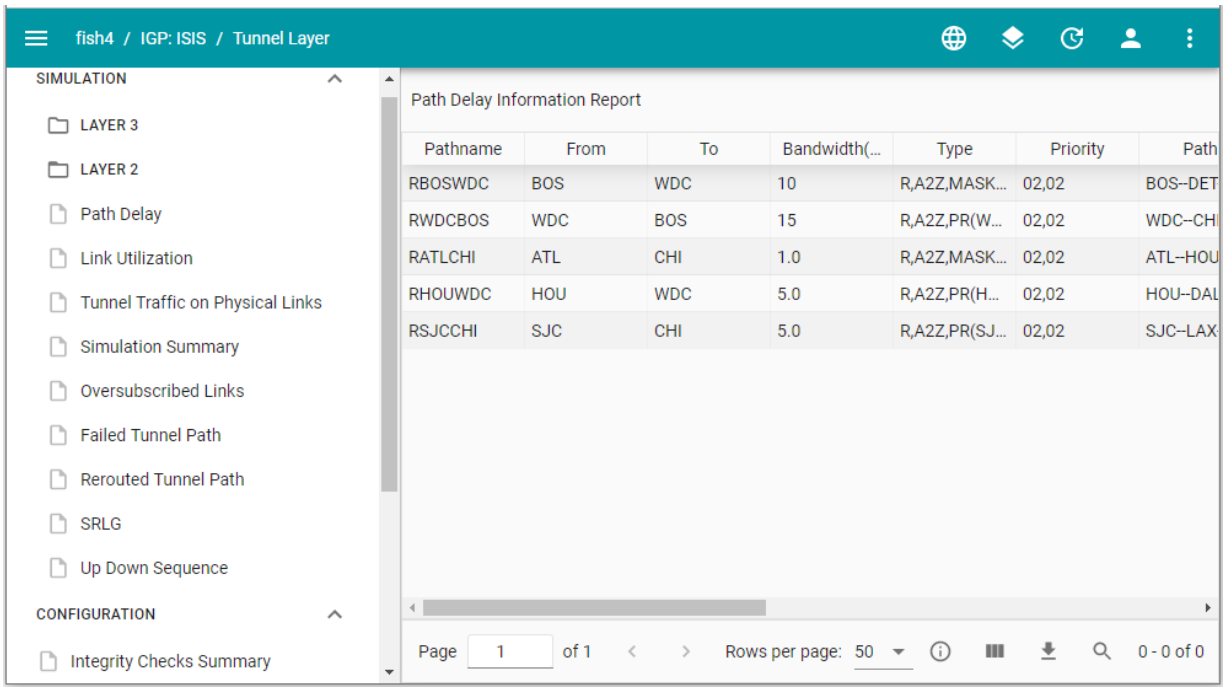
Figure 5: Simulation View



Report Manager View

The Report Manager view, shown in Figure 6 on page 12, lists all the configuration and simulation reports that can be generated by the Planner. Click any report name on the left to display the report data on the right. A download option is available for saving reports.

Figure 6: Report Manager View



See "Report Manager" on page 81 for more information about working with reports.

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Web Planner Top Menu Bar

The left side of the top menu bar in the NorthStar Planner web UI (all views) displays the main menu icon at the far left (horizontal bars), the name of the currently open network, the protocol the network is using, the currently selected layer (Tunnel Layer or Layer 3), and a drop-down menu for selecting either Design or Simulation mode. The right side of the top menu bar displays icons that provide viewing and administrative functions. See Figure 7 on page 13.

Figure 7: Top Menu Bar

NOTE: Many of these options are only available when you have an active session.

Click the network icon (world) for a drop-down list of saving and closing options:

- **Save Network**

  Saves your work to the NorthStar data directory. This option is only available when you open a network from the My Networks tab. To save one of the other network types, use the Save As option.

- **Save Network As**

  Saves a network to the NorthStar data directory. The Save As window prompts you for a network name and an optional description. The saved network is then available to you from the My Networks tab.

  NOTE: Spaces and most special characters are not allowed in network names. Hyphens and underscores are allowed. These restrictions do not apply to descriptions.

- **Load Network File**

  Loads one of the many files that comprise the current model. You can use the Load option to modify the current model since a direct Modify function is not yet available. The workflow is to download a file, modify it, save it, and then upload the edited version, refreshing the model. See "Loading Network Files" on page 19 for the procedure.

- **Restore Network**

  Overwrites the current network with the last auto-saved network. A dialog box is displayed listing the timestamp of the current data and the timestamp of the last auto-saved data, so you can compare and be sure of which data you want to keep.

  WARNING: Proceeding with this option from the dialog box (by clicking **RESTORE**) means the current data would be lost and you would not be able to undo the action.

- **Detach Current Network**

Detaches the network from your current working session.

- **Close Network**

  Closes the network you currently have open. The name of the open network disappears from the upper right corner of the Planner window. If you are in any main view other than Network Browser when you close the network, the display returns to Network Browser where you can select a network to open.

  It's completely fine to log out of Planner or close your browser without explicitly closing your session; the session will be available for you to resume your work when you log back in because it is still active on the server. This can save you considerable loading time when you start work again. However, we do recommend that you save the session periodically and before you leave it for a period of time (overnight, for example).

  > **NOTE**: Remember that if you explicitly close a network without saving it, your work is not preserved.

  You can have multiple sessions active on the server, but be aware that each one consumes one Planner license. Also, although you can have multiple sessions active on the server, your browser can be connected to only one at a time. If you have one open in your browser and you open another, it will replace the first.

Click the Layers icon (stacked squares) to select either Layer 3 or Tunnel Layer for display and simulations. Layer 3 is the default. You can always see which layer is currently selected by looking on the left side of the upper menu bar.

The Update Network icon (clock and arrow) updates the network with changes from the server. NorthStar Planner does not have a way to listen for server changes, but it does get messages from the server when there have been changes. When Planner receives update messages, it changes the color of the Update Network icon to indicate that updates are pending. You can then choose a convenient time to click the Update Network icon and refresh the display.

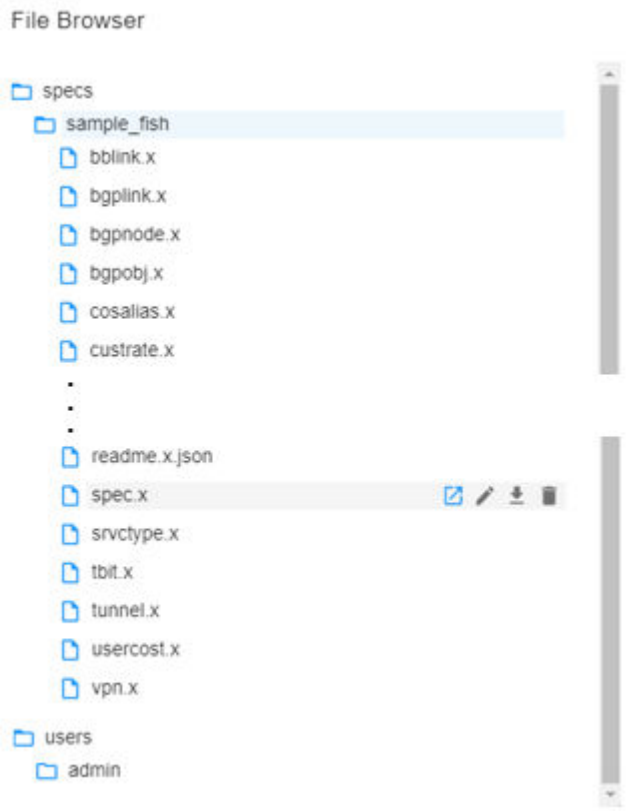
Click the user icon (initial in a colored circle) to view your account settings or to log out of NorthStar Planner. The account settings window allows you to change your password, update your contact information, and select time and date related preferences.

Click the More Items icon (vertical dots) to select one of the following options:

- **Browse Files**

  This option opens the File Browser window displaying the available spec and user files. Mouse over any file to see which of the following functions are available for that file: open the file, edit the file name, download the file, delete the file. Figure 8 on page 15 shows an example of the File Browser window.

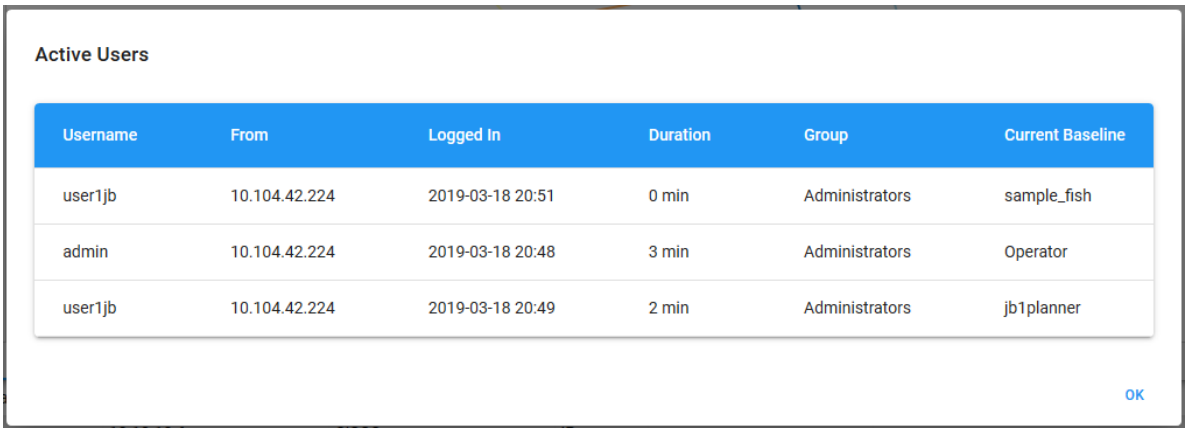
Figure 8: File Browser Window Example



- **View Active Users**

  Select View Active Users to display a list of users currently logged into the Planner as shown in Figure 9 on page 15.

Figure 9: Active Users Window



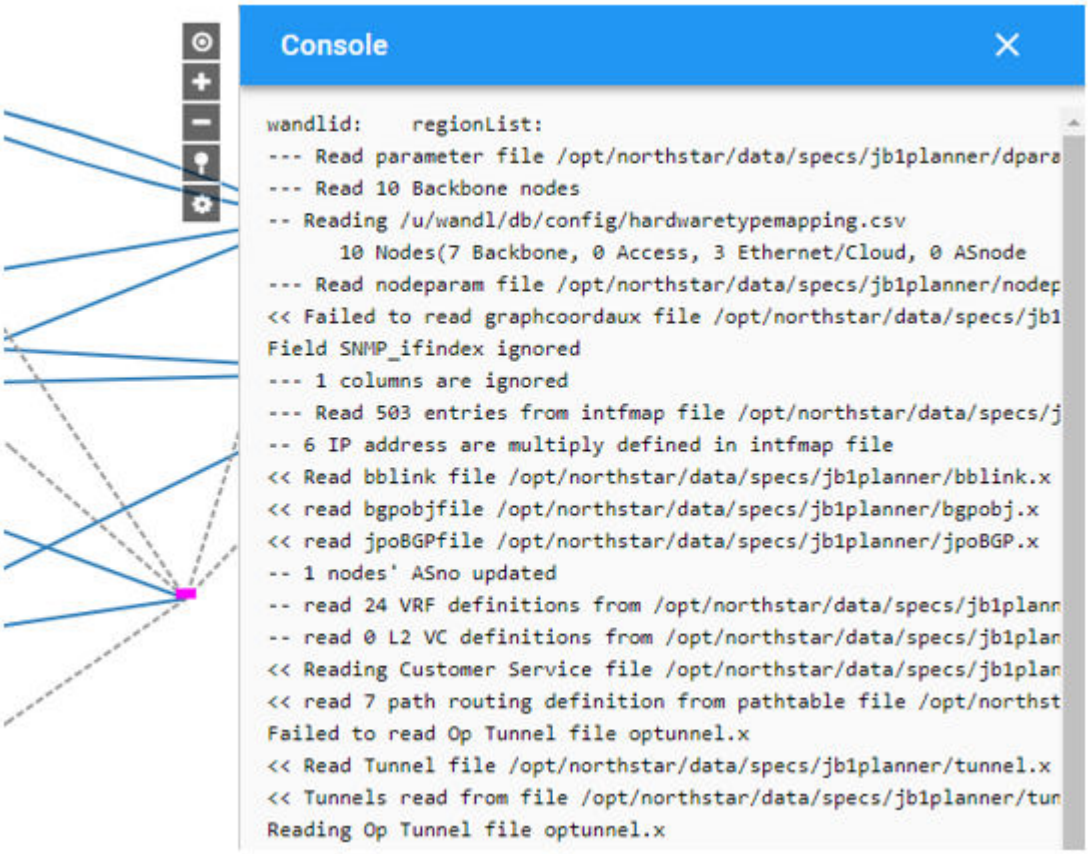
The Current Baseline column shows the name of the network each user has open.

> **NOTE**: At this time, there is no user management in the NorthStar Planner web UI. New users must be created in the NorthStar Controller. See User Management.

- **View Console**

  View Console is only available in Topology View. When you select this option, the console opens on the right side of the Planner window as shown in Figure 10 on page 16.

Figure 10: Console Window



The console displays information when loading a network, reading files, running failure simulation, generating reports, and various other functions. You can use the console to trace through information in detail.

- **Traffic Aggregation**

Selecting this option opens the Traffic Aggregation window in which you can specify parameters for extracting performance data from the analytics database for use in modeling, simulation, and trending. See "Web Planner Traffic Aggregation" on page 66 for more information.

- **About**

  Selecting this option displays the current version of NorthStar Planner, along with license information.

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CHAPTER 2

Managing Networks and Network Files

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Loading Network Files

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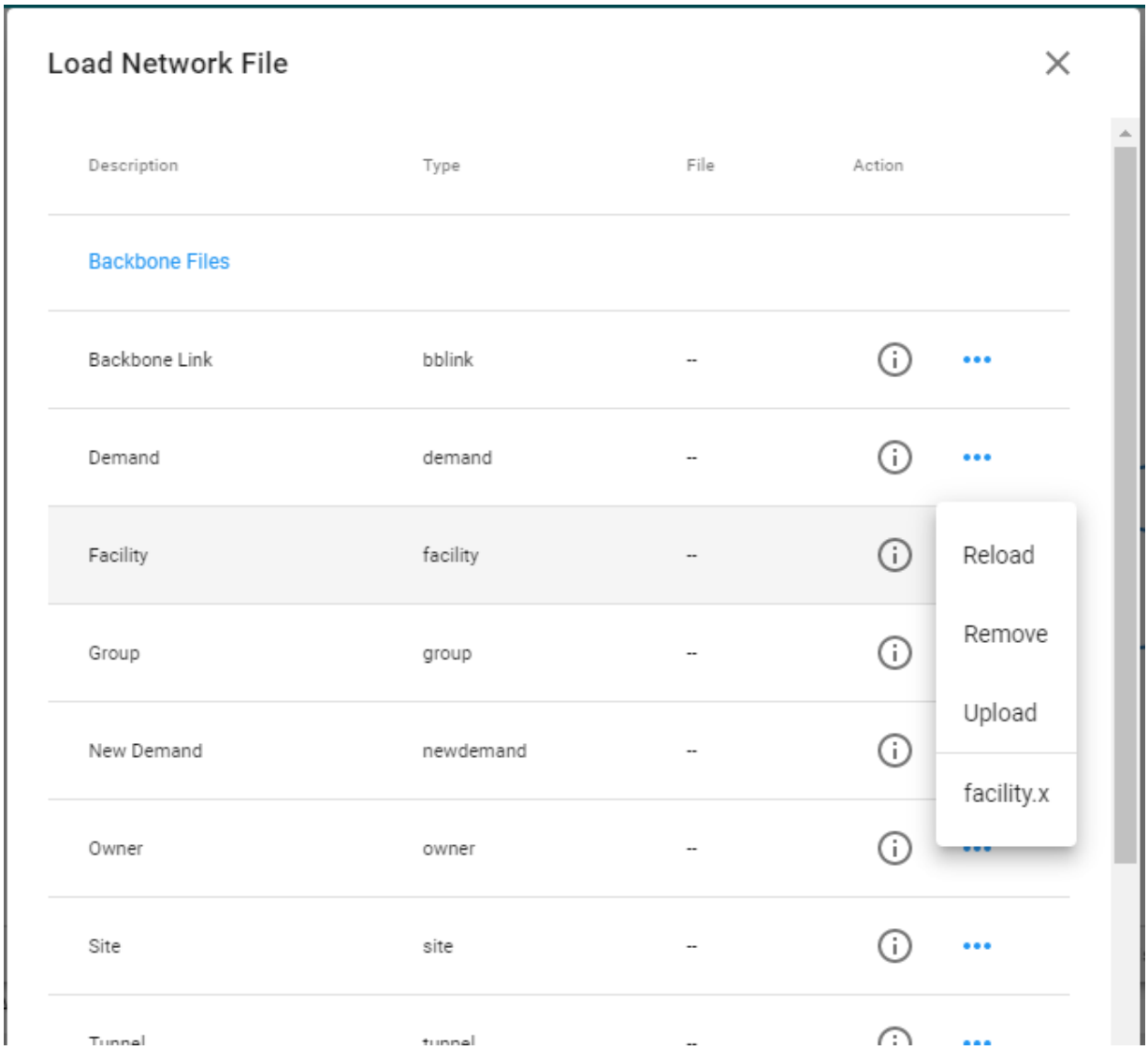
From the network icon (world) in the top menu bar of the Planner, you can select **Load** to update any of the network files that contribute to building the current network model. You can use this option to modify the current model since a direct Modify function is not yet available in the web UI. The workflow is to download a file, modify it using a text editor, save it, and then upload the saved version, refreshing the model. Over time, you could accumulate a variety of network files with specific parameters that are then available for you to load. These files are all stored on the NorthStar server.

Loading network files is described in the following sections:

Load Network File Window Overview

Figure 11 on page 20 shows the Load Network File window.

Figure 11: Load Network File Window



Key features of the window include:

- The first column (Description) shows a descriptive label for each network file type. The actual file type names are listed in the second column (Type).
- The third column (File) displays the specific file of each file type being used to build the current model.
- The Information icon ("i") is available for all file types. Click it for information about the file type's contents and definition.
- In the Action column, click the More Actions icon (•••) to display a drop-down menu from which you can choose one of the following options:

- **Reload**: Reloads the existing file and refreshes the model.
- **Remove**: Removes the current file so it is no longer used to build the model. The model is refreshed without the features that were contributed by that file.
- **Upload**: Uploads a different file of the same file type from the server and refreshes the model using the information provided by that file instead of the information provided by the original file.
- Filenames listed below the dividing line are the files stored on the server that are associated with the current model and are available to load. Any files that you previously saved and uploaded would be listed there.

Network File Types

The file types available for loading are described in Table 3 on page 21.

NOTE: Click the Information icon (“i”) beside each file type in the Load Network File window for additional information about the file type.

Table 3: Network File Types by Category

File	Description
Backbone Files	
bblink	Contains backbone link information for the network.
demand	Contains user traffic requirements.
facility	A facility is a set of nodes and links likely to fail together. The **facility** file defines the links and/or nodes associated with a facility.
group	Defines the grouping of nodes in the network topology.

Table 3: Network File Types by Category *(Continued)*

File	Description
newdemand	Allows you to specify an additional file containing user traffic requirements besides the demand file. The purpose is to reduce your effort in manually modifying the existing demand file, and/or having multiple versions. In addition, the **newdemand** file is often used in theoretical "What if..." situations in determining capacity planning for the current network state.
owner	Facilitates identifying the ownership of nodes and demands.
site	Specifies site information. The **site** file is used to define nodes in the same physical location such as a building or campus.
tunnel	Contains information about LSP tunnels.
Cost Files	
custrate	Assign tariffs for links used in the network to approximate the total cost of the network.
Traffic Files	
egress	Contains egress traffic of the network interfaces load. Egress traffic specifies traffic that is going out of the network interfaces. This data is used for calculating link utilization and load.
ingress	Contains ingress traffic of the network interfaces load. Ingress traffic specifies traffic that is going into the network interfaces. This data is used for calculating link utilization and load.
trafficload	Allows you to import measured bandwidth utilizations based on data collected from the network. Traffic loads for each PVC can be specified over the time intervals for which the data was collected.
t_trafficload	Similar to the trafficload file, but for LSP tunnels (layer 2 instead of layer 3).
Device-Specific Files	
tbit	Stores names for the tunnel attributes.

Table 3: Network File Types by Category *(Continued)*

File	Description
usertunneldef	Stores user tunnel definition information.

Modifying a Network Model

To modify a network model, use the following example procedure:

1. The File column of the Load Network File window displays a link to the specific file of each file type being used to build the current model. Click a link to open a window where you can save the file to the server, with a new name.

   NorthStar Planner file type extensions appear first in the file name. For example, “bblink” is a file type extension. In order to group network files correctly according to type, NorthStar Planner requires that the correct extension be used. If you don’t name your file using the correct extension when you save a file to the server, NorthStar Planner will add the extension for you. Be aware of that when you look for your files later. For example, if you save a bblink file as testing.1, NorthStar Planner will save it as bblink.testing.1.

2. Open the new file in a text editor and modify it to suit your purpose. Save the file.

3. In the Load Network File window, click the More Actions icon (•••) and select **Upload**. Navigate to the file you saved and select it for upload. The new file now appears in the File column.

4. In the Topology view of the model, the model now reflects the information in the newly uploaded network file.

5. Returning to the Load Network File window, click the More Actions icon for that same file type to see that both the original file and the new one you created are listed (below the dividing line), and are available for you to load into the model.

RELATED DOCUMENTATION

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Importing Archived Networks from NorthStar Controller

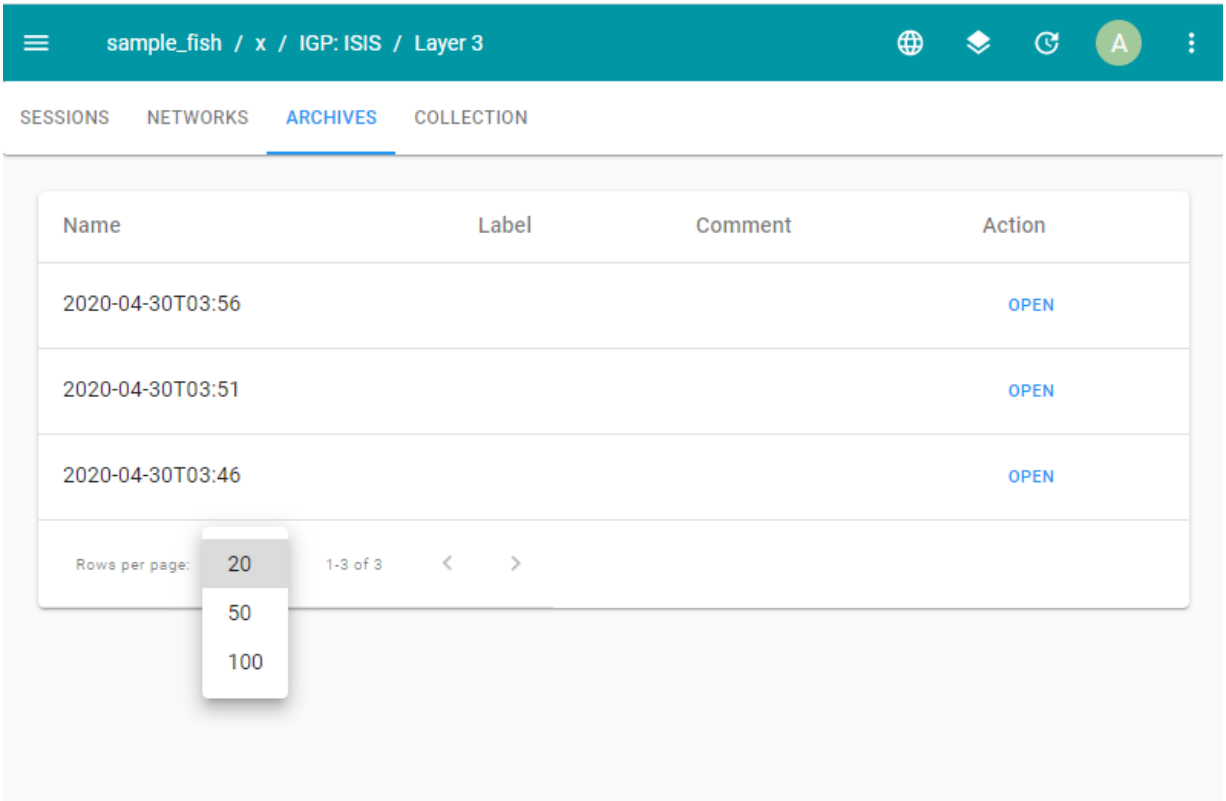
Archived networks are generated in the NorthStar Controller and saved, after which, they are available in the NorthStar Planner under the Archives tab in the Network Browser view.

Use the following procedure:

1. In the NorthStar Controller, ensure the device profiles are set up correctly. Test connectivity of all devices and troubleshoot as needed until all devices are reachable. See Device Profile and Connectivity Testing in the *NorthStar Controller User Guide*.
2. Create and run a device collection task to collect configuration data for the devices. See Scheduling Device Collection for Analytics in the *NorthStar Controller User Guide*.
3. Create and run a Network Archive task to archive the collected data. See Collection Tasks to Create Network Archives in the *NorthStar Controller User Guide*. **IMPORTANT**: Be sure to select the option to **Archive network data after processing**.

Archived networks created in this way are then available in the Network Browser, Archives Tab as shown in Figure 12 on page 25.

Figure 12: Network Browser Archives Tab

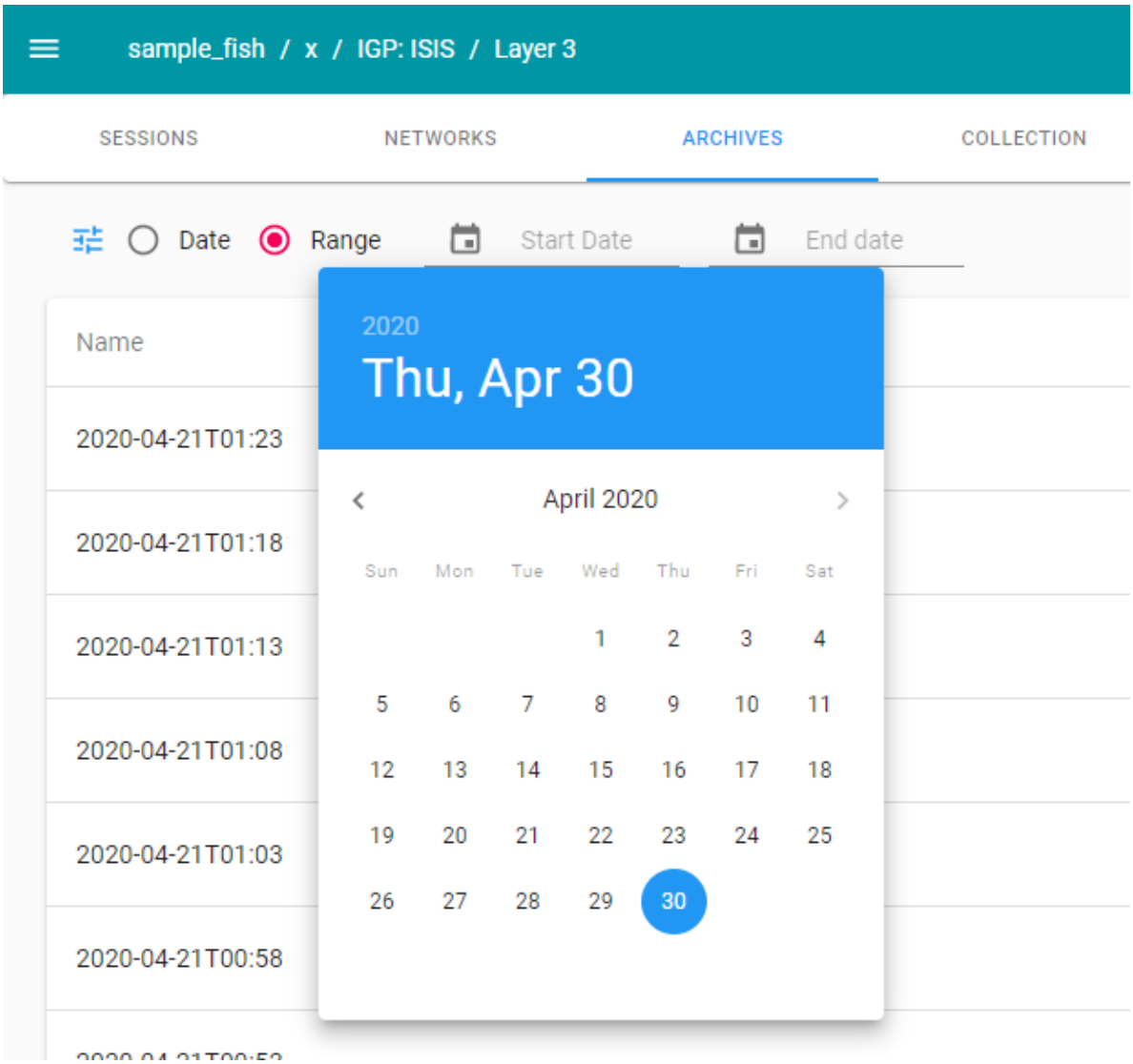


NOTE: The Name of the archived network is a timestamp of the creation time/date; it is not the same as the name you gave to the corresponding Network Archive task in the Task Scheduler. In this release, the Label and Comment fields are not used.

There are some features of the Archives tab that help with navigation if you have a large number of entries:

- At the bottom of the window, you can choose the number of rows to be displayed per page as 20, 50, or 100 as shown in Figure 12 on page 25.
- Also at the bottom of the window are right and left arrows that enable you to advance through the pages, and an indication of which page is currently displayed.
- When there are multiple pages of entries, a search filter icon appears in the upper left corner of the list of archives. Click the icon to open the filtering options shown in Figure 13 on page 26. You can choose an individual execution date or a range of dates and the display refreshes to include only the entries that fit that criteria. To clear the filter, click the search filter icon again.

Figure 13: Network Browser Archives Tab



When you open an archived network from the Network Browser, it opens in a temporary file that you cannot save. If you want to work with an archived network and then save it, you can select **Save Network As** from the Network icon (world) in the top menu bar of the Planner. Once saved, you can continue to access that network from the My Networks tab in the Network Browser.

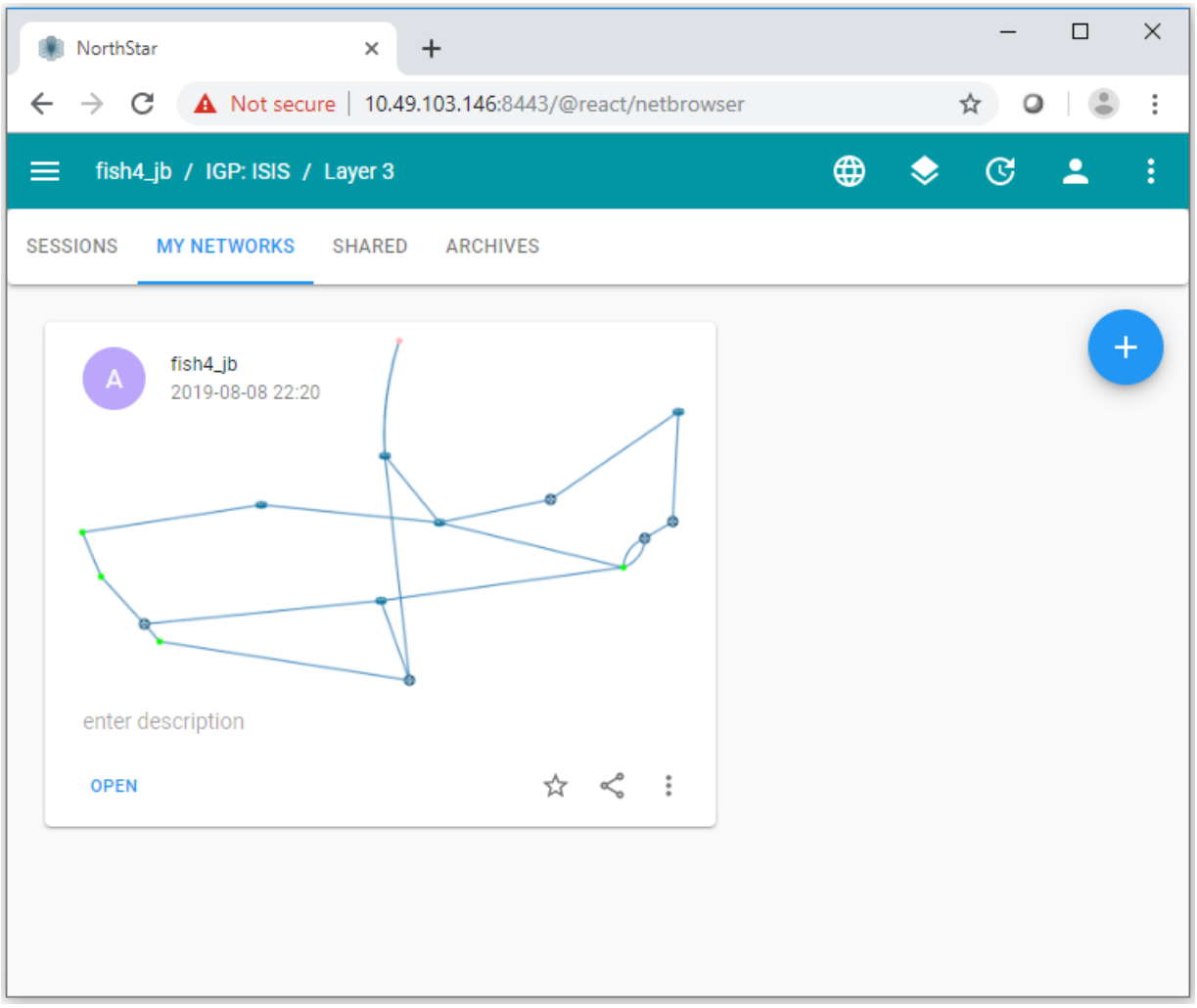
RELATED DOCUMENTATION

- Device Profile and Connectivity Testing
- Scheduling Device Collection for Analytics
- Collection Tasks to Create Network Archives

Import Network Wizard

The Import Network Wizard is an interactive tool that allows you to import data files that are converted into a NorthStar Planner network model. You can specify the import input directory and select other options for parsing a set of data files. Launch the wizard from the My Networks tab of the Network Browser by clicking the blue circle with the + sign on the right side of the window as shown in Figure 14 on page 27.

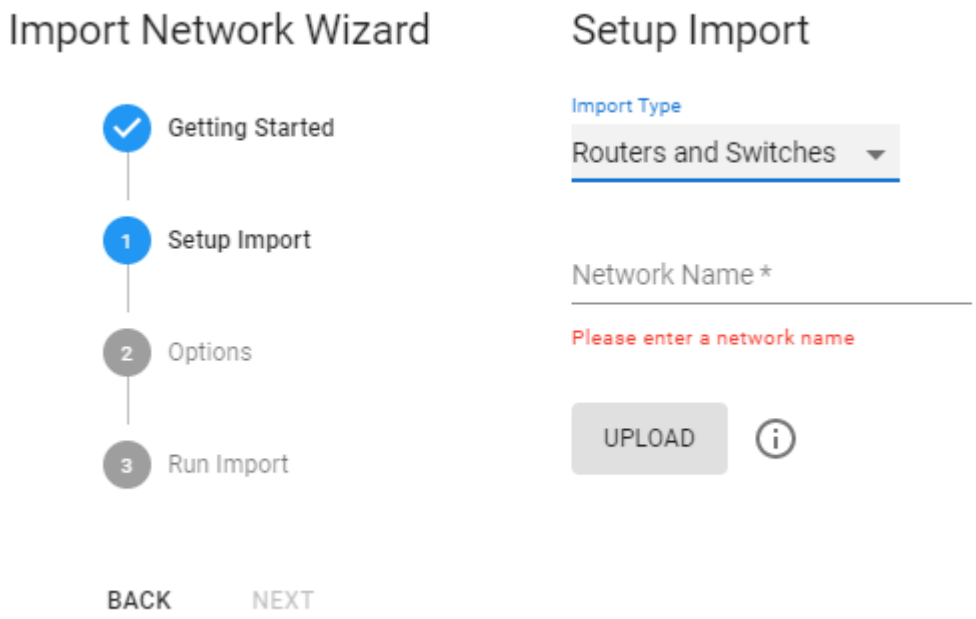
Figure 14: Launch the Import Network Wizard



Once you have launched the wizard, proceed as follows:

1. Click **Next** on the wizard landing page to display the Setup Import window shown in Figure 15 on page 28.

Figure 15: Setup Import Window



2. Use the Import Type drop-down menu to select one of the following import type options:

> **NOTE**: **Important**: Currently, only .tar and .gz files can be imported (.zip files are not supported), and the file cannot contain subdirectories.

- Routers and Switches
- OSPF/ISIS Database
- TED Database
- Spec Files

3. Enter a network name and click **Upload**. Options available for the import type you selected are displayed. If there are no options available, the options step is skipped.
4. Select options by clicking the corresponding check boxes. Click **Next** to complete the import. Once imported, the network is available in the My Networks tab of the Network Browser.

Importing Raw Network Data into NorthStar Planner

When you create a Device Collection task in NorthStar Controller, you have the option to add the raw network data into the database where it can be accessed by the NorthStar Planner. For a recurring task, all instances of the task are saved in the database, even though only the latest is available to the NorthStar Operator. Any instance can be used to create a network in the NorthStar Planner. Operator and Planner are independent of one another with regard to deleting tasks or instances of tasks.

See Scheduling Device Collection for Analytics in the *NorthStar Controller User Guide* for information on creating a device collection task with the necessary option (Add to Database) selected. Note that the default for the option is No, so you must deliberately enable it.

To create a network in the NorthStar Planner from raw data imported from a NorthStar Controller device collection task, start by clicking the Collection tab in the Network Browser. The Collection tab displays all collection instances that are available. From this window, you can select an instance to import into the NorthStar Planner as a network, using the Import Network Wizard (see "Import Network Wizard" on page 27).

Figure 16 on page 30 shows an example of the Collection tab display. Table 4 on page 30 describes the features available in this view.

Figure 16: Collection Tab Example in the Network Browser

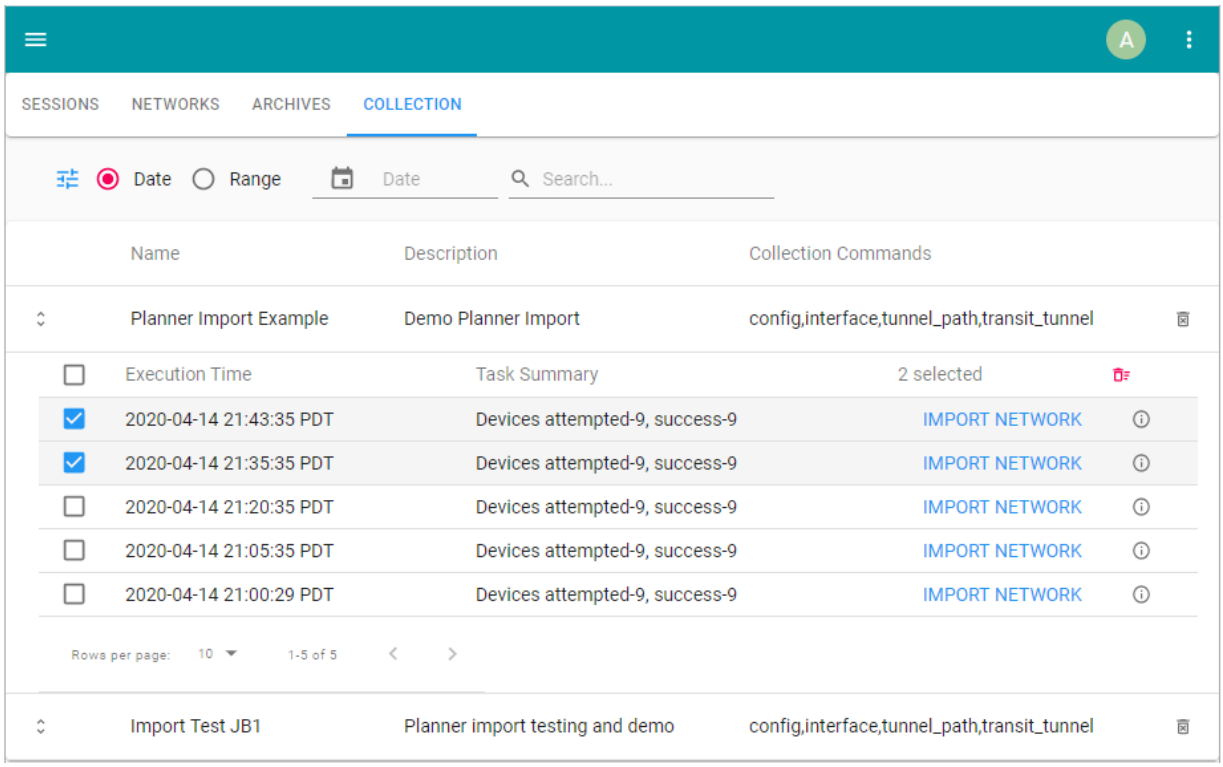


Table 4: Collection Tab Features

Collection Tab Feature	Description
	Click to toggle between showing or hiding the search functions including Date/Range fields and the field for entering the search string.
	Select the radio button for Date or Range. The buttons are mutually exclusive. Appropriate date or range fields are displayed accordingly.
	Click the Up or Down arrows to expand or collapse the list of recurring collection instances for that task. Only one task can be expanded at a time.
	Click the task-level Trash icon to delete the entire task and all of its instances.

Table 4: Collection Tab Features *(Continued)*

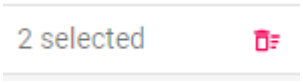
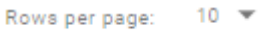
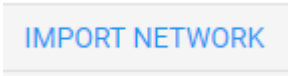
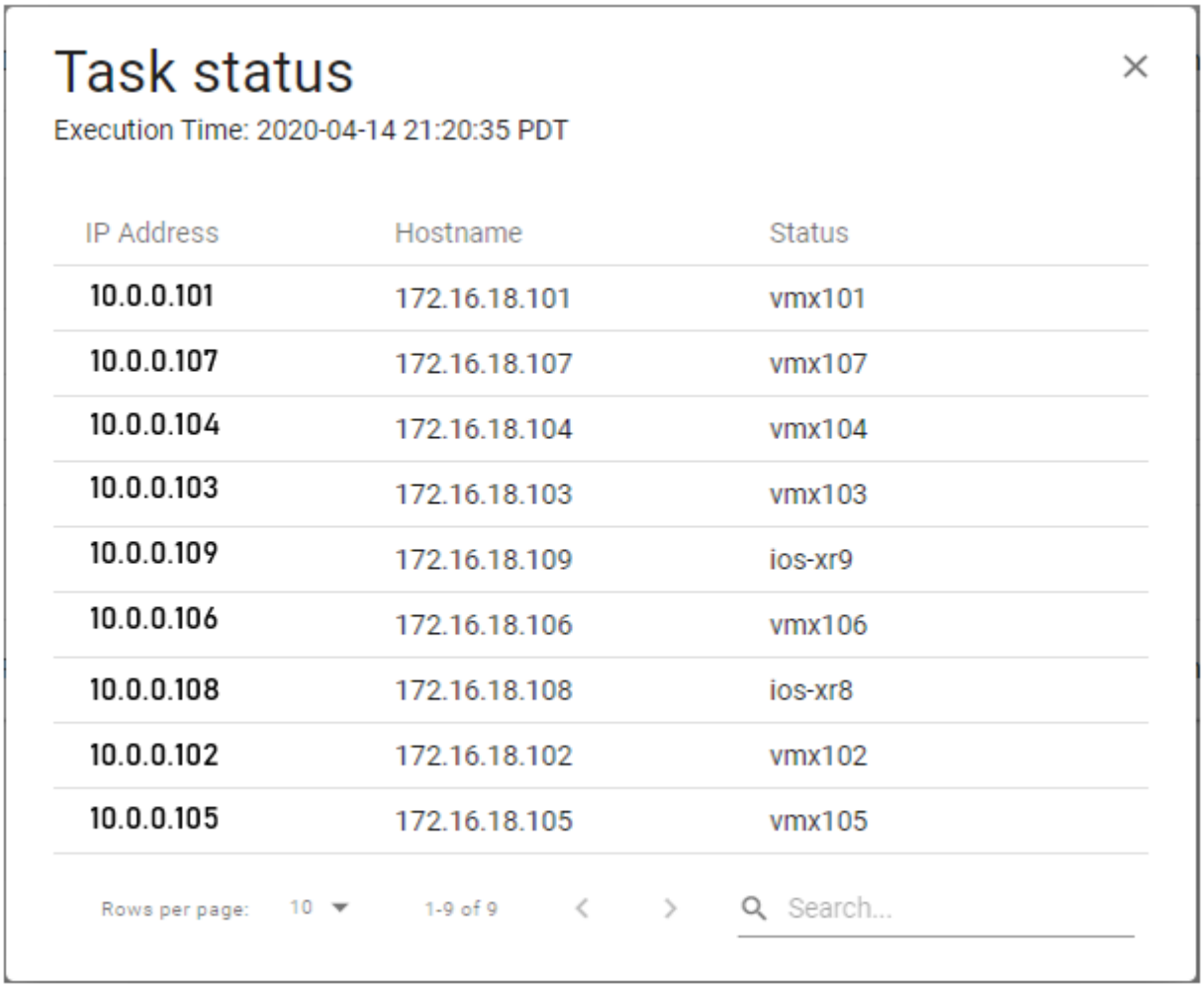
Collection Tab Feature	Description
	Select one or more collection task instances using the check boxes at the far left. Click the instance-level Trash icon to delete all instances that you have selected.
	Click the Information icon to see details associated with the collection task instance. See Figure 17 on page 32 for an example.
	Use the drop-down menu to select 10, 25, or 50 rows per page.
	Use the Left/Right arrows to advance through the rows of data.
	Click Import Network to launch the Import Network Wizard for the collection instance. The Collection Task Data field is pre-populated for you.

Figure 17 on page 32 shows an example of the information displayed when you click on the Information icon.

Figure 17: Information Icon Display Example



Once you use the Import Network Wizard to import the data, the new network is available in the Networks tab of the Networks Browser.

RELATED DOCUMENTATION

- Scheduling Device Collection for Analytics
- Import Network Wizard | 27

CHAPTER 3

Topology View

Navigation Functions in the Topology View | 34

Interactive Map Features | 35

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Network Information Table Overview | 53

Sorting and Filtering Options in the Network Information Table | 55

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Web Planner Traffic Aggregation | 66

Navigation Functions in the Topology View

Many familiar navigation functions are supported in the Topology window, and are summarized in Table 5 on page 34.

Table 5: Supported Topology Window Navigation Functions

Function	Method
Drag and drop	Left-click an element, hold while repositioning the cursor, then release.
Select an element	Click a link or node to select it.
Select multiple elements	1. Hold down the Shift key and left mouse button while dragging the mouse to create a rectangular selection box. All elements within the box are selected. 2. Hold down the Shift key and click multiple nodes, one at a time. One application for selecting multiple elements is creating node groups.
Zoom to fit 	Click the circular button that looks like a bull's eye in the upper right corner of the window to size and center the topology map to fit the window.
Zoom in and out 	1. Use the mouse scroll wheel. 2. Click the +/- buttons in the upper right corner of the Planner window.
Right-click to access functions	Right-click a blank part of the topology map or on a map element to access context-relevant functions.
Hover	You can hover over some network elements in the topology map to display the element name or ID.
Resize panes	You can click and drag many of the pane margins to resize the panes in a display.

Interactive Map Features

IN THIS SECTION

- Right-Click Functions | 35
- Auto Group | 40
- Topology Menu Bar | 43
- Show Paths | 44
- Topology Settings Window | 44

The topology map is interactive, meaning that you can use features within the map itself to customize it. The map uses a geographic coordinate reference system. Some features enabled by that system include:

- Constrained zooming: NorthStar Controller performs coordinate checking so the view is constrained to the coordinates of the earth.
- World wrapping/map wrapping: Scrolling the map in one direction is like spinning a globe. This enables representation of links across an ocean, for example.

The following sections describe additional map features and functionality:

Right-Click Functions

Right-click a node, selected nodes, or node group on the topology map to display node-specific filtering options as shown in Figure 18 on page 36 and described in Table 6 on page 36.

Figure 18: Right-Click Options for Nodes or Groups

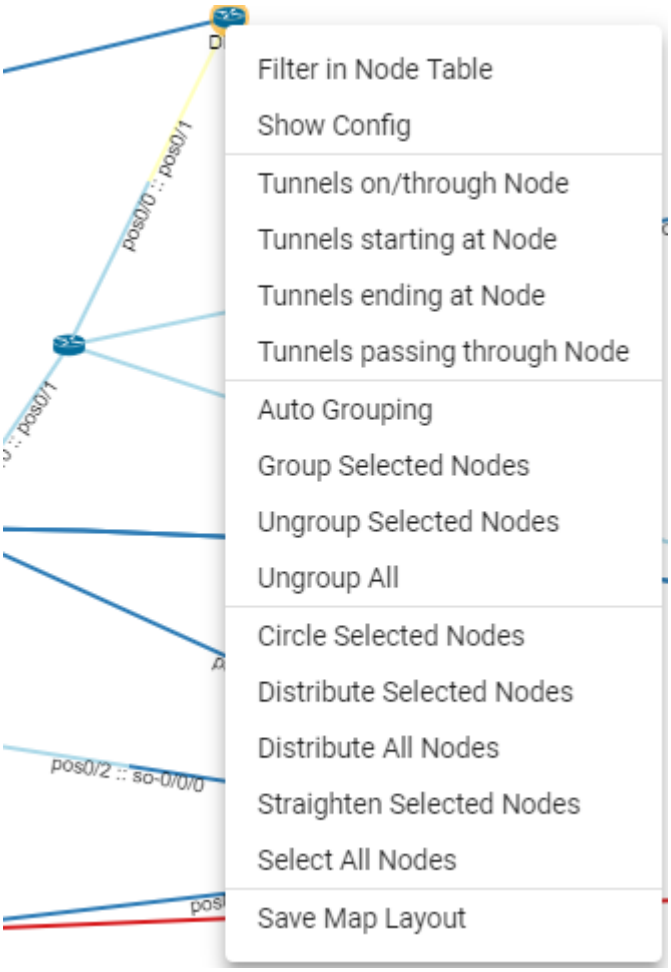


Table 6: Right-Click Options for Nodes or Groups

Option	Function
Filter in Node Table	Filters the nodes displayed in the network information table to display only the selected node(s) or node group(s). To clear the filter in the network information table, click **Clear Filter** in the lower right corner.
Tunnels on/through Node	Filters the tunnels displayed in the network information table to include only those that meet the On or Through Node criteria.

Table 6: Right-Click Options for Nodes or Groups *(Continued)*

Option	Function
Tunnels starting at Node	Filters the tunnels displayed in the network information table to include only those that meet the Starting at Node criteria.
Tunnels ending at Node	Filters the tunnels displayed in the network information table to include only those that meet the Ending at Node criteria.
Auto Grouping	Opens the Auto Group tool window on the right side of the topology view. The Auto Group tool allows you to establish rules for automatic node-grouping. There is more information about this tool later in this topic.
Group Selected Nodes	Prompts you to give the group of selected nodes a name, after which the group can be expanded or collapsed on the topology map.
Ungroup Selected Nodes	Ungroups the nodes in the selected group.
Ungroup All	Ungroups the nodes in all groups.
Circle Selected Nodes	Arranges the selected nodes in a roughly circular pattern with the nodes and links separated as much as possible.
Distribute Selected Nodes	Forces the selected elements away from each other and minimizes overlap.
Straighten Selected Nodes	Aligns the selected nodes in a horizontal pattern.
Select All Nodes	Selects all nodes on the topology map. This is a shortcut to using shift-left-click to create a selection box around all nodes or individually shift-clicking on all nodes.

Table 6: Right-Click Options for Nodes or Groups *(Continued)*

Option	Function
Save Map Layout	Saves the current map layout (mapview.json) in the server spec directory, which is then displayed the next time you open the same network. You will not see any confirmation that the save was successful.

Right-click a link on the topology map to display link-specific filtering options as shown in Figure 19 on page 38 and described in Table 7 on page 38.

Figure 19: Right-Click Options for Links

Table 7: Right-Click Options for Links

Option	Function
Filter in Link Table	Filters the links or tunnels displayed in the network information table to display only the selected link.
Tunnels on/through Link	Filters the links or tunnels displayed in the network information table to include only those that meet the On or Through Link criteria.

NOTE: To clear the tunnel filter so that all links or tunnels are again displayed, click **Clear Filter** in the lower right corner of the network information table.

Right-click blank space in the topology map pane to access the whole-map functions shown in Figure 20 on page 39 and described in Table 8 on page 39.

Figure 20: Right-Click Options for the Topology Map as a Whole

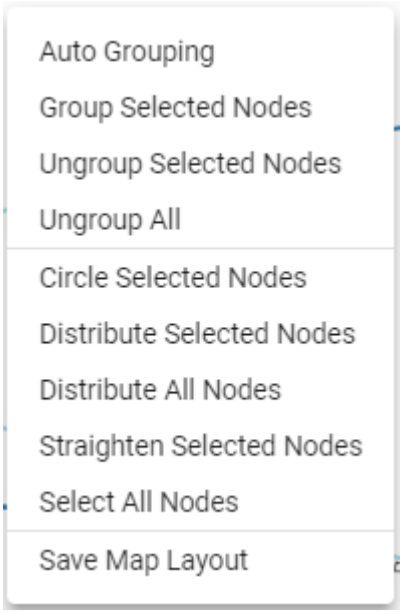


Table 8: Right-Click Options for the Topology Map as a Whole

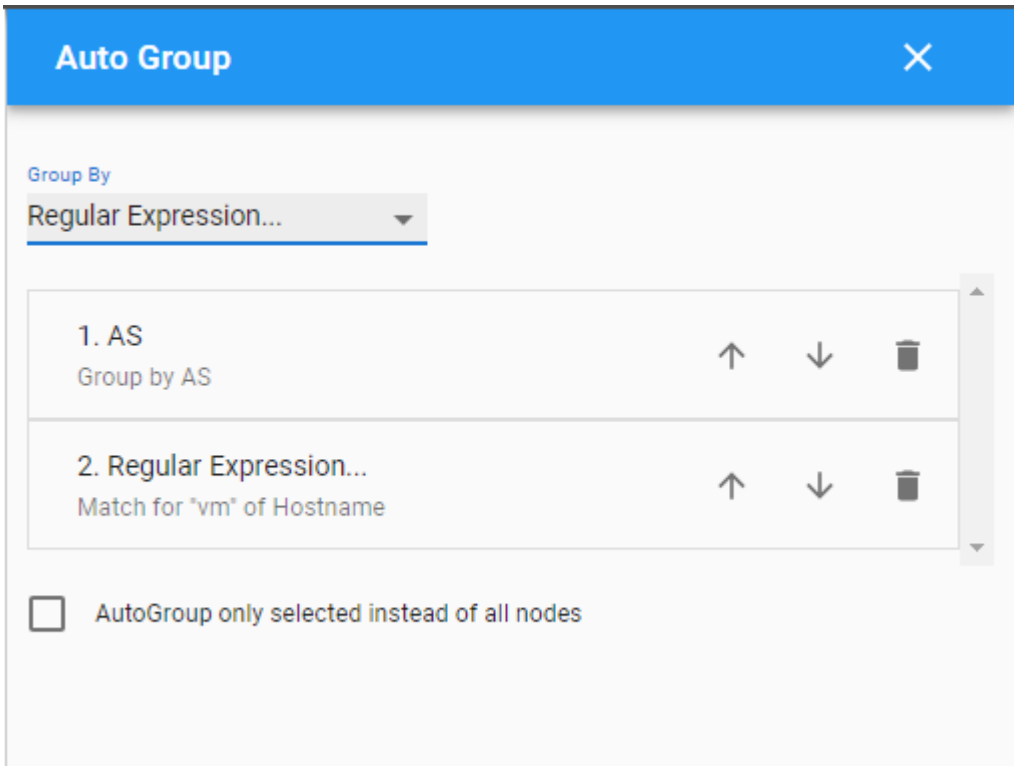
Option	Function
Auto Grouping	Opens the Auto Group tool window on the right side of the topology view. The Auto Group tool allows you to establish rules for automatic node-grouping. There is more information about this tool later in this topic.
Group Selected Nodes	Prompts you to give the group of selected nodes a name, after which the group can be expanded or collapsed on the topology map.
Ungroup Selected Nodes	Ungroups the nodes in the selected group.
Ungroup All	Ungroups the nodes in all groups.
Circle Selected Nodes	Arranges the selected nodes in a roughly circular pattern with the nodes and links separated as much as possible.

Distribute Selected Nodes	Forces the selected elements away from each other and minimizes overlap.
Straighten Selected Nodes	Aligns the selected nodes in a horizontal pattern.
Select All Nodes	Selects all nodes on the topology map. This is a shortcut to using shift-left-click to create a selection box around all nodes or individually shift-clicking on all nodes.
Save Map Layout	Saves the current map layout (mapview.json) in the server spec directory, which is then displayed the next time you open the same network. You will not see any confirmation that the save was successful.

Auto Group

Launch the Auto Group tool by right-clicking a node in the topology map and selecting **Auto Grouping**. Auto Group allows you to use multiple rules in sequence to group nodes using rule set builder functionality. This is an alternative to creating groups manually. For example, you could set up rules that first group by AS number and then by hostnames that begin with **vm**.Figure 21 on page 41 shows the Auto Group window with that example set up.

Figure 21: Auto Group Window Example

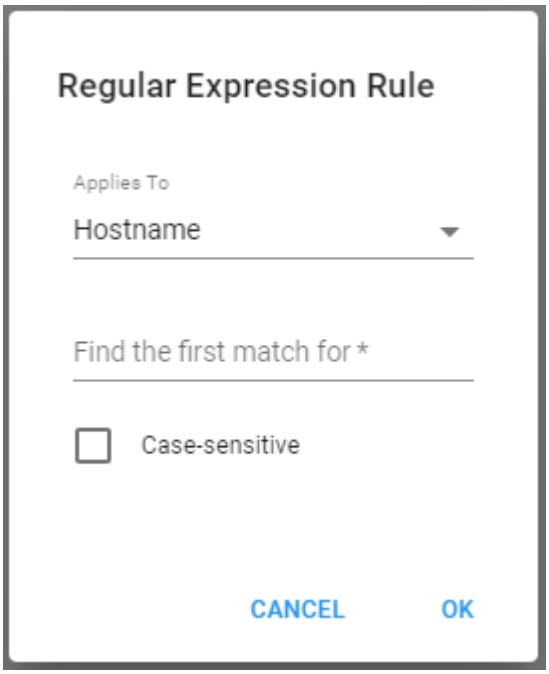


To begin, first click the Group By down arrow and select your first rule. Click the Group By down arrow again to select your second rule, and so on until you have all the rules you need.

NOTE: You can set up a maximum of six rules.

When you select Regular Expression as the rule type, the Regular Expression Rule window is displayed as shown in Figure 22 on page 42.

Figure 22: Regular Expression Rule Window



Use the Applies To drop down menu to select Hostname, Name, IP Address, or Type. Enter the text in the **Find the first match for*** field. Standard regular expression syntax is supported, so for example, you could select **Name** and then type **..** and the tool would group nodes whose names start with the same first two digits. Click the check box if you want the match to be case sensitive. Click **OK** to add the rule to your list.

Table 9 on page 42 shows some examples of regular expressions.

Table 9: Regular Expression Examples

Router Names	Regular Expression	Resulting Groups
GERABC1234	...	groups to GER
GERABC1234	^.(..)	groups to ER
GERABC1234	^.(...)	groups to ERA
GERABC1234	^.(....)	groups to ERAB

Table 9: Regular Expression Examples *(Continued)*

Router Names	Regular Expression	Resulting Groups
GERABC1234	...(...)	groups to ABC
GERABC1234	^.{3}(...)	groups to ABC
P1_ATL, P2_ATL, P3_ATL, P1_NYC, P2_NYC, P3_NYC, P1_CHI, P2_CHI, P3_CHI	.*_([A-Z]*) or .._(...)	ATL, NYC, and CHI , each containing 3 routers

In the list of rules you selected/created, use the up and down arrows beside each of the rules to move them up or down in the list. The rules are executed in order, starting with number 1, so order can be significant.

The default is for the auto grouping to be executed for all nodes in the network, but you can click the check box for **AutoGroup only selected instead of all nodes**, if that is your preference. To delete a rule, click the corresponding **Delete** button (trash can icon).

Click **Submit** at the bottom of the Auto Group window to perform the grouping. Check the results in the topology map and in the Node/Groups left pane display.

Topology Menu Bar

On the right side of the topology window is a menu bar offering various topology settings, as shown in Figure 23 on page 43.

Figure 23: Topology Settings Menu Bar

From the menu bar, you can:

- Center the topology in the window (target icon).
- Enlarge the topology in the window (plus symbol).
- Reduce the size of the topology in the window (minus symbol).
- Show paths from a source node to a destination node (map pin icon).
- Access the topology settings window (gear icon).

Show Paths

When you click the show paths icon (map pin), a message appears in the upper left corner of the topology map window, prompting you to select a source node. When you click your desired source node on the map, you are prompted to select a destination node. When you click your desired destination node, the Paths window opens on the right side of the topology display, showing you the current route between the selected nodes and giving you the option to hide unrelated nodes on the map.

For this release, only the current route is displayed. In a future release, configured secondary routes will also be selectable using the Paths drop-down menu.

You can also reach the Paths window from the network information table by right-clicking a tunnel in the Tunnel tab or a demand in the Demands tab.

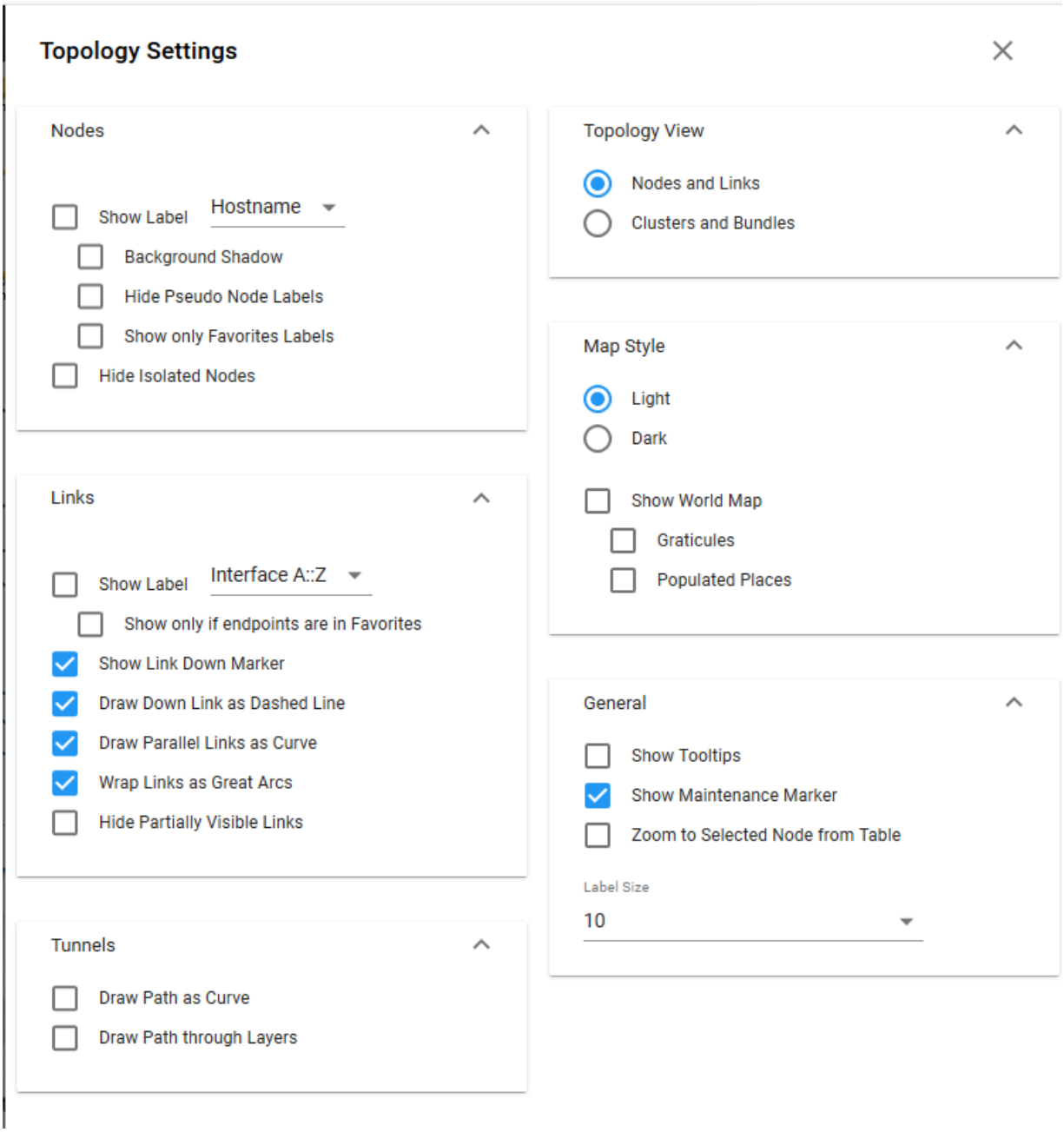
Topology Settings Window

The Topology Settings window contains many topology display settings, all in one place. Figure 24 on page 45 shows the Topology Settings window.

You can select as many settings as you like by clicking the associated check boxes. When you opt to Show Label for nodes or links, you can select only one label from the corresponding drop-down menu.

NOTE: For readability reasons, NorthStar does not display node or link labels over a certain quantity, even if the Topology Settings call for labels to be displayed.

Figure 24: Topology Settings Window



NOTE: Drawing DOWN links as a solid, rather than dashed, line can improve performance when redrawing the topology.

A few of these settings might not be self-explanatory:

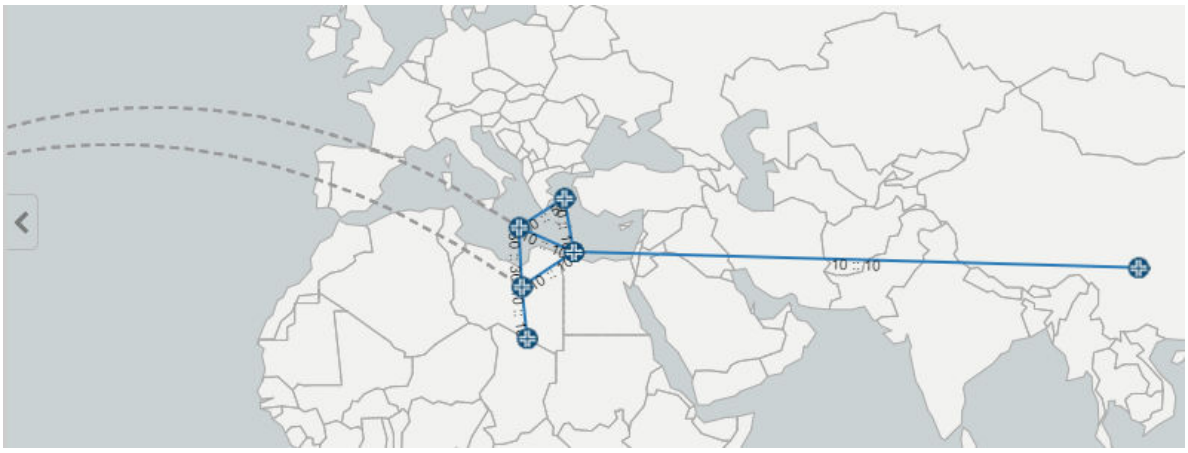
- Hide Partially Visible Links

Removes from the display any links for which both end nodes are not within the field of view. This is useful for focusing on a subset of a large network.

- Wrap Links as Great Arcs

  Distinguishes links that would have to wrap around the world map. An example is shown in Figure 25 on page 46.

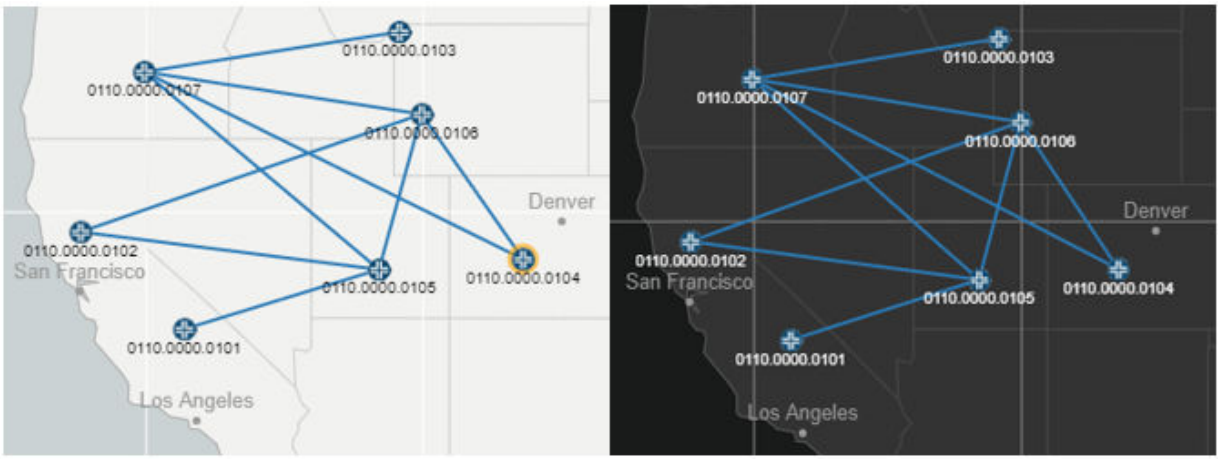
Figure 25: Wrap Links as Great Arcs Example



Map Style section

The Light and Dark options available in this section are mutually exclusive; select one radio button or the other.Figure 26 on page 46 shows an example of the light and dark map styles.

Figure 26: Light and Dark Map Styles



If you select to Show World Map, you can opt to display graticules (a grid of lines parallel to meridians of longitude and parallels of latitude) and labeling of major populated places (both shown in Figure 26 on page 46).

> **NOTE**: Even if you deselect Show World Map, the topology still behaves according to geographical coordinates in terms of displaying the topology within the field of view.

General section

Select the check boxes for as many of the options in this group as you like:

- Show Maintenance Marker: Displays a red M over any link currently part of a maintenance event.
- Zoom to Selected Node from Table: With this option enabled, when you click on a node entry in the network information table (Node tab), the topology automatically centers the view on that selected node.

Use the Label Size drop-down menu to select a font size for node and link labels.

Topology View Left Pane Options

IN THIS SECTION

- Protocols | **49**
- Types | **49**
- AS | **50**
- ISIS Areas | **51**
- OSPF Areas | **52**
- Node/Groups | **52**

The left pane drop-down menu offers several ways to filter the data that is displayed in the NorthStar Planner topology map pane. When you first open a network and display the topology, the initial view shows Protocols. Table 10 on page 48 summarizes the left pane drop-down menu choices.

Table 10: NorthStar Planner Topology View Left Pane Options

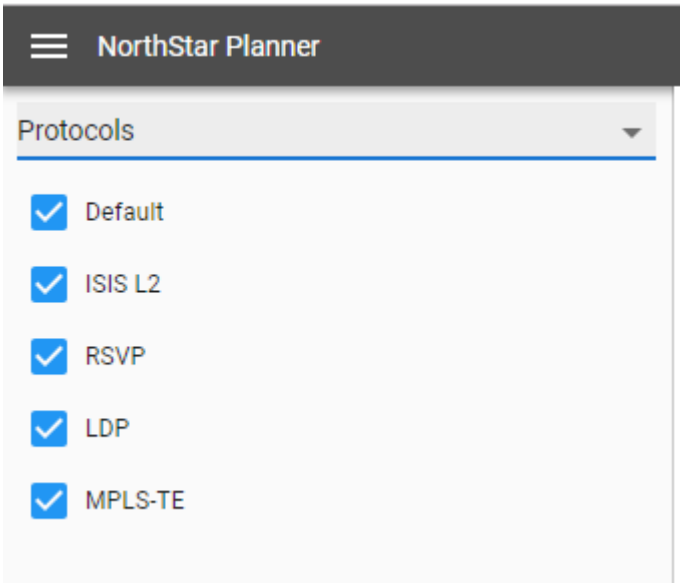
Option	Description
Protocols	Lists protocols you can opt to display or hide on the topology map. Nodes configured with selected protocols are displayed. Selecting **Default** is the same as selecting all the protocols in the network. Click the check boxes corresponding to the protocols you want to select or deselect.
Types	Lists node types you can opt to display or hide on the topology map. Click the check boxes corresponding to the types you want to select or deselect.
AS	Selects autonomous systems (ASs) you can opt to display or hide on the topology map. Click the check boxes corresponding to the ASs you want to select or deselect.
ISIS Areas	Selects ISIS areas you can opt to display or hide on the topology map. Click the check boxes corresponding to the ISIS areas you want to select or deselect.
OSPF Areas	Selects OSPF areas you can opt to display or hide on the topology map. Click the check boxes corresponding to the OSPF areas you want to select or deselect.
Node/Groups	Displays user-created groups with or without listing the member nodes. Expanded groups are represented on the topology map by individual node icons. Collapsed groups are represented on the topology map by group icons, and the individual member nodes are not displayed. All nodes start out as ungrouped.

The following sections describe the left pane display options:

Protocols

The Protocols list includes all protocols present in the current topology. Figure 27 on page 49 shows an example.

Figure 27: Protocols List



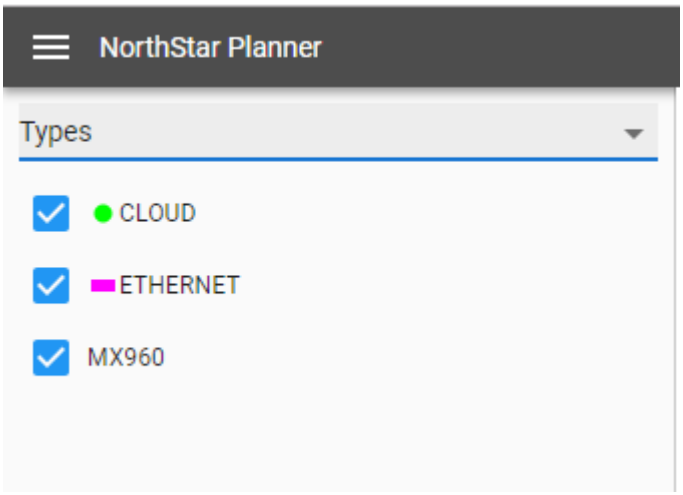
Protocols can be selected or deselected by checking or clearing the corresponding check boxes. Only network elements that support selected protocols are displayed in the topology map.

NOTE: Select **Default** to display all protocols on the topology map. If you do not want elements supporting all protocols to be displayed on the topology map, be sure to clear the Default check box.

Types

The Types list in the left pane of the Topology view includes categories of nodes and links found in the network. Figure 28 on page 50 shows a sample Types list.

Figure 28: Left Pane Types List



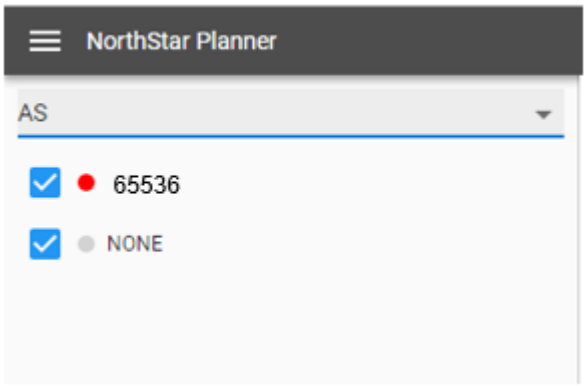
Different types are associated with different icons, which are reflected in the topology map. You can select or deselect a type by checking or clearing the corresponding check box. Only selected options are displayed in the topology map.

NOTE: All nodes of one type use the same icon.

AS

The autonomous systems (AS) list assigns a color, for purposes of representation on the topology map, for each AS number configured in the network. As noted in Figure 29 on page 51, routers configured with AS 65536 would appear on the topology map as red dots. NONE shows the color assigned to routers with no AS configured.

Figure 29: AS List

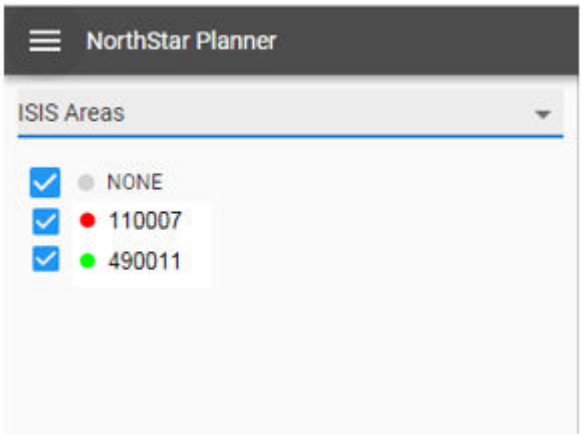


Select or deselect AS numbers by checking or clearing the corresponding check boxes. Only selected AS numbers are displayed in the topology map.

ISIS Areas

The ISIS Areas list assigns a color, for purposes of representation on the topology map, for each IS-IS area identifier configured in the network. The area identifier is the first three bytes of the ISO network entity title (NET) address. As noted in Figure 30 on page 51, routers whose NET addresses include area identifier 11.0007 appear on the topology map as red dots. Those with area identifier 49.0011 appear as green dots. NONE shows the color assigned to routers with no NET address configured.

Figure 30: ISIS Areas List



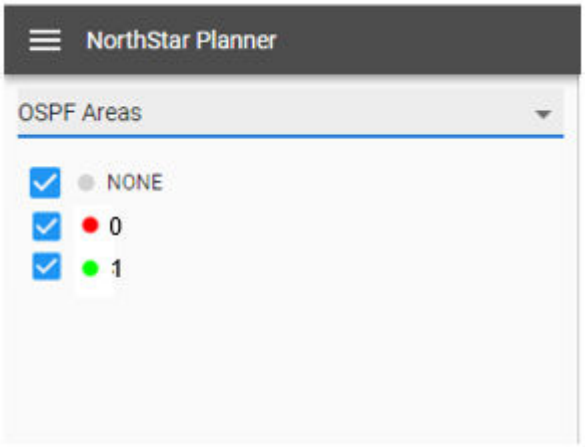
Select or deselect ISIS area identifiers by checking or clearing the corresponding check boxes. Only selected area identifiers are displayed in the topology map.

OSPF Areas

The OSPF Areas list assigns a color, for purposes of representation on the topology map, for each OSPF area configured in the network. NONE shows the color assigned to routers with no OSPF area configured.

As noted in Figure 31 on page 52, routers with OSPF area 0 configured appear on the topology map as red dots. Those with OSPF area 1 appear as green dots. NONE shows the color assigned to routers with no OSPF area configured.

Figure 31: OSPF Areas List



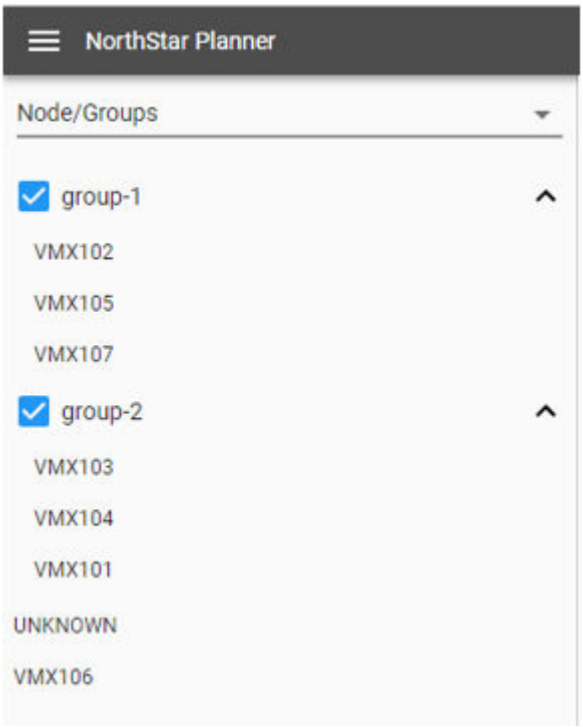
Select or deselect OSPF areas by checking or clearing the corresponding check boxes. Only selected areas are displayed in the topology map.

Node/Groups

You can create groups of nodes by selecting nodes and using the right-click topology map functions. Nodes can also be auto-grouped using criteria that you provide. Once you have groups in your topology, the Node/Groups list in the left pane of the Topology view shows all your node groups, and lists all nodes not included in any group.

When you expand a group listing using the down arrow next to the group name, all the member nodes are listed. When you collapse a group listing using the up arrow next to the group name, only the group name appears in the list. In Figure 32 on page 53, group-1 and group-2 are expanded. The nodes listed below group-2 are ungrouped.

Figure 32: Example Node/Groups List

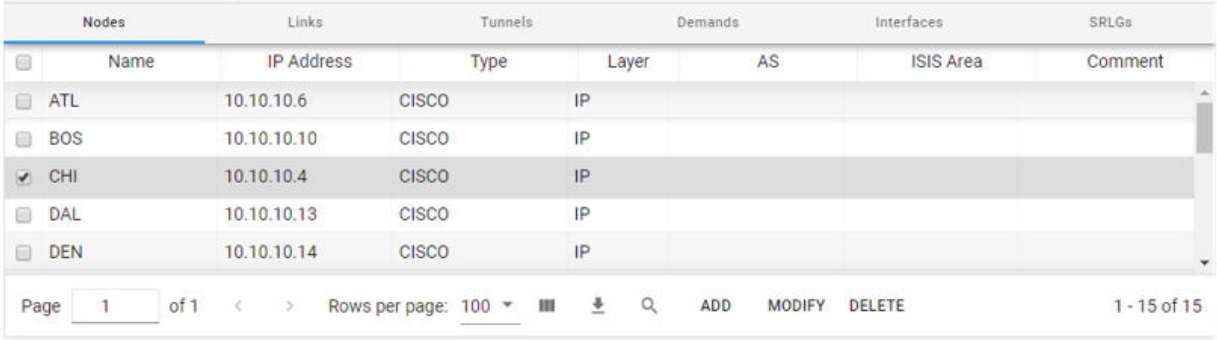


The topology map reflects the expansion and collapse of the groups in the groups list. For an expanded group, all individual nodes are displayed in the topology map, without indication of which group they belong to. For a collapsed group, the individual node icons are collectively represented by a group icon. Hover over or click on the group icon in the map to display the group name.

Network Information Table Overview

Network information is displayed in the pane at the bottom of the Topology view, below the topology map. An example of the table is shown in Figure 33 on page 54.

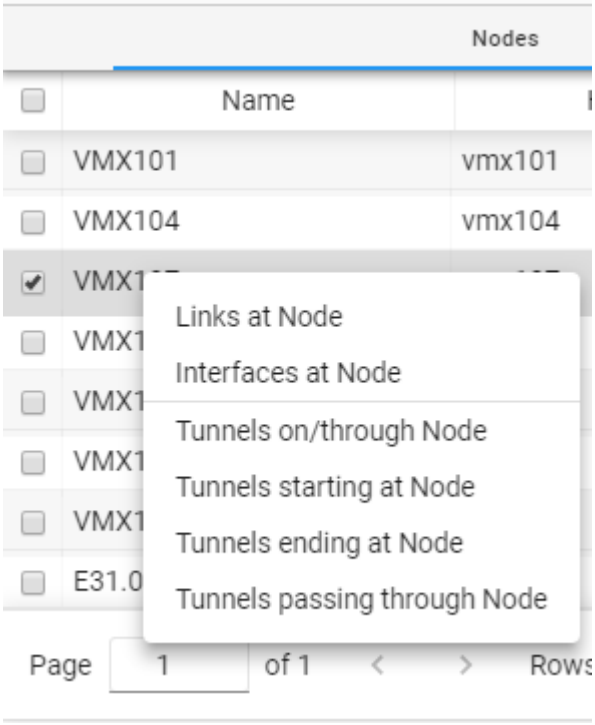
Figure 33: Network Information Table



Tabs appear across the top of the network information table. The columns of information change according to the tab you select (Nodes, Links, Tunnels, Demands, Interfaces, SRLGs). Within the tables, each row represents an element. When you select one or more elements in the network information table, the corresponding elements are highlighted in the topology map. You can filter the elements (rows) that are included in the table using the right-click functions on the topology map or in the table itself.

For example, if you right-click a node in the Nodes tab of the table, you have the options shown in Figure 34 on page 54.

Figure 34: Right-Click Options Example



See "Sorting and Filtering Options in the Network Information Table" on page 55 for details on the filtering options available from the network information table.

The options available in the tool bar across the bottom of the network information table are described in "Network Information Table Bottom Tool Bar" on page 62.

RELATED DOCUMENTATION

Sorting and Filtering Options in the Network Information Table | 55

Network Information Table Bottom Tool Bar | 62

Sorting and Filtering Options in the Network Information Table

IN THIS SECTION

- Sorting from Column Headings | 55
- Filtering from Table Rows | 56
- Filtering Using the Search Function | 59
- Using the Show Path Tool from the Tunnels or Demands Tab | 60

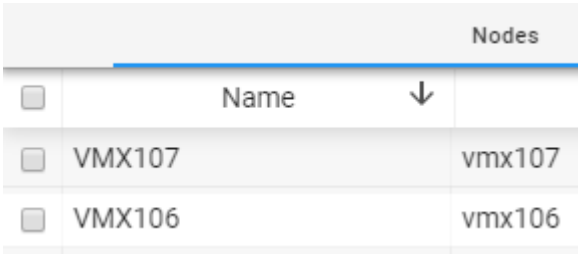
This topic describes the sorting and filtering options that are available in the network information table at the bottom of the topology view.

Sorting from Column Headings

You have the option to sort the display of network elements in the network information table by any column heading. Click in the column heading to sort ascending and click again to sort descending. The up or down arrow in the column heading tells you which sort order is displayed. Figure 35 on page 56 shows an example of the arrow.

NOTE: You only see the up or down arrow when you click in the column heading.

Figure 35: Sort Arrow in Table Column Heading



Filtering from Table Rows

Right-click on a table row under any of the table tabs (Nodes, Links, Tunnels, Interfaces) to see the filtering options that are available from that network element. For example, if you right-click a node in the Nodes tab of the table, you have the options shown in Figure 36 on page 57.

Figure 36: Right-Click Filtering Options Example

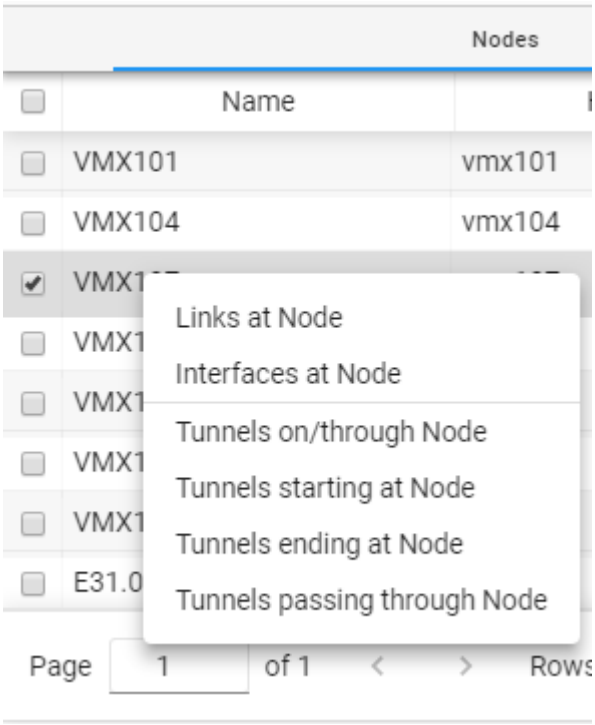


Table 11 on page 57, Table 12 on page 58, and Table 13 on page 58 describe the options available when right-clicking an element in the Nodes, Links, and Interfaces tabs. Right-clicking a tunnel in the Tunnels tab or a demand in the Demands tab launches the Show Path tool, which is addressed in a later section.

NOTE: To clear a filter so that all network elements are again displayed, click **Clear Filter** in the lower right corner of the network information table (only visible when a filter is in effect).

Table 11: Right-Click Filtering Options in the Nodes Tab

Option	Function
Links at Node	Switches the display to the Links tab and shows only those links that have the selected node as Node A or Node Z.
Interfaces at Node	Switches the display to the Interfaces tab and shows only those interfaces with the selected node.

Table 11: Right-Click Filtering Options in the Nodes Tab *(Continued)*

Option	Function
Tunnels on/through Node	Switches the display to the Tunnels tab and shows only those tunnels that start, end, or run through the selected node.
Tunnels starting at Node	Switches the display to the Tunnels tab and shows only those tunnels that start at the selected node.
Tunnels ending at Node	Switches the display to the Tunnels tab and shows only those tunnels that end at the selected node.
Tunnels passing through Node	Switches the display to the Tunnels tab and shows only those tunnels that pass through the selected node.

Table 12: Right-Click Filtering Options in the Links Tab

Option	Function
Nodes on Link	Switches the display to the Nodes tab and shows only those nodes that are on the selected link.
Interfaces on Link	Switches the display to the Interfaces tab and shows only those interfaces that are on the selected link.
Tunnels on/through Link	Switches the display to the Tunnels tab and shows only those tunnels that run on or through the selected link.

Table 13: Right-Click Filtering Options in the Interfaces Tab

Option	Function
Link at Interface	Switches the display to the Links tab and shows only those links that have the selected interface.

Filtering Using the Search Function

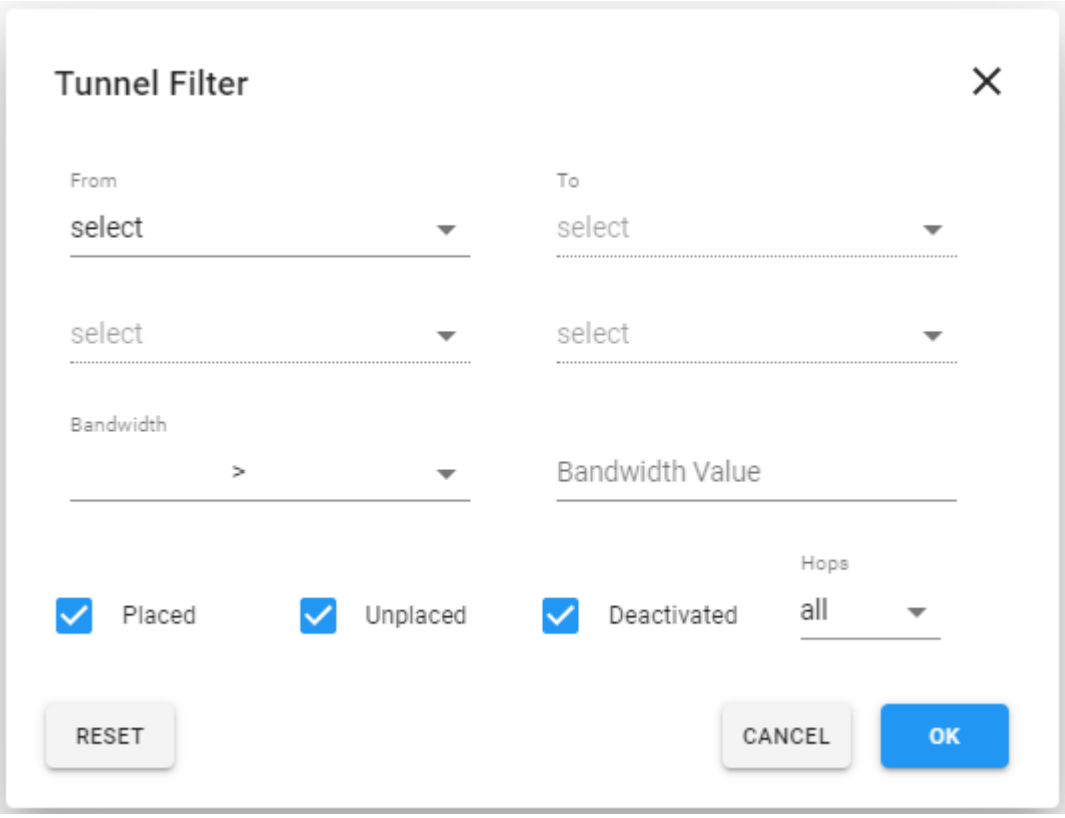
The search icon (magnifying glass) in the bottom tool bar of the network information table behaves differently depending on which tab (Nodes, Links, and so on) you are in. For the Nodes and Links tabs, clicking the search icon brings up a simple text box beside the icon as shown in Figure 37 on page 59.

Figure 37: Text Search Box

The rows are filtered to display only those elements satisfying the search criteria. This does not change the topology map. To clear the filter so that all network elements are again displayed, click the X beside the search box.

In the Tunnels, Demands, and Interfaces tabs, clicking the search icon brings up a filter window in which you can enter or select specific search criteria appropriate to that network element type. For example, see the Tunnel Filter window shown in Figure 38 on page 60.

Figure 38: Text Search Box

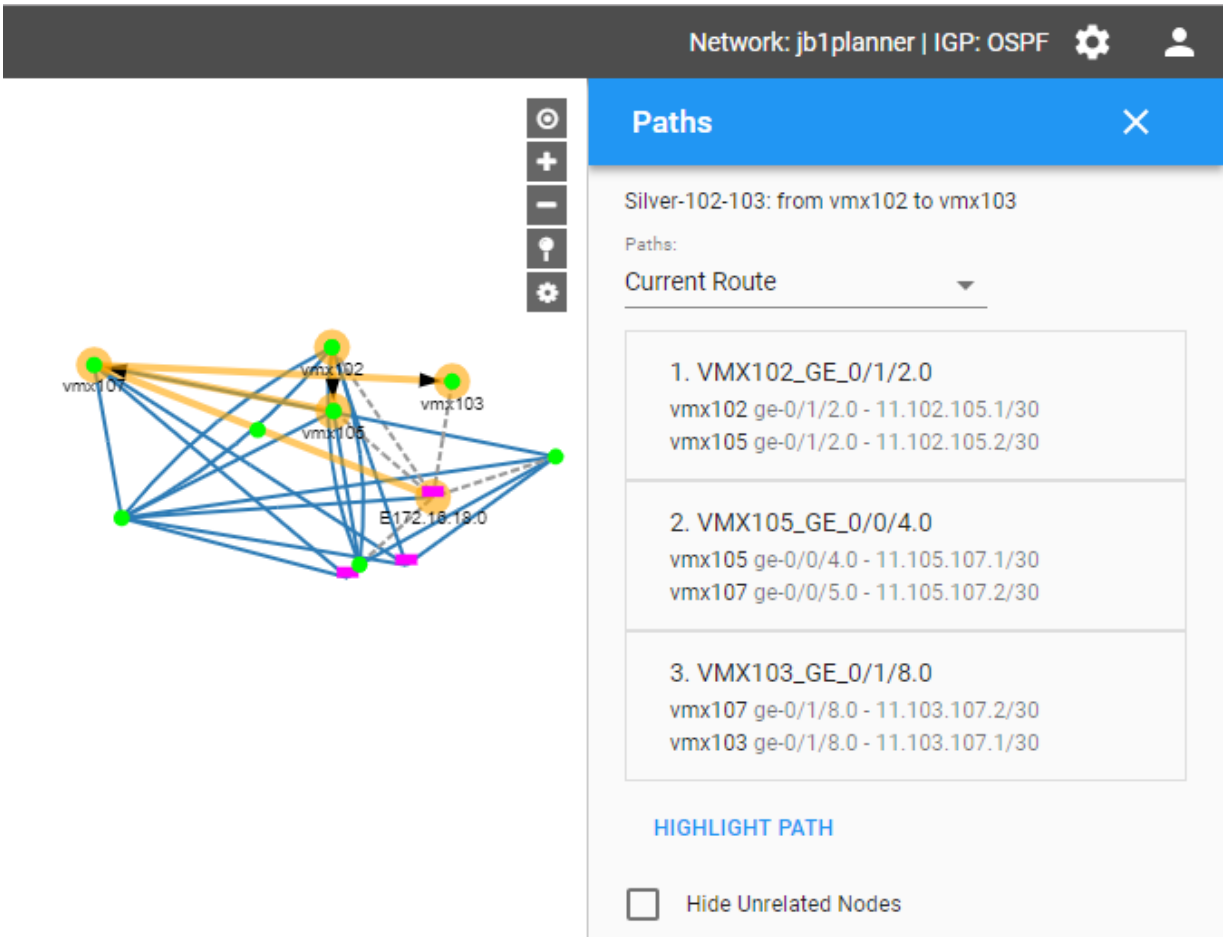


Once you have entered/selected the search criteria, click **OK**. The filter window closes and the table displays only the rows that satisfy the search criteria. To clear the filter so that all network elements are again displayed, click **Clear Filter** at the far right of the bottom tool bar.

Using the Show Path Tool from the Tunnels or Demands Tab

To launch the Show Path tool, right-click a network element in the Tunnels or Demands tab of the network information table, and select **Show Path**. The Paths window opens to the right of the topology map, displaying the current route for the selected tunnel, hop by hop. An example is shown in Figure 39 on page 61.

Figure 39: Paths Window



Note that the path is highlighted in the topology map. You can click **Highlight Path** if the path is not already highlighted, which it might not be if you clicked to a different network information table tab and then clicked back.

Currently, only the current route can be displayed. A future release will support secondary route display from the Paths drop-down menu to the right of the Current Route heading.

At the bottom of the display is an option to Hide Unrelated Nodes on the topology map. Click the check box to select or deselect this option.

RELATED DOCUMENTATION

Network Information Table Overview | 53

Network Information Table Bottom Tool Bar | 62

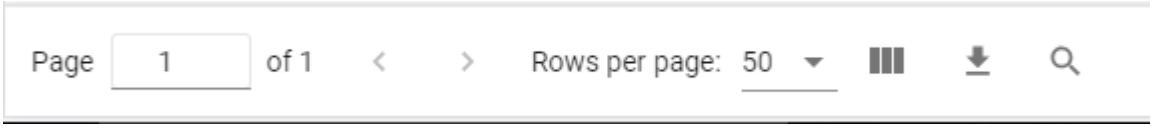
Network Information Table Bottom Tool Bar

IN THIS SECTION

- Navigation Tools | 62
- Column Chooser | 63
- Add/Modify/Delete Buttons | 64
- Download Data Tool | 65
- Search Function | 66

The bottom tool bar in the network information table has tools for navigating through pages of network element data, selecting columns to display, downloading data, and filtering data. Figure 40 on page 62 shows the bottom tool bar.

Figure 40: Network Information Table Bottom Tool Bar



Navigation Tools

The navigation tools in the network information table bottom tool bar are available to help you navigate through rows and pages of data, and change the number of rows per loaded page. These tools are especially useful for large models with many elements.

Table 14 on page 63 describes the navigation tools in the bottom tool bar.

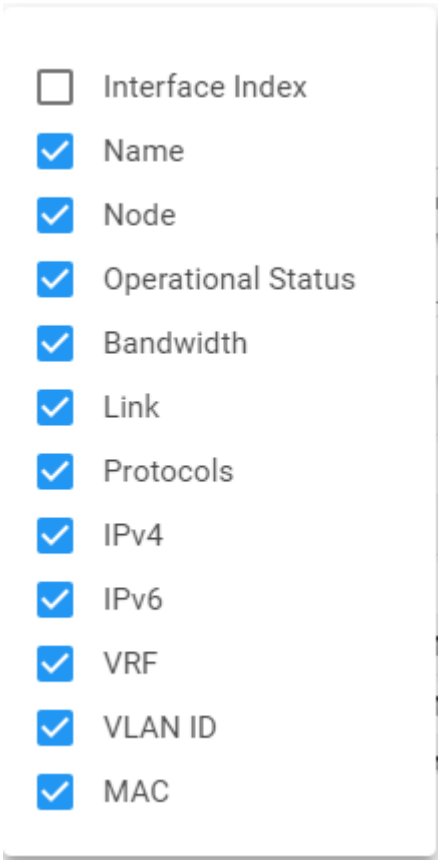
Table 14: Navigation Tools in the Network Information Bottom Tool Bar

Tool or Button	Description
Page __ of <total pages>	Shows which page of data is currently displayed. You can use the up and down arrows that appear when you click in the page box to page forward or backward.
<	Displays the previous page of data.
>	Displays the next page of data.
Rows per page	Click the down arrow to select the number of rows per page (10, 50, 100, 500, or 1000)

Column Chooser

The Column Chooser tool is available for all network information tabs. Launch the tool by clicking the columns icon (vertical bars). The resulting list of available columns is different, depending on the table tab. Figure 41 on page 64 shows the list of columns available in the Interfaces tab, for example.

Figure 41: Column Chooser for the Interfaces Tab



Click the check boxes to select or deselect the columns.

Add/Modify/Delete Buttons

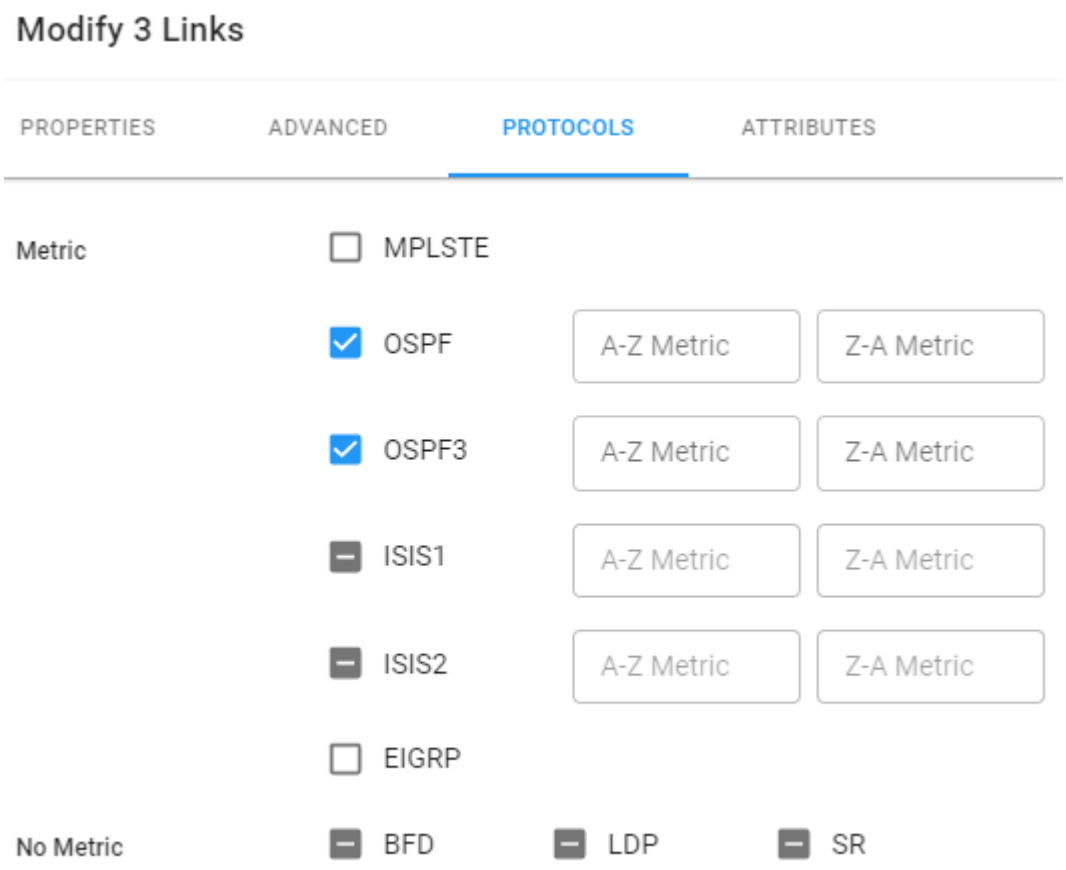
You can add, modify, or delete elements from any of the tabs except SRLGs using the buttons in the bottom tool bar. Modify and Delete are not available until you select an element (row) in the table. You can also bulk modify or delete by selecting multiple elements and then clicking Modify or Delete.

A feature of the bulk modify function is a tri-state check box. Clicking the check box multiple times cycles through three states:

- Unchecked means disabled.
- Checked means enabled.
- A horizontal line through the box means each element you selected for the bulk modify will keep the value it already had.

The three possible states allow you to modify multiple elements at once without resulting in all the parameters in all of the elements becoming identical. Figure 42 on page 65 shows a bulk Modify window with check boxes representing all three states, for comparison.

Figure 42: Tri-State Check Boxes



Download Data Tool

The Download Data tool is available for all network information table tabs. Launch the tool by clicking the download icon (down arrow). A csv file is created that contains all the data from the table tab.

The data is downloaded the way you have it sorted and filtered in the network information table.

Search Function

The search function is fully described in "Sorting and Filtering Options in the Network Information Table" on page 55.

The search icon (magnifying glass) behaves differently, depending on the network information table tab.

RELATED DOCUMENTATION

Network Information Table Overview | 53

Sorting and Filtering Options in the Network Information Table | 55

Web Planner Traffic Aggregation

IN THIS SECTION

- Performance Data Indices Used for Aggregated Queries | 68
- Generate Options | 69
- Range Options | 70
- Series Options | 71
- Statistic Options | 71
- Output Directory and Output Runcode | 72
- Load New Data | 72

The Traffic Aggregation function allows extraction of performance data from the analytics database for use in modeling and simulation. You can extract different types of performance traffic into their relative files using a variety of timeframes and traffic statistics. Traffic aggregation is performed on archived networks in the web Planner.

To do traffic aggregation, you must first perform data collection in the NorthStar Controller using Network Archive, LDP Collection, and SNMP Collection tasks. See the following topics in the *NorthStar Controller User Guide* for information about those task types:

- Collection Tasks to Create Network Archives

Needed to create the archived networks for which traffic aggregation is performed.

- LDP Traffic Collection

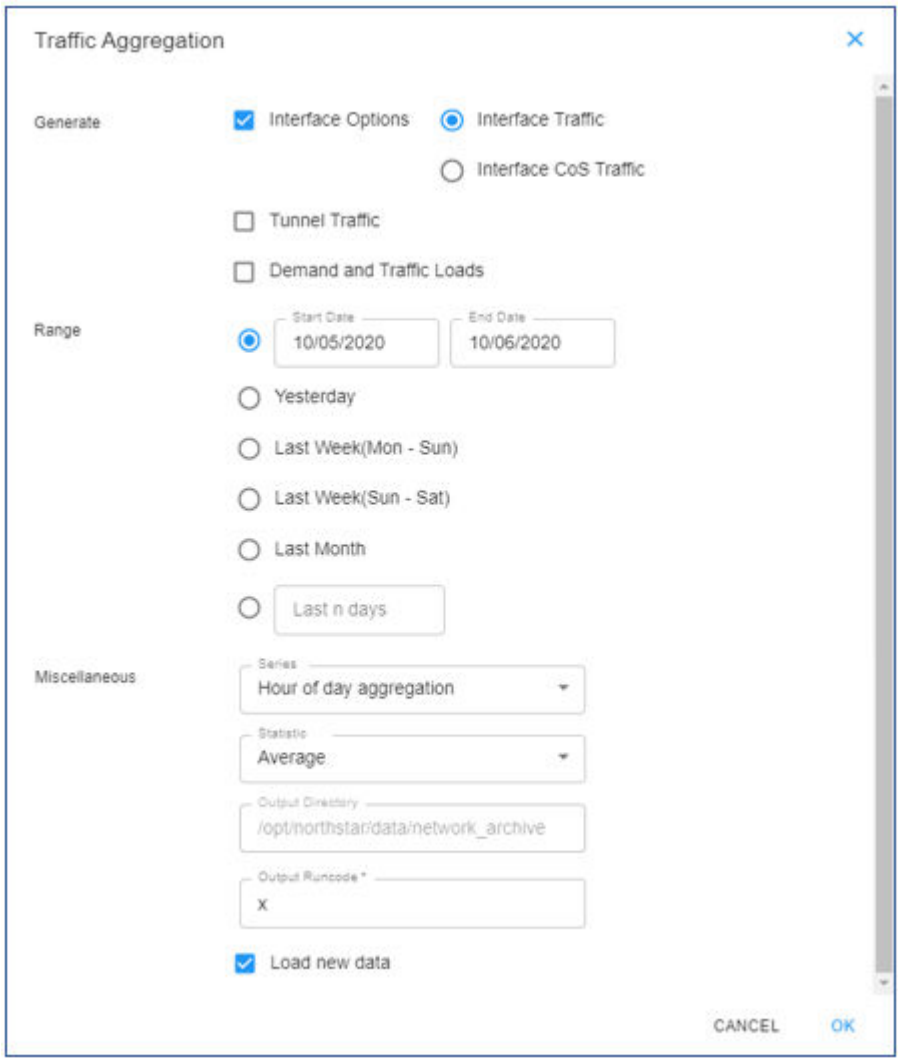
  Needed for Demand and Traffic Loads traffic aggregation.

- Data Collection Using SNMP

  Needed for Interface Options and Tunnel Traffic traffic aggregation.

To reach the Traffic Aggregation window in the web Planner, click the More Options icon (three vertical dots) in the upper right corner of the Planner window and select **Traffic Aggregation**. Figure 43 on page 67 shows the resulting Traffic Aggregation window.

Figure 43: Traffic Aggregation Window



The overall process is:

- Make your selections in the Traffic Aggregation window and click **OK**.
- The traffic aggregation process on the server requests the analytics database to aggregate the performance data according to the selections you provided, and the data are stored to the corresponding traffic files.

Type of Data	Filename
Egress interface traffic	interface
Ingress interface traffic	interfacei
Demand traffic	trafficload
Tunnel traffic	tunneltraf

- When complete, a message displays, informing you of success or failure.
- If you selected **Load new data** in the Traffic Aggregation window, the generated traffic results are displayed in the network information table.

Use the information in the following sections to help you define a traffic aggregation that suits your purpose.

Performance Data Indices Used for Aggregated Queries

The analytics database stores performance data in a series of indices. The default index for a measurement contains each measurement to a granularity of five minutes. High frequency measurements collected through Telemetry are stored in a special index used mostly for real-time traffic graphs. The high-speed (raw) index is then recorded as an average into the default index. The default index has a configurable retention period.

The measurements are then rolled up hourly with average and 90 percentile aggregations, and this rolled-up index is used for more scalable queries on the performance data. In addition to the hourly index, the default index is also rolled up into daily, weekly and monthly indices to support queries over longer time frames. .

The performance data indices are summarized in Table 15 on page 69.

Table 15: Performance Data Indices

Index	Interval	Purpose	Retention
Raw	Same as collection for high frequency measurements such as Telemetry (30 seconds, for example).	• Temporary storage for traffic graphing • Averaged aggregation over five minute periods into the default index	Hard set to 1 day
Default	Measurement frequency or five minutes, whichever is less.	• Base for rollup indices • Used for extended period traffic graphs	Set using the NorthStar CLI: **set northstar system scheduler tasks collection-cleanup raw-data-retention-duration**
Rollup	Rolled up on an hourly, daily, weekly, and monthly basis.	Produces increased performance and reduced storage needs for traffic reporting and modeling.	Set using the NorthStar CLI: **set northstar system scheduler tasks collection-cleanup rollup-data-retention-duration**

Generate Options

Remember that performing the appropriate data collection tasks in the NorthStar Controller is a prerequisite to performing traffic aggregation.

The generate options are:

- Interface Traffic
- Interface CoS Traffic
- Tunnel Traffic
- Demand and Traffic Loads

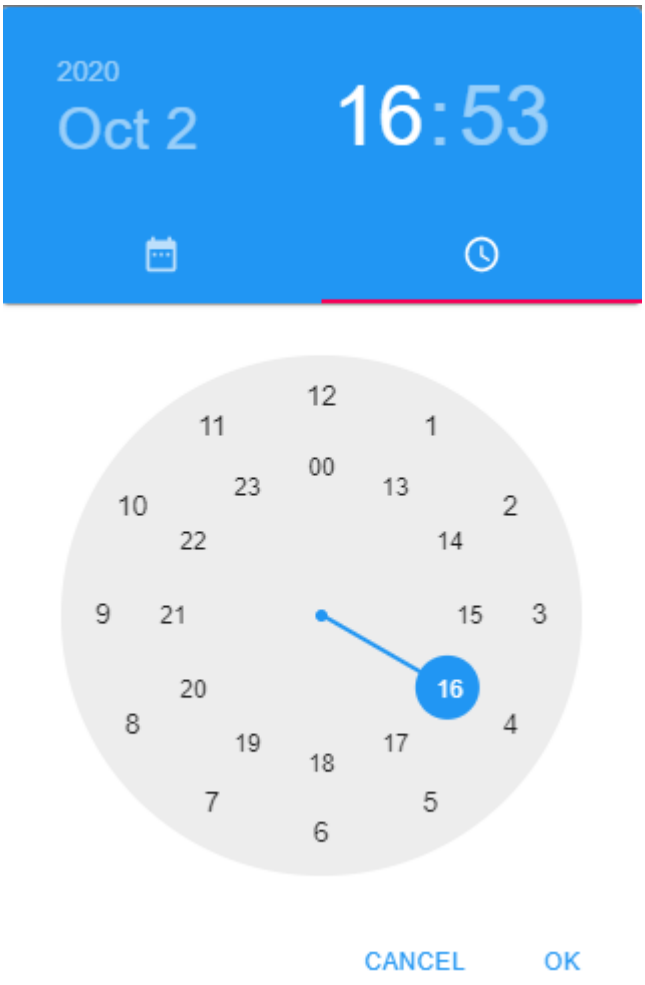
Click the check boxes to select as many of these options as you want, except that Interface Traffic and Interface CoS Traffic are mutually exclusive. They use the same interface traffic files for output, so you can only have one or the other.

Range Options

Click any one of the radio buttons to select that range. For Start Date and End Date, click in each of those fields to bring up the calendar or calendar/clock window. The Start Date and End Date formats are a little different, depending on what you choose for Series:

- If Series = “Hour of day aggregation” or “Time Series”, the Start Date and End Date are specified as just the date because all hours of the specified days are used. A calendar window displays for you to select the date.
- If Series = “Time Series - Hourly”, the Start Date and End Date are specified as date and hour. In this case, a calendar/clock window displays, with calendar and clock icons for selecting the date and the hour, respectively. Note that it is a 24-hour clock as shown in Figure 44 on page 70.

Figure 44: Calendar and Clock Icons in the Calendar/Clock Window



Series Options

Three options are available for Series:

- **Hour of day aggregation**

  In this type of series, all measurements are aggregated by hour of day, potentially across multiple days. For example, by specifying “last week”, you would get the average or 90 percentile traffic for 9 – 10 PM. All measurements between 9 and 10 PM from all seven days would be considered in the calculation of the statistics. This is useful for calculating a typical day across a date range. Each parameter would have 24 values in the resultant traffic file, corresponding to each hour in the typical day. The usefulness of this series type diminishes as the time range becomes longer because the impacts of traffic trend over the time range would skew the statistic to represent either the time range mid-point or end-point for average and 90 percentile statistics, respectively.

- **Time Series**

  When you select Time Series, an additional Interval field is displayed. One data point per the specified interval (1 day, 1 week, or 1 month) between the selected start and end dates is used. How you set your range and interval will determine the number of data points. For example, if you do daily statistic calculations for 24 days, you would have 168 data points. If you were interested in a time series for four months of data, you might want to use a courser interval such as weekly.

- **Time Series - Hourly**

  Time Series – Hourly is a variation of Time Series that specifically uses one hour as the interval. One data point per hour is used, for the duration of the date range you specify.

Statistic Options

Use the drop-down menu to select from the two traffic statistics options offered. The two options enable different objectives in modeling:

- **Average**: Provides a representation of the typical traffic during a period.
- **90 percentile**: Provides a representation of peak traffic during a period.

For recent time ranges (last day or week), there might not be a large difference in these values for hourly interval time series or hour of day aggregation. For daily or larger intervals, 90 percentile might be a better choice for capacity planning.

Output Directory and Output Runcode

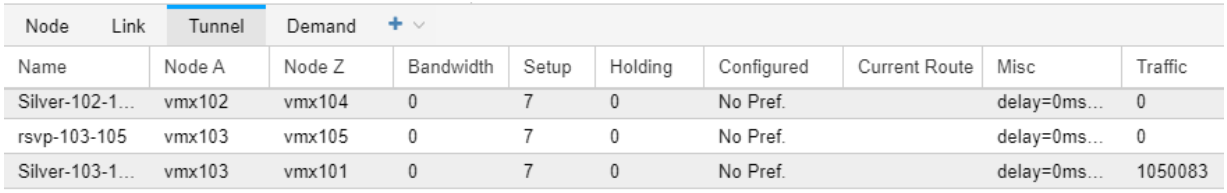
The output directory is **/opt/northstar/data/network_archive** .

The output runcode defaults to the current model's runcode.

Load New Data

If you select "Load new data" in the Traffic Aggregation window, the extracted performance files are read into the current model and displayed in the network information table in columns that are only shown once traffic aggregation data is available. In the Tunnel and Demand tabs, the results are displayed in the Traffic column. In the Interface tab, the results are displayed in the Ingress Traffic and Egress Traffic columns. Figure 45 on page 72, Figure 46 on page 72, and Figure 47 on page 73 show examples.

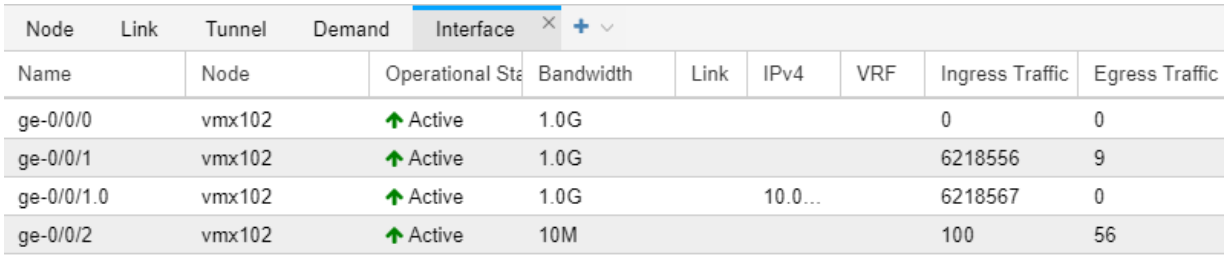
Figure 45: Tunnel Tab Showing Traffic Column



Node | Link | Tunnel | Demand

Name	Node A	Node Z	Bandwidth	Setup	Holding	Configured	Current Route	Misc	Traffic
Silver-102-1...	vmx102	vmx104	0	7	0	No Pref.		delay=0ms...	0
rsvp-103-105	vmx103	vmx105	0	7	0	No Pref.		delay=0ms...	0
Silver-103-1...	vmx103	vmx101	0	7	0	No Pref.		delay=0ms...	1050083

Figure 46: Interface Tab Showing Ingress and Egress Traffic Columns



Node | Link | Tunnel | Demand | Interface

Name	Node	Operational Sta	Bandwidth	Link	IPv4	VRF	Ingress Traffic	Egress Traffic
ge-0/0/0	vmx102	Active	1.0G				0	0
ge-0/0/1	vmx102	Active	1.0G				6218556	9
ge-0/0/1.0	vmx102	Active	1.0G		10.0...		6218567	0
ge-0/0/2	vmx102	Active	10M				100	56

Figure 47: Demand Tab Showing Traffic Column

Node Link Tunnel Demand +

Name	Node A	Node Z	Bandwidth	Setup	Holding	Configured	Current Ro	Misc	Traffic
vmx104_11.0....	vmx104	vmx103	0	7	7	No Pref.	[(T=Sil...	delay=0.00...	0
vmx104_11.0....	vmx104	vmx105	0	7	7	No Pref.	[(T=rsv...	delay=0.00...	0
vmx104_11.0....	vmx104	vmx106	187	7	7	No Pref.	11.104...	delay=0.00...	184
vmx104_11.0....	vmx104	vmx107	187	7	7	No Pref.	11.104...	delay=0.00...	167
vmx103_11.0....	vmx103	vmx101	0	7	7	No Pref.	[(T=Sil...	delay=0.00...	0

RELATED DOCUMENTATION

- Introduction to the Task Scheduler
- Collection Tasks to Create Network Archives
- LDP Traffic Collection
- Data Collection Using SNMP

4

CHAPTER

Simulation View

Simulation | 75

Simulation

When you click the menu icon (horizontal bars) in the upper left corner of the Planner and select **Simulation**, the Simulation tool opens in the main window (a network must be open for this option to be available). The Simulation tool allows you to run failure analysis using path provisioning that simulates the hardware's implementation of bandwidth allocation and demand routing on the existing topology. This tool walks you through creating a simulation, step by step.

NOTE: After selecting at least one element in Step 1, you are not restricted to progressing through these steps in order. You can click on any Step number directly to go backward and forward rather than using the Next or Back buttons.

Using this tool, you can design a simulation that uses a single, double, or triple exhaustive failure combination, using network element types of your choice.

NOTE: NorthStar web UI Planner runs modeling and simulation in whichever layer (Tunnel/Layer 2 or Layer 3) you have selected and that is displayed in the top menu bar.

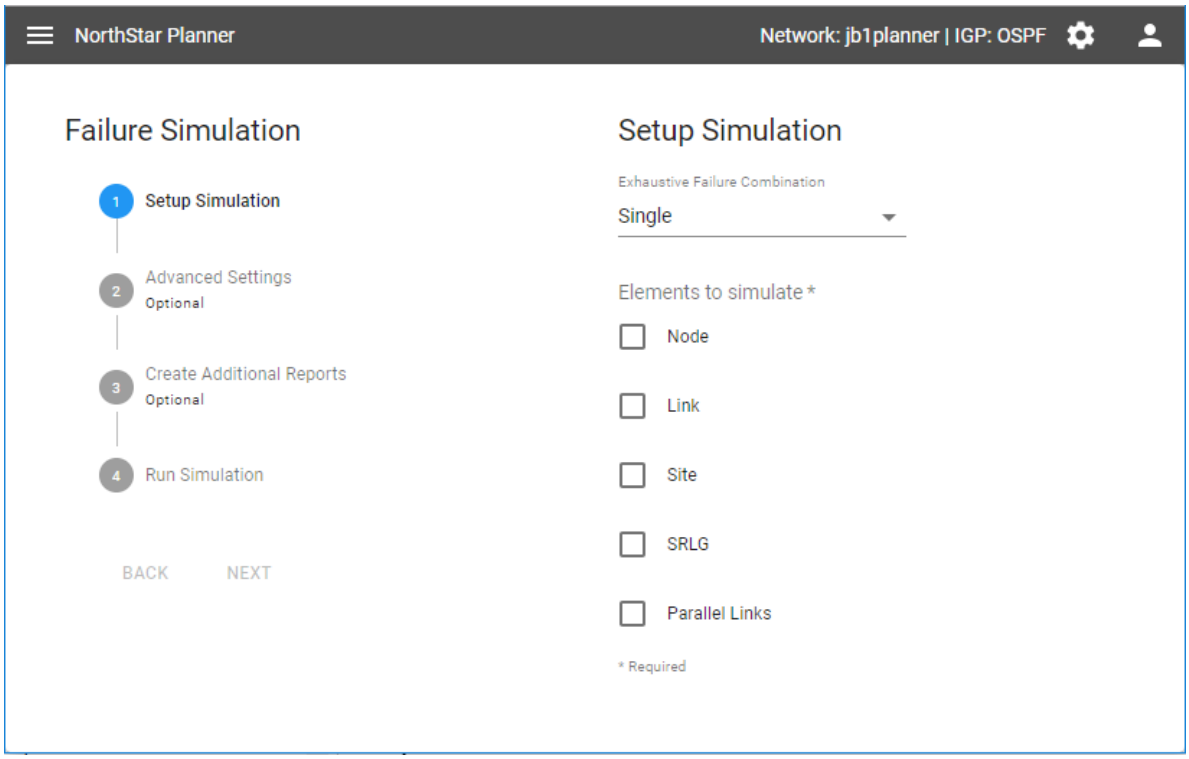
An exhaustive single failure simulation fails all network elements of a given type, one at a time. For example, an exhaustive node failure fails every node in the network, one at a time. For an exhaustive double failure simulation, two elements are failed at once. For example, if you select Node and Link for a Double exhaustive failure, the simulation would then fail all node and node, node and link, and link and link combinations. An exhaustive triple failure fails three elements at once.

The tool also allows you to select a routing method to use for the simulation, either Normal, Fast Reroute (FRR), or both (the default). Fast Reroute is a mechanism that can be used to protect MPLS traffic engineering LSP tunnels in the event of node or link failures. It accomplishes this with SONET-like restoration times by locally repairing the LSPs at the point of failure, using backup tunnels that bypass the failure while waiting for the head-end routers to establish a new LSP. The short restoration times are especially desirable for real-time applications such as voice over IP, which often cannot tolerate high delays. "Normal" routing method means "without FRR."

To design and execute a simulation, use the following procedure.

1. In Step 1, shown in Figure 48 on page 76, select the exhaustive failure combination from the drop-down menu (Single, Double, or Triple) and click the check boxes corresponding to the network elements to be included in the simulation.

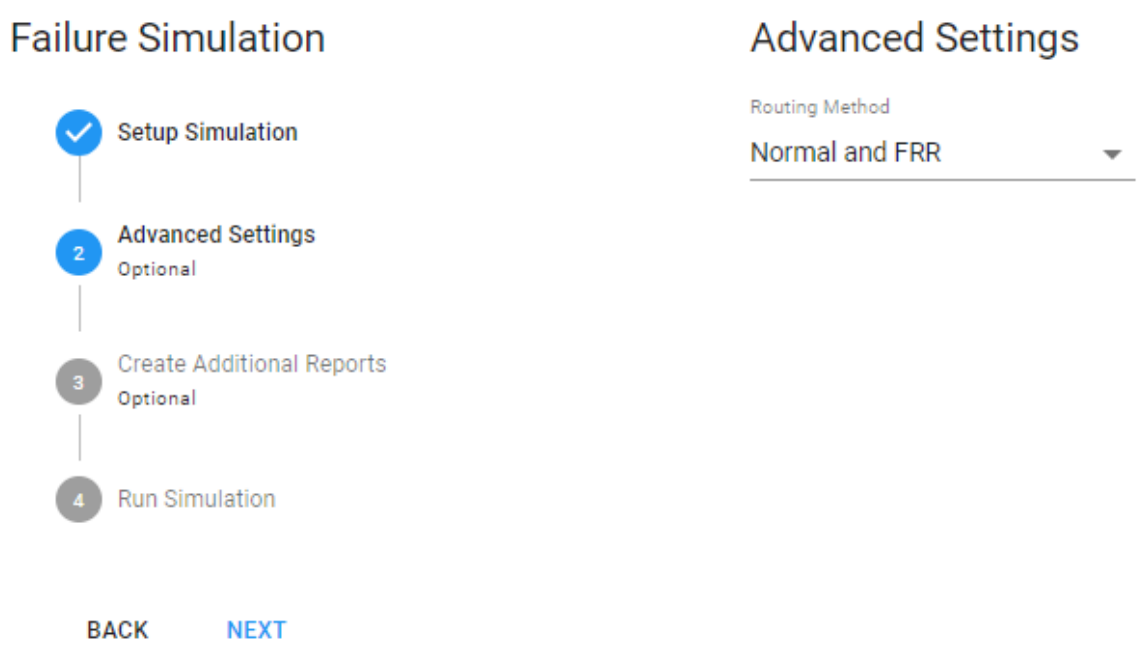
Figure 48: Simulation, Step 1



The default exhaustive failure combination is Single. No network elements are selected by default. You must select at least one network element type. When the form is complete, click **Next**.

2. In Step 2, shown in Figure 49 on page 77, you can accept the default routing method (Normal and FRR) or use the drop-down menu to select an alternative (Normal alone or FRR alone).

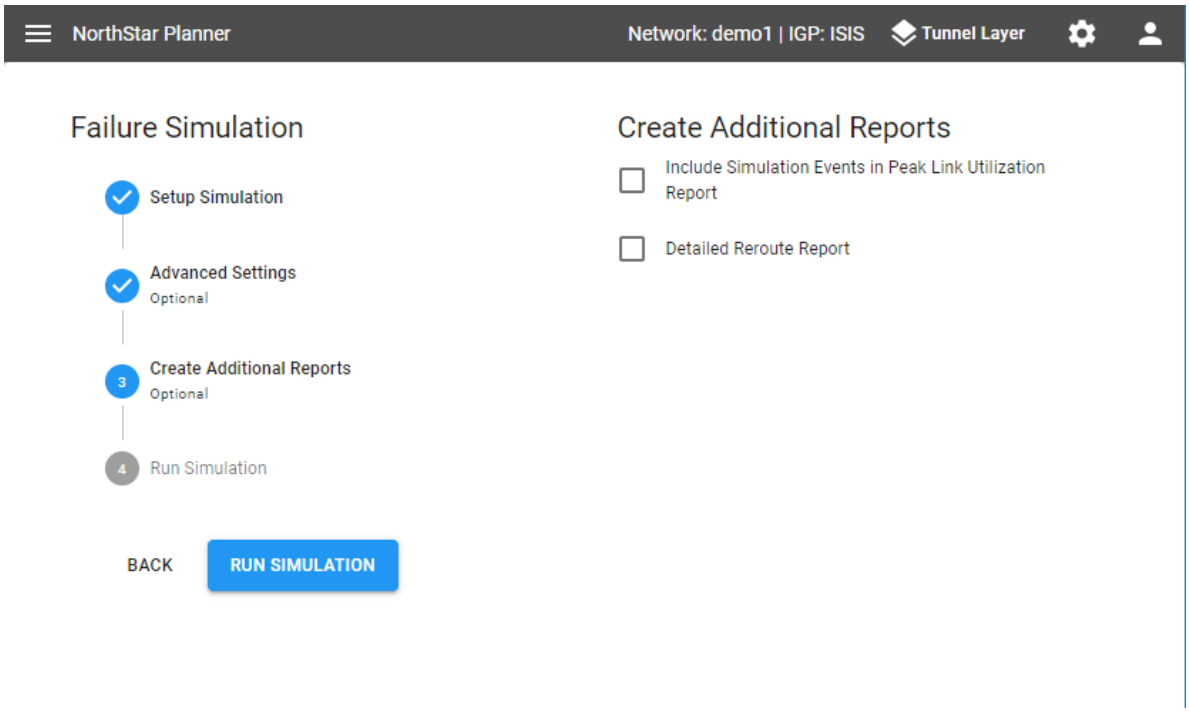
Figure 49: Simulation, Step 2



Click **Next**.

3. In Step 3, shown in Figure 50 on page 78, click the check boxes for any additional reports you would like generated.

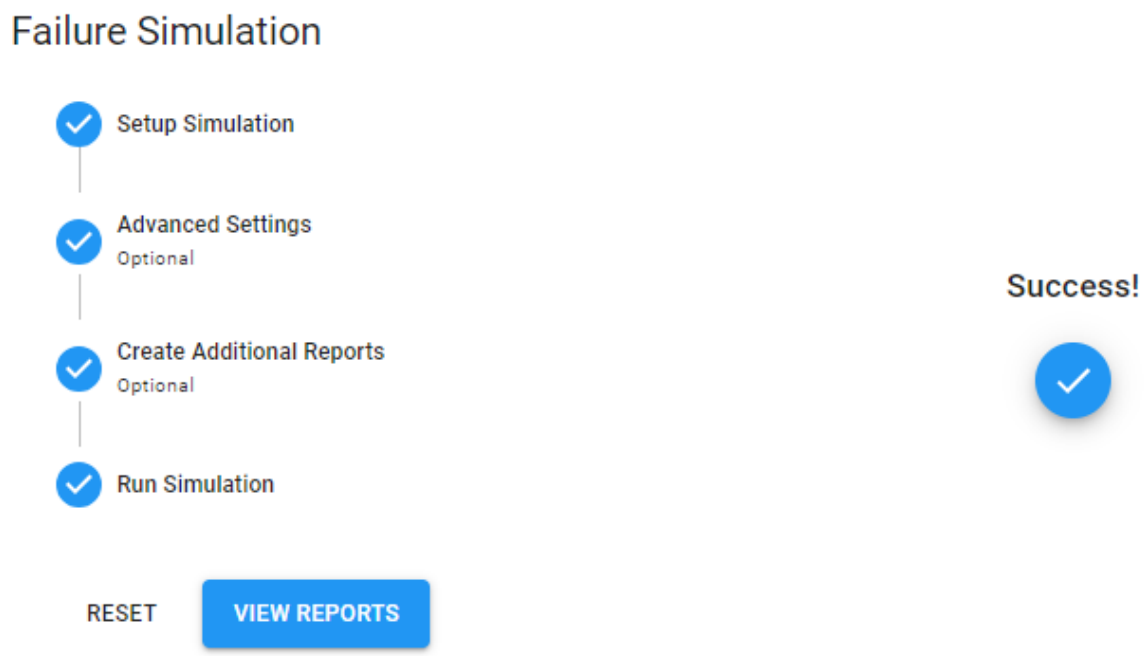
Figure 50: Simulation, Step 3



Click **Run Simulation**.

4. A success message indicates the simulation was executed, as shown in Figure 51 on page 79.

Figure 51: Simulation, Step 4



Click **View Reports** to go to the Report Manager where you can access all the simulation reports that were generated. Click **Reset** to begin another simulation.

In the Report Manager, simulation reports are overwritten by the next simulation, so be sure to use the download tool (down arrow icon in the bottom tool bar) to download any reports you want to keep. The Report Manager is fully documented in "Report Manager" on page 81.

RELATED DOCUMENTATION

Report Manager | **81**

5
CHAPTER

Report Manager View

Report Manager | 81

Report Manager

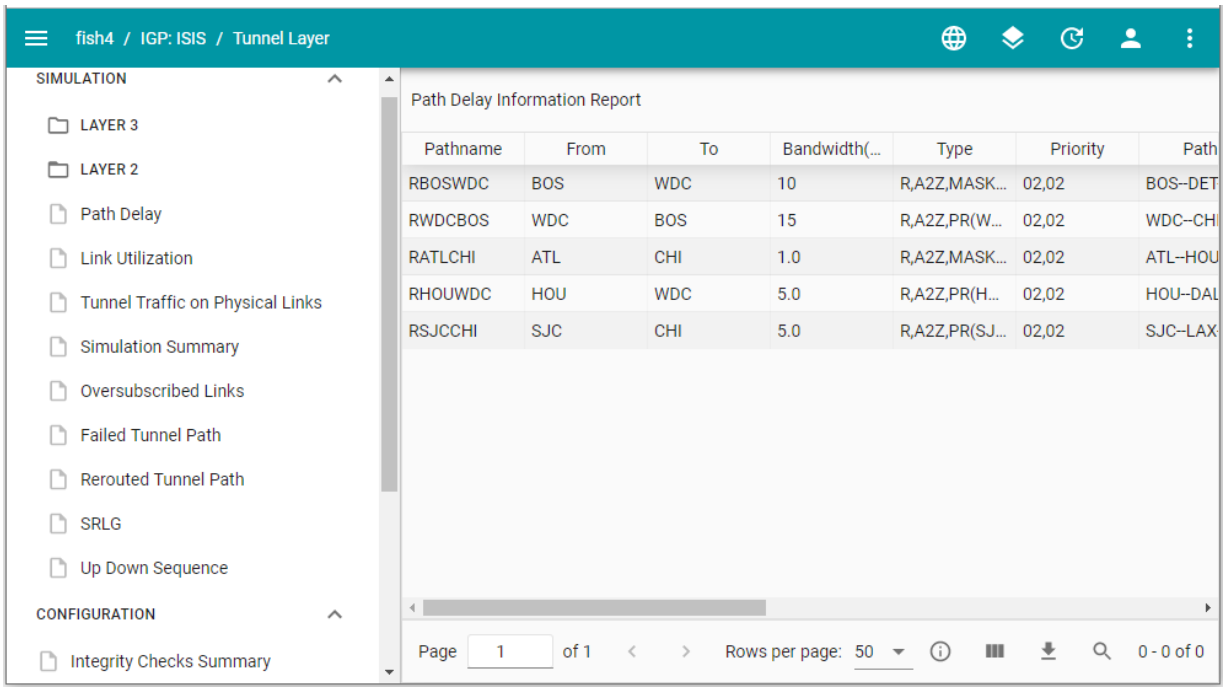
IN THIS SECTION

- Available Reports | 82
- Sorting Report Data by Column | 83
- Report Manager Bottom Tool Bar | 83

To reach the Report Manager in the NorthStar Planner web UI, click the menu icon (horizontal bars) in the upper left corner of the Planner and select **Report Manager** (a network must be open for this option to be available).

A list of reports is displayed on the left side of the window and the contents of the selected report displays on the right side. Any report name that is grayed out has not been generated for the network. Reports can generate with no content if there is no applicable data for the report. Figure 52 on page 82 shows an example of the Report Manager with the contents of a selected report displayed on the right. Simulation reports generated at Layer 2 and Layer 3 are available in separate folders.

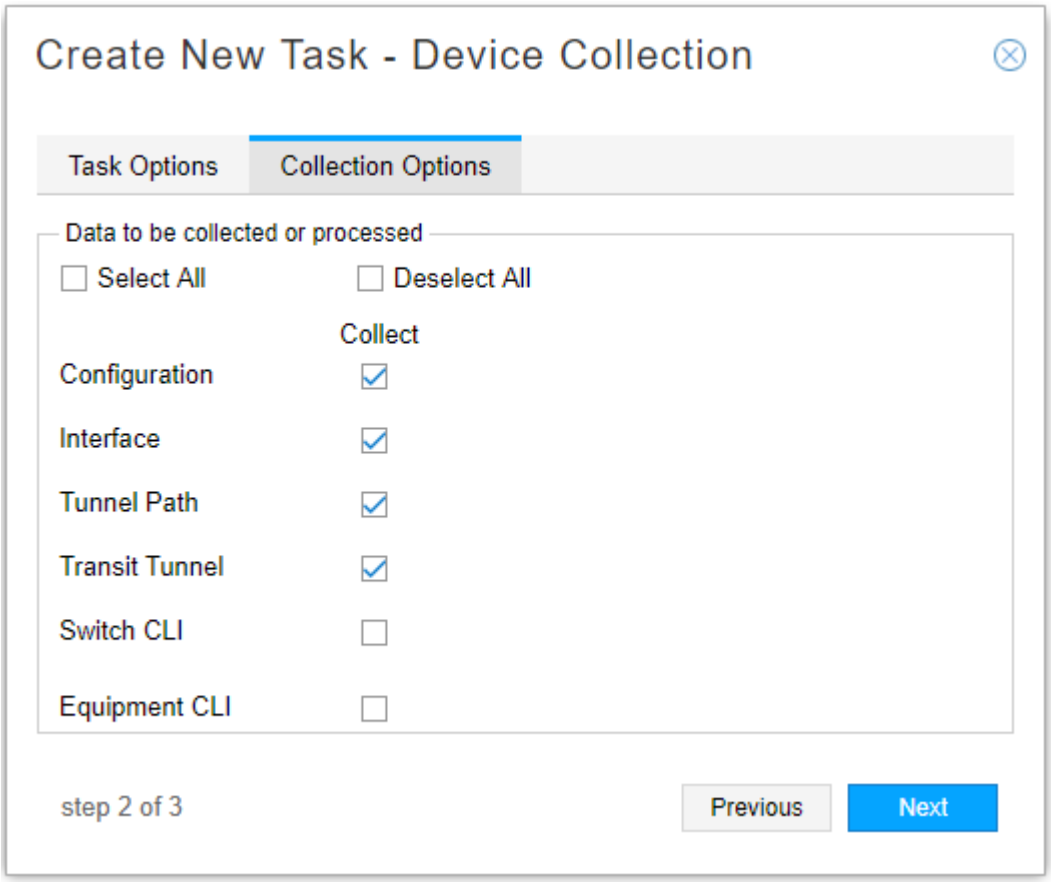
Figure 52: Report Manager Overview



Available Reports

Configuration reports are available after running **Administration** > **Task Scheduler** > **Device Collection** in the NorthStar Controller (Operator). Collection Options must be set to include **Configuration** as shown in Figure 53 on page 83.

Figure 53: Report Manager Overview



Simulation reports are available after running a simulation in NorthStar Planner.

Sorting Report Data by Column

By clicking in any report column heading, you can sort the report data by that column, either ascending or descending. The report data remains sorted if you download the report.

Report Manager Bottom Tool Bar

At the bottom of the right pane in the Report Manager, there is a tool bar with several useful functions, described in Table 16 on page 84. These tools can help you navigate through pages of report data and filter the columns of data that are displayed. Figure 54 on page 84 shows the tool bar.

Figure 54: Report Manager Bottom Tool Bar

Table 16: Tools in the Report Manager Bottom Tool Bar

Tool or Button	Description
Page __ of <total pages>	Shows which page of data is currently displayed and the total number of pages. If you click in the page box, up and down arrows appear which you can use to page forward or back.
<	Displays the previous page of data.
>	Displays the next page of data.
Rows per page	Click the down arrow to select the number of rows per page (10, 50, 100, 500, or 1000).
	Click the Information icon to display some additional information about the selected report, including the date and time the report was generated.
	Click the Columns icon to launch the Column Chooser tool. The resulting list of available columns is different, depending on the selected report. Click the check boxes to select or deselect the columns for display. If you download the report, your selections remain intact.
	Click the Download icon to download the selected report in a csv file to your local downloads location. Any sorting or filtering you performed remains intact in the downloaded version.

Table 16: Tools in the Report Manager Bottom Tool Bar *(Continued)*

Tool or Button	Description
	Click the Search icon to open a search field. Enter your search criteria where it says “Filter this report”. The report display changes to include only the rows that match your search criteria. If you download the report, this filtering remains intact. To clear the filter so that all report rows are again displayed, clear the search field.
X - Y of Z	Number of rows displayed on the current page and the total number of rows in the report. 1-50 of 60, for example.

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