

Paragon Planner Web Application User Guide

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Juniper Networks, Inc.
1133 Innovation Way
Sunnyvale, California 94089
USA
408-745-2000
www.juniper.net

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Paragon Planner Web Application User Guide
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About This Guide

Use this guide to understand the Paragon Planner web UI where you can simulate and analyze various network scenarios without affecting your live network. This guide documents the features that are supported in the Paragon Planner web UI.

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Paragon Planner Overview

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- [Key Features and Use Cases | 2](#)
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Juniper's Paragon Automation suite of applications includes Paragon Planner, which helps network operators to effectively plan and design their network.

Paragon Planner is a network modeling tool that enables offline visualization of network resources and provides detailed architectural planning of the production networks. Paragon Planner allows you to simulate network changes and other traffic scenarios without affecting the live network. Paragon Planner helps you forecast the effect of network changes and assess the network for potential failure scenarios.

NOTE: Support for Paragon Planner web application is a Beta feature in the Paragon Automation Release 21.3.

Key Features and Use Cases

Key features and use cases of Paragon Planner include:

- Automatically construct network topologies by using data snapshots of live networks (obtained from Paragon Pathfinder) or source data from stored network configuration files and other sources.
- Perform capacity planning to determine whether there is sufficient capacity or if more capacity should be added, and which links can be pruned without compromising resiliency.
- Analyze traffic loads to determine accurate link utilization for failure simulation.
- Validate network changes (in a safe, virtual environment) before deployment.
- Run what-if scenarios to anticipate the impact of any network change.
- Create and model VPNs, simulate VPN routing, and generate VPN traffic.

- Simulate multicast flows based on user-defined multicast groups and demands.
- Design and simulate MPLS traffic engineering (MPLS-TE) and label-switched path (LSP) routing.
- Assess network resiliency against different failure scenarios and analyze how traffic is rerouted and its effect on network links.
- Ensure service-level agreement (SLA) compliance by a modeling class of service (CoS) classes and policies and queuing schemes. (You can define application flows based on CoS to enable the modeling of voice over IP (VoIP) or video on demand (VOD) traffic.)
- Model and analyze BGP routing.
- Hardware inventory.
- Network integrity checks.

Benefits of Paragon Planner

- Lower CapEx and OpEx (hardware and maintenance costs) by using Paragon Planner's tariff-based design, MPLS LSP, and segment routing traffic engineering (SR-TE) features for effective utilization of the network, and superior design optimization.
- Quickly diagnose performance problems by using flow analysis, congestion detection and analysis, peak utilization analysis, and multicast simulation features.
- Optimize plans for future network growth (to meet business needs) by using capacity planning and data forecasting.
- Avoid problems and mitigate risk by assessing the network using Planner's resiliency analysis, fiber cut analysis, and so on.
- Validate new services, equipment, and technologies before they are rolled out.

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Understand Differences between Paragon Pathfinder and Planner

This topic explains key differences between Paragon Pathfinder and Paragon Planner, two applications that belong to the Paragon Automation suite of applications:

- Paragon Pathfinder (formerly NorthStar Controller) is a traffic engineering solution that simplifies and automates provisioning, management, and monitoring of segment routing and IP/MPLS flows across large networks.
- Paragon Planner (formerly NorthStar Planner) is a network modeling tool that can be used for offline visualization and detailed architectural planning of any production network.

[Table 1 on page 4](#) lists the key differences between the two applications.

Table 1: Differences between Paragon Pathfinder and Paragon Planner

Paragon Pathfinder	Paragon Planner
Paragon Pathfinder enables you to monitor your live network. and any changes that you make in Pathfinder are propagated to your live network.	Paragon Planner is an offline modeling application, which means that changes that you make in Planner do not affect your live network.
Pathfinder can connect to the live network because of the connectivity between Pathfinder and the live network.	Planner has no capability to connect to the network because there's no connectivity between Planner and the network.
In Pathfinder, there's only one live network model.	In Planner, you can have one or more offline network models, which means you can analyze and compare impact of different design changes or failure scenarios. However, the changes are not propagated into the live network.

Table 1: Differences between Paragon Pathfinder and Paragon Planner *(Continued)*

Paragon Pathfinder	Paragon Planner
<p>In Pathfinder, the network model is based on the traffic-engineering database, which is based on the current (real time) status of the network.</p> <p>For example, if you configure a link that later goes down, the down status of the link is reflected in the traffic-engineering database, but not in the router's configuration.</p>	<p>The network models that we use in Planner are from archives and collections in Pathfinder, which means that Planner relies on data from Pathfinder.</p> <p>Planner builds the model of the network using router configuration files. Therefore, Planner displays an intent-based model (configuration) with some supplemental live information from Pathfinder, such as initiated label-switched paths (LSPs), which are not available in the router's configuration.</p>
In Pathfinder, any changes you make to the network model affects the live network.	Planner allows you to run what-if scenarios, which allow you to make changes to the network model and see the effect of those changes, without affecting the live network.
In Pathfinder, you can perform a maintenance event simulation. You define a maintenance event by specifying what happens, for example, a router goes down or a link fails. Then, based on that event, you simulate what happens to the live LSPs and traffic demands.	In Planner, you can run failure simulations (for example, fail a link or a router) and analyze the impact on traffic demand or LSP tunnels.
The network topology map shows live node status, link utilization, and LSP paths.	The 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 by using Path Computation Element (PCE) protocol (PCEP), BGP-LS, or NETCONF.	Import and parse router configuration, or add nodes, links, and LSPs for network modeling.
Provision LSPs directly to the network.	Add and stage LSPs to the offline model for simulation. However, you cannot provision LSPs to the live network.
Create or schedule maintenance events to reroute LSPs around the impacted nodes and links.	Create or schedule simulation events to analyze the network model from failure scenarios.

Table 1: Differences between Paragon Pathfinder and Paragon Planner *(Continued)*

Paragon Pathfinder	Paragon Planner
Dashboard reports show the current status of and key performance indicators (KPIs) for the live network.	Report manager provides extensive reports for simulation and planning.
Collects real-time interface traffic or delay statistics, and stores the data for querying and for displaying in charts.	Import interface data or aggregate archived data to generate historical statistics for querying and displaying in charts.

Accessing Web Planner

You can launch the Paragon Planner web application from within the Paragon Automation GUI.

Navigate to **Planning > Paragon Planner** page from the left-navigation menu of the Paragon Automation GUI to launch the Paragon Planner in a new tab.

NOTE: For information on how to log in to Paragon Automation, see *Single Sign-On Overview* and *Accessing the Paragon Automation GUI* in the *Paragon Automation User Guide*.

Paragon Planner Web UI Overview

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Once you have logged into the Paragon Automation, you can access the Paragon Planner GUI by selecting **Planning > Paragon Planner**.

The Paragon Planner Network Browser opens in a new tab displaying the **Sessions** page.

The Paragon Planner Web Application UI has the following main views:

- ["Network Browser" on page 7](#)
- ["Topology" on page 8](#)
- ["Simulation" on page 10](#)

Network Browser View

Paragon Planner's Network Browser has the following tabs on the left-navigation menu:

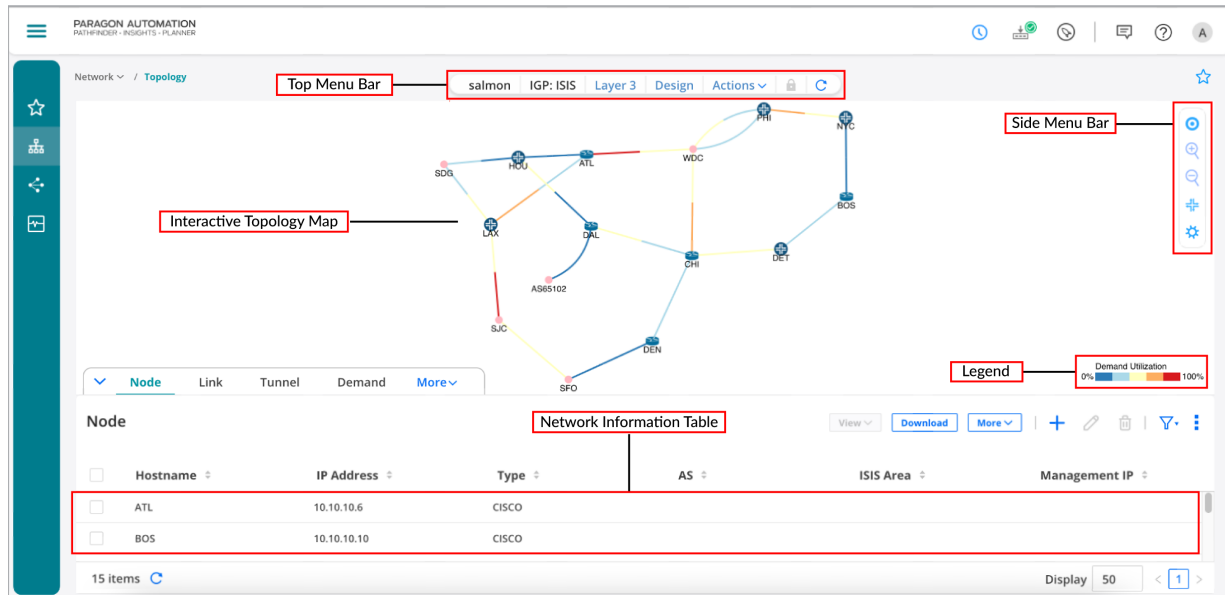
- **Sessions Tab**—A session is like an instance of a network. In the session, you can make changes to the network, view reports, and run failure simulations. For more information, see ["About the Sessions Page" on page 12](#).
- **Network Models Tab**:
 - **Saved Network Models**—Network models that are stored in the Planner database are displayed here. You can start a session or view existing sessions for a network model. You can also import a network model. For more information, see ["About the Saved Network Models Page" on page 14](#) and ["Import Network Using Saved Network Models" on page 16](#).
 - **Pathfinder Archives**—An archive is a snapshot of a network model. You can generate network archives from the Paragon Automation Task Scheduler (**Administration > Task Scheduler**) using the **Network Archive** task, after which, the archives are visible in the Pathfinder Archives tab. For more information, see ["About the Pathfinder Archives Page" on page 18](#).
 - **Pathfinder Collections**—A collection is a group of configuration files of the devices in your network. You can generate collections from the Paragon Automation Task Scheduler (**Administration > Task Scheduler**) using the **Device Collection** task when **Store Collection for Planner** field is selected. This task collects the configuration files from the network elements like routers and saves the files to the database. After this task is executed successfully, the collections are visible in the Pathfinder Collections tab. You can then build a network model by importing the files in the collection. For more information, see ["About the Pathfinder Collections Page" on page 19](#).
 - **Specification Files**—You can migrate your entire existing data directory from your application server to Paragon Automation. In the specification files, Paragon Planner uses spec. files which can be used to build a new network model. For more information, see ["About the Specification Files Page" on page 21](#).

NOTE: You can tag the network model as a favorite using the Star icon on the top-right corner on the topology page. Favorites are displayed in the **Favorites** tab in the left-navigation of the Network Browser.

Topology View

Once you start a session for a network model, you will be directed to the Topology Page.

Figure 1: Planner Topology Page



The Planner Topology is the main work area for any network model that you load into the system. It displays important link and node properties. Links are color-coded according to utilization.

The topology page has the following main sections:

- Left navigation menu with network topology and failure simulation options.
- Customizable topology map displayed at the center. The topology map is a graphical representation of the baseline network. For more information, see ["Interactive Planner Map Features" on page 31](#).
- A top menu bar that displays important network details and enables you to customize the topology map. For more information, see ["Top Menu Bar Overview" on page 50](#).

- A side menu bar that provides the following:
 - Zooming options:
 - Zoom to Fit—Center and adjust the size of the topology map in the page.
 - Zoom In (Plus icon)—Enlarge the topology map size.
 - Zoom out (Minus icon)—Reduce the topology map size.
 - Path Trace—View current path between two nodes.
 1. When you select the **Path Trace** icon, a message appears in the upper left corner of the topology map window, prompting you to select a source node on the topology map.
 2. When you select your desired source node on the map, you are prompted to select a destination node.
 3. Once you select your desired destination node, the **Path** window opens on the right displaying the current routes (links) between the selected nodes. You can click on each link displayed to zoom in on it on the map.

You can select **Highlight Path** to highlight the path between the source and destination on the map in yellow. You can also click **Hide Unrelated Nodes/Links** to hide all the nodes/links unrelated to the current path, from the topology map. Once you have hidden the unrelated nodes/links, you can view the entire network by selecting **Show All Nodes/Links**.
 - Topology Settings— Allows you to customize any network element (nodes, links, or tunnels), and provides general map settings like animations or map theme. For more information, see
- Network information table at the bottom displaying detailed information about the different network elements within the following tabs:
 - Node
 - Link
 - Tunnel
 - Demand
 - Interface
 - SRLG/Facility

For more information, see ["Network Information Table Overview" on page 52](#).

- Legend—Click on the Legend graphic at the right to customize the topology map colors based on any of the following options from the **Legend Settings** list:

- Demand Utilization—Displays the planned link utilization. Planned utilization is the percentage of the link bandwidth used by the demands you input into the network.
- Demand Peak Utilization—Displays the highest (or worst case) link utilization experienced by each link, depending on the rerouting of demand/flow traffic after any single failure simulation.
- Demand CoS Utilization—Displays the normal and peak utilization calculated based on demand routing.
- Measured Link Utilization—Displays the measured interface traffic on a node.
- Planner Node Load—Displays the planned traffic on a node.

You can move the arrows to the left or right on the color slider bar to customize the colors for the different utilization percentages. You can also click on the individual colors on the color bar to choose a different color for the display.

Simulation View

Simulation allows you to design and run failure simulations on your network model. This enables you to test the network's resiliency and discover worst-case scenarios. You can design a simulation that uses a single, double, or triple exhaustive failure combinations for a network element of your choice. For more information, see ["About the Failure Simulation Page" on page 77](#).

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Understand How You Can Get a Network Model into Planner

You can use any of the following methods to get a network model in Planner from the Network Browser:

- From the Task Scheduler (**Administration > Task Scheduler**) page in Paragon Automation (Pathfinder):
 - Add and run a new **Device Collection** task that collects the configuration data from the devices in your network. Select the **Store Collection to Planner** field while creating this task. Once the task completes, the collection is listed in the Pathfinder Collection page. Select a collection and use the **Import** wizard to create a new network model from that collection, after which it is listed in the Saved Network Models page. You can then start a planning session for the selected network model from the Saved Network Models page.
 - Add and run a new **Network Archive** task that archives the data collected from your network. Select **Archive Network Data After Processing** while creating this task. Once the task completes, the archive is listed in the Network Archive page. Since the network archive is a snapshot of the live network from Paragon Pathfinder, you can directly start a planning session for the selected archive from the Network Archives page.
- From the **Import** wizard on the Saved Network Models page, you can import a new network using the routers/switches configuration, OSPF/ISIS/TED databases, or using by specification (spec) files.

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About the Sessions Page

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This page lists information about ongoing planning sessions. A session is like an instance of a network. You can think of it as your working directory. When you start a session, you can make changes to the network, view reports, and run failure simulations on your network topology. When you're finished with your work, you can close the session with or without saving. You can attach (or detach) an existing session for a network model to quickly open up the planner topology page and resume your previous work. This is much faster than starting a new session every time you want to work on your planner network. If you save it, it then becomes available in the **Network Models > Saved Network Models** page.

When you first access the Paragon Planner, the Sessions page will be empty. When you start a session for a network model, the session related information will appear on this page.

You can 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.

Tasks You Can Perform

- **Attach Session**—Attaches the session for the network model and opens up the Planner topology view where you can configure the network.
- **Detach Session**—Detaches the session for the network model. You might have to detach a session to attach the session back again to open up the Planner topology.
- **Group by**—Select **Model** from the list to group sessions based on the network model it is associated with or select **None** (default).
- From the **More** list, you can:
 - **View details about existing sessions**—Click the Details icon when you hover over the session name or select **More > Detail**. The **Network Details** pane appears on the right displaying the network element names, tunnel, and hop counts.
 - **Download Model**—Click **More > Download Model** to compress all the network model related files and download it as a tar.gz file to your local machine.
 - **Share Session**—Click **More > Share..** to give access to the session with specific users. By default, only the user that had started the session can attach and share access to that session.

The Shared Access page appears.

To share or give access to a user:

1. From the **Username**s field, select one or more users that you want to give access to.
2. From the list on the right of the **Username**s field, select **Can Attach**.

3. Click **Add Users**.

The user is displayed under **Current Users**.

4. Click **Save** once you have completed giving the required access to each user added.

NOTE: To remove access to a user, select **Remove** from the permissions list next to the user's name on the **Share Access** page .

- Edit the session description—Select the session and click the **Edit** (pencil) icon. In the **Description** field, you can enter a text description for the session and click **OK**. The description is updated and is displayed on the Sessions page.

- Delete a session—Select the session and click the **Delete** (trashcan) icon. On the confirmation message, click **Yes**. The session is terminated and is removed from the Sessions page.

- Show/Hide Columns—Choose to show or hide a specific column in the table.

Hover over the **More Options** (vertical ellipsis) > **Show/Hide Columns** and select the *Column-Name* check box of the columns you want to display in the table.

- Reset Preference—Reset the displayed columns to the default set of columns for each tab in the table.

Hover over the **More Options** (vertical ellipsis) and select **Reset Preference**.

- Sort Entries—Click the column name to highlight the up and down arrows next to the column name, to sort the table entries in ascending or descending order.

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About the Saved Network Models Page

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You can view, download, edit, delete, or share network models that are already saved in the Paragon Planner database from the Saved Network Models page (**Network Models > Saved Network Models**).

To save a network model if you wish to work on it again later, on the Planner **Topology** page, from the **Actions** list in the top menu bar, click **Save Network** or **Save Network As**. The saved network models are then listed on the Saved Network Models page. This is the easiest way to build your own repository of different network models.

You can also import a collection from which you can create a network model. Once the collection import is successful, the new network model is listed on the Saved Network Models page.

Tasks You Can Perform

- **Start Session**—Click **Start Session** to start a new session associated with the selected network model. You will be redirected to the Topology page where you can configure your network.
- **View Sessions**—Click **View Sessions** to see all the sessions associated with the selected network model on the Sessions page.
- **Import Network**—Click **Import** to import your data files that can be converted to a Paragon Planner network model. For more information, see ["Import Network Using Saved Network Models" on page 16](#).
- From the **More** list, you can:
 - **View details about existing network models**—Click the Details icon when you hover over the network model name or select **More > Detail**. The **Session Details** pane appears on the right displaying the network element names, tunnel, and hop counts.
 - **Download Model**—Click **More > Download Model** to compress all the network model-related files and download it as a tar.gz file to your local machine.
 - **Share Network Model**—Select the network model and click **More > Share..** to give access or share the network model information with specific users. The user's permission level to view or edit the network model after attaching to it is determined by the share permission selected here.

The Shared Access page appears.

To share or give access to a user:

1. From the **Username**s field, select one or more users that you want to give access to
2. From the list on the right, select one of the following permissions for the user:
 - **Can view**: This option allows the user to only view the network model.

- Can edit: This option allows the user to view and edit the network model.
3. Click **Add Users**.
The user is displayed under **Current Users**.
 4. Click **Save** once you have completed giving the required access to each user added.

NOTE: To remove access to a user, select **Remove** from the permissions list next to the user's name on the **Share Access** page.

- Edit the network model description—Select the network model and click the **Edit** (pencil) icon. In the **Description** field, you can enter a text description for the network model and click **OK**. The description is updated and is displayed on the Saved Network Models page.
- Delete a network model—Select one or more network models and click the **Delete** (trashcan) icon. On the confirmation message, click **Yes**. The network model is deleted and is removed from the Saved Network Models page.
- Show/Hide Columns—Choose to show or hide a specific column in the table.

Hover over the **More Options** (vertical ellipsis) > **Show/Hide Columns** and select the *Column-Name* check box of the columns you want to display in the table.
- Reset Preference—Reset the displayed columns to the default set of columns for each tab in the table.

Hover over the **More Options** (vertical ellipsis) and select **Reset Preference**.
- Sort Entries—Click the column name to highlight the up and down arrows next to the column name, to sort the table entries in ascending or descending order.

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Import Network Using Saved Network Models

The network import option enables you to import data files that can be converted to a network model.

1. Select **Network Models** > **Saved Network Models**.

The Saved Network Model page appears.

2. Select **Import**.

The Import Network page appears.

3. Configure the fields as described in [Table 2 on page 17](#).

NOTE: Fields marked with asterisk (*) are mandatory.

4. Click **Add**.

A confirmation message appears stating that the network import was successful and is available in the **Saved Network Models** page.

Table 2: Fields on the Import Network Page

Field	Description
Import Type	<p>Select one of the following types of import:</p> <ul style="list-style-type: none"> • Specs (this is the easiest way to import a network as the spec file is easily parsed by Paragon Planner) • Router and Switches (router configuration files) • OSPF/ISIS Database • TED Database <p>NOTE: When you select Routers and Switches, OSPF/ISIS Database, or TED database as the Import Type, you have the option to select various optional advanced settings or to ignore one or more IP addresses/ERX interfaces. For more information, see <i>Import Network Wizard</i> in the <i>Paragon Planner Desktop Application User Guide</i>.</p>
Network Name	Enter a name for the network. Only “ _ - . : > < (symbols) are allowed. Character limit is be 255.
Description	Enter a description for the network.
Import from File	Click Browse and navigate to the .tar or tar.gz file that you want to import.

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About the Pathfinder Archives Page

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You can view information about networks archived from Paragon Pathfinder on the Pathfinder Archives (**Network Models > Pathfinder Archives**). An archive is a snapshot of the live network in Pathfinder.

To archive a network from Paragon Pathfinder, you must add and run a **Network Archive** task. For more information, see *Add a Device Collection Task* in the *Paragon Automation User Guide*. The number of archives generated depends on the frequency selected during the task creation.

NOTE: Ensure that you select the **Archive Network Data After Processing** field when you create the network archive task. Once this task completes, the collection is listed in Pathfinder Archives page in Paragon Planner.

Tasks You Can Perform

- **Start Session**—Click **Start Session** to start a new session associated with the selected network archive. You will be redirected to the Topology page where you can configure your network.
- From the **More** list, you can view details about existing network archives—Click the Details icon when you hover over the archive name or select **More > Detail**. The Archive Details pane appears on the right.
- **Show/Hide Columns**—Choose to show or hide a specific column in the table.

Hover over the **More Options** (vertical ellipsis) > **Show/Hide Columns** and select the *Column-Name* check box of the columns you want to display in the table.

- **Reset Preference**—Reset the displayed columns to the default set of columns for each tab in the table.

Hover over the **More Options** (vertical ellipsis) and select **Reset Preference**.

- **Sort Entries**—Click the column name to highlight the up and down arrows next to the column name, to sort the table entries in ascending or descending order.

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About the Pathfinder Collections Page

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You can view or delete collections that are imported from Pathfinder in the Pathfinder Collections (**Network Models > Pathfinder Collections**) page. You can import a new network using from the selected collection.

To import a collection from Pathfinder, you must add and run a **Device Collection** task to collect configuration data for all or selected devices in your network. For more information, see *Add a Device Collection Task* in *Paragon Automation User Guide*. After this task completes, the collection is listed in Pathfinder Collections page. You can then import the collection to build a network model.

NOTE: Ensure that you select the **Store Collection to Planner** field while creating the network archive task.

Tasks You Can Perform

You can perform the following tasks from this page:

- Import a collection. For more information, see ["Import Network from Collection" on page 20](#).
- Group By—Select **Task** from the list to group collections based on the device collection task associated with it or select **None** (default).
- From the **More** list, you can view details about existing collections—Click the Details icon when you hover over the collection name or select **More** > **Detail**. The Collection Details pane appears on the right displaying information about devices associated with the collection (IP address, Management IP address, and Hostname) and general collection details.
- Delete a collection—Select the collection and click the **Delete** (trashcan) icon. On the confirmation message, click **Yes**. The collection is deleted and is removed from the Pathfinder Collections page.
- Show/Hide Columns—Choose to show or hide a specific column in the table.

Hover over the **More Options** (vertical ellipsis) > **Show/Hide Columns** and select the *Column-Name* check box of the columns you want to display in the table.

- Reset Preference—Reset the displayed columns to the default set of columns for each tab in the table.

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Import Network from Collection

The import network option enables you to import data files that can be converted to a network model.

1. Select **Network Models** > **Pathfinder Collections**.

The Pathfinder Collections page appears.

2. Select the collection you wish to import and click **Import**.

The Import Network page appears.

3. Configure the fields as described in [Table 3 on page 21](#).

NOTE: Fields marked with asterisk (*) are mandatory.

4. Click **Add**.

A confirmation message appears stating that the network import was successful and is available in the **Saved Network Models** page.

Table 3: Fields on the Import Network Page

Field	Description
Import Type	Automatically selected as Collection Table .
Network Name	Enter a name for the network. Only “ _ - . : > < (symbols) are allowed. Character limit is be 255.
Description	Enter a description for the network.
Advanced > Options	(Optional) Select the advanced settings. You can also ignore one or more IP addresses or ERX interfaces by entering the required values in the Ignore IP Address and Ignore ERX interfaces respectively.

About the Specification Files Page

IN THIS SECTION

- [Specification File Overview | 22](#)
- [Migrate Data from NorthStar to Paragon Automation | 28](#)

A specification file is a text file that specifies all the network input files to be loaded for the network model.

NOTE: Ensure that you perform data migration first as per the procedure described in ["Migrate Data from NorthStar to Paragon Automation" on page 28](#).

Specification files (spec) are used by the Planner to determine which input directories and files to load for the network. You can migrate your entire existing NorthStar data directory from your application server to Paragon Automation. For more information on specification files, see ["Specification File Overview" on page 22](#).

Within the specification file, navigate and select the required spec. file. A **File Details** pane appears on the right. Click **Start Activity** to create session for the network model.

Specification File Overview

You can read or navigate to the files within the specification file folder. [Table 4 on page 22](#) mentions these file categories and lists the individual files present in it.

Table 4: Spec File Categories

Type of Files	File Names
Backbone Files	bblink, demand, domainfile, facility, graphcoord, group, muxloc, newdemand, nodeparam, owner, site, svcprofile, and srvctype. See Table 5 on page 23 .
Cost Files	custrate and usercost. See Table 6 on page 25 .
Control Files	admincost, fixlink, linkdist, nodeweight, and rsvbwfile. See Table 6 on page 25 .
Traffic Files	devicedir, egress, ingress, t_trafficload, trafdir, trafficload, and tunneltrafdir. See Table 7 on page 26 .
Access Design Files	chanbank, offckt, offgraphcoord, offloc, and offsitek.
Discrete Event Simulation	tfxdata and tfxpattern. See Table 8 on page 26 .
Device-Specific Files	aclist, bgplink, bgpnode, bgpobj, intfmap, junospolicy, policymap, route, tbit, tunnel, and vpn . See Table 9 on page 27 .

Table 5 on page 23 describes the network backbone files that specify how the network is represented.

Table 5: Spec File Backbone Files List

File	Description
bblink	The bblink file contains backbone link information for the network. Each link entry is defined by a link name [optional], From_Location, To_Location, vendor, number of links, and link type. A vendor may be specified as DEF (default) if it is not known.
demand	The demand file contains user traffic requirements. A demand is defined by an ID, From_Location, To_Location, Bandwidth, Type, Priority, and Preempt Priority.
domainfile	The domainfile contains the definitions for domain elements. Domain elements are defined by ID, name, and color to be used in the Map window. If OSPF is present in the network, this file is used to define OSPF areas.
facility	The facility file defines the links or nodes or both associated with a facility. In this file, the first field defines the facility name. The subsequent fields specify the node IDs or link names associated with that facility, delimited by tabs, spaces, or commas. All elements associated with a facility should be specified on the same line. Whenever more than one line is needed to specify the elements, a backslash, '\', must be used to indicate that the element list is continued on the next line. The facility feature does not check the validity of the nodes and/or links listed in the facility file. Duplicate links and/or nodes are also duplicated in the facility. Nodes may be specified either by their node ID or node name. If both are used in the same facility, then that node is duplicated. Nodes which are not in the mux file and links not in the bblink file are ignored.
graphcoord	The graphcoord file is used to position nodes at coordinates different from their true geographic location. This is helpful when multiple nodes have the same NPANXX location or are located in close proximity to each other. You can move the nodes by selecting and dragging them to the desired location. The pricing information does not change because the change is only to the graphical representation and not a physical change.
group	The group file defines the grouping of nodes in the network topology. Discs are painted on the Standard map around grouped nodes.

Table 5: Spec File Backbone Files List *(Continued)*

File	Description
muxloc	Muxloc specifies the file containing switch information such as name, ID, NPANXX, latitude, longitude, vertical, or horizontal. This information is used to determine location placement in the map window as well as for link pricing.
newdemand	The newdemand file 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.
nodeparam	The nodeparam file allows you to define specific information on a per-node basis such as the hardware type, vendor, or model.
owner	The owner file facilitates identifying the ownership of nodes and demands. Ownership should be specified in either the muxloc or demand files.
site	The site file specifies site information. The site file is used to define nodes in the same physical location such as a building or campus.
service profile	The service profile file lists the service types and the percentage that are in each service profile.
service type	The service type file lists service types (for example, FTP, TELNET) and their descriptions (for example, owner, min. and max. bandwidth, type, pri, pre).

[Table 6 on page 25](#) describes the cost and control files which are used to assign tariffs and implement link controls.

Table 6: Cost and Control Files

File	Description
custrate	The custrate file is used to assign tariffs for links used in the network to approximate the total cost of the network. You can specify the parameters from which these tariffs are calculated using the modify custom rate and custom rate class windows.
usercost	The usercost file is used to define the cost for links according to the end nodes, vendor, and link type.
admincost	The admincost file contains rules to set each link default admin weight/metric according to attributes such as link type, mileage, and the hardware type and sites of the endpoints.
fixlink	The fixlink file specifies information for links that cannot be removed from the backbone topology. For varying reasons, a customer might have a group of links in the backbone that cannot be removed (even if it is optimal to do so). In this case, during the optimization phase of the design, links from the fixlink file are not modified. Note that the bblink file might be used for the fixlink file if the current topology cannot be changed.
linkdist	The linkdist file is used to define link distance values on a node pair basis. Link distances can be used to bias path routing by assigning either a higher or lower weight to a node pair. If a linkdist file is not specified or a particular link's metric is not defined, and the Admin Weight routing method is specified in the design options of the Path Placement tab, the default link distance value is assigned.
nodeweight	<p>The nodeweight file is used to restrict the creation of links at particular nodes during design by assigning to the node a penalty for adding links or the maximum bandwidth capacity for links. This file can also be used to restrict the transit demand bandwidth at a node if the hardware model supports path configuration for demands.</p> <p>Every entry in the nodeweight file consists of four fields: node ID or name, node weight (link penalty for design), maximum bandwidth capacity (to carry links), and transit demand bandwidth limit. Fields are separated by spaces or tabs. A node weight is required if maximum link bandwidth capacity is to be specified.</p>
rsvbwfile	The rsvbwfile is used to define reserved bandwidth for links between specific node pairs. Reserved bandwidth is specified as a fixed bandwidth (fixfat) plus a percentage of the link bandwidth (fatpct).

Table 7: Traffic Files

File	Description
egress	The egress file 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	The ingress file 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.
trafdir, tunneltrafdir	<p>The trafdir file identifies the location of the daily interface traffic directories repository.</p> <p>The tunneltrafdir file identifies the location of the tunnel traffic directories repository.</p>
trafficload, t_trafficload	<p>The trafficload file allows you to import measured bandwidth utilization 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.</p> <p>The t_trafficload file (IP/MPLS only) is similar to the trafficload file, but for LSP tunnels (layer 2 instead of layer 3).</p>

Table 8: Discrete Event Simulation

File	Description
tfxdata	The trafficdata file allows you to define each demand by specifying multiple packets and packet sizes. Although this requires you to have a reasonable knowledge of the traffic, more accurate network simulation results can be obtained in this manner.
tfxpattern	The trafficpattern file allows you to define several class types based on traffic characteristics. Each traffic type may be specified in terms of four parameters: number of messages, duration (seconds), message size (bits), and frame size (bytes).

[Table 9 on page 27](#) describes the device specific files that contain the definitions for various types of devices.

Table 9: Device-Specific Files

Field	Description
aclist	The aclist file (Router only) contains information about access rules such as access lists, distribute lists, and filter lists.
bgplink	The bgplink file (Router only) contains the definitions for BGP neighbors.
bgpnode	The bgpnode file (Router only) contains the definitions for BGP speakers.
bgpobj	The bgpobj file (Router only) contains information about BGP neighbors and is stored in binary format to speed up performance. Note: If you want to manually edit bgpnode and bgplink, comment out this entry before reloading the network.
intfmap	The intfmap file (Router only) contains information about router interfaces, including the node, interface, IP address, status, bandwidth, VPN-list, and other details.
polycymap	The polycymap file (Router only) contains information about CoS Policies on each router.
tbit	The tbit file (Router only) stores names for the tunnel attributes (otherwise referred to as admin group for Juniper Networks).
tunnel	The tunnel file (Router only) contains information about LSP tunnels.
vpn	The vpn file (Router only) contains information about Virtual Private Network details such as vrf, route distinguisher, route target, and protocols.

RELATED DOCUMENTATION

https://www.juniper.net/documentation/en_US/northstar6.2.1/topics/reference-general/ipmpls-file-backbone.html

Migrate Data from NorthStar to Paragon Automation

IN THIS SECTION

- [Migrate NorthStar Planner Data | 28](#)

Use the steps described in this topic to migrate data from NorthStar to Paragon Automation.

NOTE: Ensure that both the NorthStar and Paragon Automation setups are up and running.

Migrate NorthStar Planner Data

If you want to use saved NorthStar Planner models on the NorthStar application server file system in Paragon Automation, copy the models using the following steps:

1. Log in to the NorthStar server.
2. Use `scp` and copy the directory (`/opt/northstar/data/specs`) where your Planner models are saved to the Paragon Automation primary node (`/root/ns_specs`). For example:

```
[root@ns1-site1-q-pod21 specs]# ls -l /opt/northstar/data/specs
total 8
drwx----- 2 root root 4096 Sep 16 08:18 network1
drwx----- 2 root root 4096 Sep 16 08:18 sample_fish

[root@ns1-site1-q-pod21 data]# [root@ns1-site1-q-pod21 ~]# scp -r /opt/northstar/data/specs
@10.xx.xx.153:/root/ns_specs
The authenticity of host '10.xx.xx.153 (10.xx.xx.153)' can't be established.
ECDSA key fingerprint is SHA256:haylHqFfEuIEm8xThKbHJhG2uuTpT2xBpC2GZdzfZss.
ECDSA key fingerprint is MD5:15:71:76:c7:d2:2b:0d:fe:ff:0d:5f:62:7f:52:80:fe.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '10.xx.xx.153' (ECDSA) to the list of known hosts.
bblink.x
          100% 3893      2.2MB/s   00:00
bgplink.x
          100%  140      9.6KB/s    00:00
bgpnode.x
          100%  120     56.5KB/s   00:00
```

```

bgpobj.x
      100% 4888    1.8MB/s   00:00
cosalias.x
      100%  385   180.4KB/s   00:00
custrate.x
      100% 1062   184.0KB/s   00:00
demand.x
      100% 104KB   2.1MB/s   00:00
dparam.x
      100%  11KB   2.5MB/s   00:00
...

```

3. Log in to the Paragon Automation primary node.
4. Copy the **/root/ns_specs** folder to the NorthStar Planner pod at **/opt/northstar/data/specs** using the **kubectl** command. For example:

```

root@pa-primary:~# ls -l /root/ns_specs
total 8
drwx----- 4 root root 4096 Sep 16 01:41 network1
drwx----- 4 root root 4096 Sep 16 01:41 sample_fish

root@pa-primary:~# kubectl cp /root/ns_specs northstar/$(kubectl get po -n northstar -l
app=ns-web-planner -o jsonpath={..metadata.name}):/opt/northstar/data/specs -c ns-web-planner

```

5. Verify that the NorthStar Planner models are copied inside the NorthStar Planner pod at **/opt/northstar/data/specs/ns_specs**.

```

root@pa-primary:~/ns_specs# kubectl exec -it $(kubectl get po -n northstar -l app=ns-web-
planner -o jsonpath={..metadata.name}) -c ns-web-planner -n northstar -- ls -l /opt/northstar/
data/specs/ns_specs
total 8
drwx----- 2 root root 4096 Sep 16 08:18 network1
drwx----- 2 root root 4096 Sep 16 08:18 sample_fish

```

RELATED DOCUMENTATION

[Paragon Planner Web UI Overview](#) | 6

3

CHAPTER

Topology

[Interactive Planner Map Features | 31](#)

[Top Menu Bar Overview | 50](#)

[Simulation Mode Overview | 51](#)

[Network Information Table Overview | 52](#)

Interactive Planner Map Features

IN THIS SECTION

- [Group Nodes | 45](#)
- [Auto Grouping Nodes | 46](#)
- [Ungroup Nodes | 48](#)
- [Manage Layouts | 48](#)

The Paragon Planner map is interactive (similar to Topology page in Paragon Automation) which means you can use several features within the map to customize the map and the network information table. The topology map is the main work area for any network model you load into the system. Links are color-coded according to utilization. The map uses a geographic coordinate reference system.

Path analysis can be performed in the topology window. The path function displays detailed path information between any two nodes found in the network based on factors such as routing method used, reserved and actual bandwidth allocation, link distance, or over subscription.

For information about network information table, see "[Network Information Table Overview](#)" on page 52.

Right-click Functions

You can right-click a node, node group, link, or blank space on the topology map to access context-specific menus.

[Table 10 on page 32](#) describes the options that are displayed when you right-click any where on the topology map.

Table 10: Right-Click Options for Blank Space on the Topology Page

Option	Description
Grouping	
You can view, group, or ungroup the nodes in a node group.	
Nodes & Groups	Displays the nodes and node groups in the topology. You can select a particular node group to be displayed on the topology map.
Auto Grouping	Enables you to specify the criteria that are used to automatically group nodes. For more information, see "Auto Grouping Nodes" on page 46 .
Group Selected Nodes	Groups the selected nodes. For more information, see "Group Nodes" on page 45 .
Ungroup Selected Nodes	Ungroups the nodes from the selected group. For more information, see "Ungroup Nodes" on page 48 .
Ungroup All	Ungroups the nodes in all groups.
Select All Nodes	Selects all the nodes on the topology map. This option is a shortcut to using the Shift+left-click option to create a selection box around all nodes or individually shift-clicking on all nodes.
Show All Nodes and Links	Restores the topology map so that it includes all the nodes and links in the network, as opposed to a filtered subset.
Save to Default Map Layout	Saves the current layout as the default. Selecting this option does not change the name of the default in the Manage Layouts page.
Layout	
Manage Map View	Save, load, or edit the current topology map. For more information, see "Manage Layouts" on page 48 .

Table 10: Right-Click Options for Blank Space on the Topology Page *(Continued)*

Option	Description
Distribute All Nodes	Select multiple nodes on the topology map and redistribute them to improve visual clarity or for personal preference. Distributes all the nodes in the map, pushing elements away from each other and minimizing overlap.
Distribute Selected nodes	Forces the selected elements away from each other and minimizes overlap.
Circle selected nodes	Arranges the selected nodes in a roughly circular pattern, with the nodes and links separated adequately.
Straighten selected nodes	Aligns the selected nodes in a linear pattern.
Reset by Coordinates	Resets the map to display the nodes based on their configured coordinates (latitude and longitude). NOTE: You can reset the distribution of the nodes on the topology map according to geographical coordinates if you have set the latitude and longitude values of the nodes. It can be useful to have the country map backdrop displayed when you use this distribution model.
Import from	Import a layout from a CSV or GeoJSON file. For more information, see https://geojson.org/ .
Export to	Export a layout to a CSV or GeoJSON file.

Table 10: Right-Click Options for Blank Space on the Topology Page *(Continued)*

Option	Description
Node Label	<p>Select one of the following options to label the nodes on the topology map:</p> <ul style="list-style-type: none">• Name• Hostname• IP address• IPv6 Address• IP, SID• ISIS System ID• OS version• OSPF ref BW• SID• Type• Hide Label—Hides all the labels for the network elements on the topology map

Table 10: Right-Click Options for Blank Space on the Topology Page *(Continued)*

Option	Description
Link Label	<p>Select one of the following options to label the links on the topology map:</p> <ul style="list-style-type: none"> Name Node Name A::Z Interface A::Z IP A::Z IP, SID A::Z TE Metric A::Z Bandwidth A::Z Delay A::Z Interface Util A::Z ISIS1 Metric A::Z ISIS2 Metric A::Z Measured Delay A::Z OSPF Metric A::Z Packet Loss Metric A::Z RSVP Bandwidth A::Z RSVP Util A::Z RSVP Live Util A::Z Shape BW A::Z SID A::Z SRLG TE Admin Group A::Z Hide Label
Favorites	
Add Selected Nodes to Favorites	Select nodes on the topology map and designate them as favorites.
Remove Selected Nodes from Favorites	Removes the nodes that you select on the topology map from the Favorites tab.
Clear Favorites	Clears all the existing favorite nodes.
Highlight Favorites	Highlights only the favorite nodes on the topology map.
Show only Favorites	Displays only the favorite nodes on the topology map.

Table 10: Right-Click Options for Blank Space on the Topology Page *(Continued)*

Option	Description
Hide Favorites	Hides all the favorite nodes on the topology map.
Subview	Filters the network elements on the topology map based on Node Type, Autonomous System (AS) number, OSPF Area, ISIS Area, or Layer. For more information about these options, see Table 11 on page 36 .

Table 11: Subview Options

Options	Description
Node Type	Select the node types from the list.
AS	<p>Assign a color to represent each AS number that is configured on the topology map.</p> <p>From the AS pane, you can select or clear AS numbers by selecting or clearing the corresponding check boxes. Only nodes corresponding to the selected AS numbers are displayed in the topology map.</p>
ISIS Area	<p>Assign a color to represent each IS-IS area identifier that is configured on the topology map. The area identifier is the first three bytes of the ISO network entity title (NET) address.</p> <p>From the ISIS area pane, you can select or clear ISIS area identifiers by selecting or clearing the corresponding check boxes. Only nodes corresponding to the selected area identifiers are displayed in the topology map.</p>
OSPF Area	<p>Assign a color to represent each OSPF area that is configured on the topology map. NONE shows the color assigned to routers that have no OSPF area configured.</p> <p>From the OSPF Areas pane, select or clear OSPF areas by selecting or clearing the corresponding check boxes. Only nodes corresponding to the selected OSPF areas are displayed in the topology map.</p>
Layer	<p>Include or exclude individual layer information in the topology map.</p> <p>From the Layers list, select the layers (IP, Transport, or both) that you want to display. If you are not using the Multilayer feature, the Layers list contains only IP.</p>

Table 12 on page 37 describes the right-click options for a node or selected node group on the topology map.

Table 12: Right-Click Options for Nodes or Node Groups

Option	Description
Filter in Node Table	Filters the nodes that are displayed in the network information table to display the selected nodes or node groups only.
Tunnels	
Tunnels On or Thru Node	Opens a new tab in the network information table to show only those tunnels that meet the On or Thru Node criteria.
Tunnels Starting at Node	Opens a new tab in the network information table to show only those tunnels that start at the selected node.
Tunnels Ending at Node	Opens a new tab in the network information table to show only those tunnels that end at the selected node.
Tunnels Passing Through Node	Opens a new tab in the network information table to display only those tunnels that pass through the selected node.
Demands	
Demands on Thru Node	Opens a new tab in the network information table to show only those demands that start at the selected node.
Demands Starting At Node	Opens a new tab in the network information table to show only those demands that end at the selected node.
Demands Ending At Node	Opens a new tab in the network information table to show only those demands that end at the selected node.
Demands Passing through Node	Opens a new tab in the network information table to display only those demands that pass through the selected node.

NOTE: For the description of other right-click options, see [Table 10 on page 32](#).

[Table 13 on page 38](#) describes the right-click options for a link on the topology map.

Table 13: Right-Click Options for Links

Option	Function
Filter in Link Table	Filters the tunnels that are displayed in the network information table to display only the selected link.
Tunnels On or Thru Link	Opens a new tab in the network information table to show only those tunnels that meet the On or Thru Link criteria.

NOTE: For the description of other right-click options, see [Table 10 on page 32](#).

Topology Settings

You can access the Topology Settings pane by clicking the **Settings** icon in the Topology menu bar located at the upper right corner of the Topology Page.

[Table 14 on page 39](#) describes the tabs on the Topology Settings pane.

Table 14: Topology Settings Options

Tab	Description
Nodes	<p data-bbox="427 367 808 396">You can perform the following tasks:</p> <ul data-bbox="427 430 1377 888" style="list-style-type: none"><li data-bbox="427 430 1377 499">• Change the labels of all the nodes on the topology map by selecting an option from the Label list.<li data-bbox="427 531 1040 888">• After you select a label, click the toggle button to view:<ul data-bbox="464 594 867 888" style="list-style-type: none"><li data-bbox="464 594 867 623">• Background shadow of node labels<li data-bbox="464 657 695 686">• Pseudo node label<li data-bbox="464 720 764 749">• Only favorite node labels<li data-bbox="464 783 654 812">• Isolated nodes<li data-bbox="464 846 712 875">• Overload bit marker

Table 14: Topology Settings Options (*Continued*)

Tab	Description
Links	<p>You can perform the following tasks:</p> <ul style="list-style-type: none"> • Change the labels of all the links on the topology map by selecting an option from the Label list. • Click the toggle button to: <ul style="list-style-type: none"> • Show or hide the link down markers • Represent down links as a dashed line • Represent a link line of width in proportion to the interface speed • Draw parallel links as a curve: Toggle the button to draw parallel links between two nodes as a curve, so that the parallel links do not overlap and appear separately (as curves) on the topology map. If the parallel links between two nodes are drawn as straight lines, they would overlap on the topology map (as a bundle). • Show utilization max instead of Average within bundle: Toggle this button to display the maximum utilization value (in red) instead of the average utilization value for parallel links. For example, if there are two parallel links between two nodes and one link has 10% utilization and the other has 20% utilization, and you want to draw the link as a straight line between the nodes, you can choose which utilization value should be displayed: 15% (average) or 20% (maximum) value. • Wrap links as Great Arcs: Distinguishes links that would have to wrap around the world map.

Table 14: Topology Settings Options (Continued)

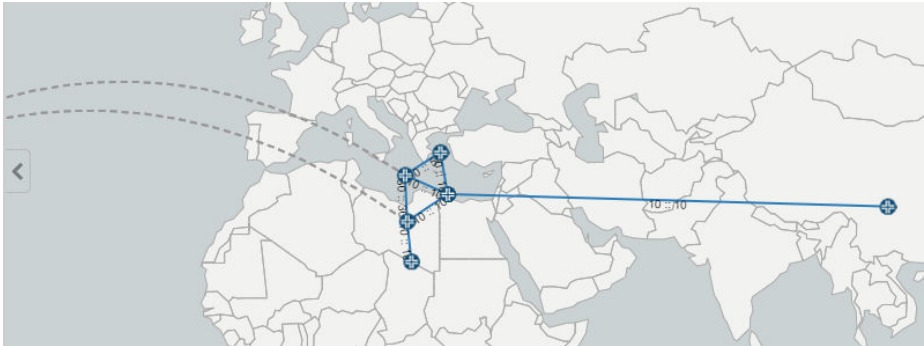
Tab	Description
	<p>Figure 2: Example: Wrap Links as Great Arcs</p>  <ul style="list-style-type: none">• Hide Partially Visible links: Hides any link whose end nodes are outside the visible area. This is useful for focusing on a subset of a large network. <p>NOTE: The topology map does not display more than a certain number of node or link labels, even if the topology settings call for labels to be displayed. This can be improved by reducing the number of elements displayed by panning or zooming which will re-enable the label display.</p>

Table 14: Topology Settings Options *(Continued)*

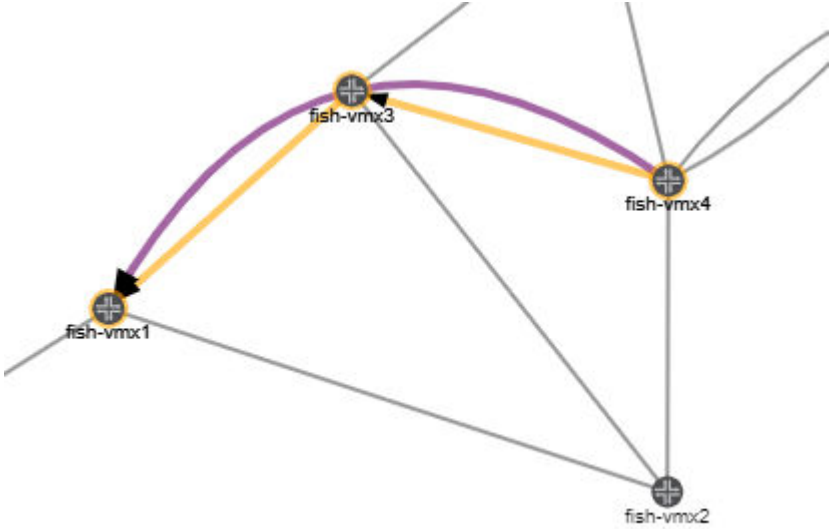
Tab	Description
Tunnels	<div>You can perform the following tasks:</div> <ul style="list-style-type: none">Click the toggle button to draw a path as a curve, which might improve network visualization. <p>Figure 3 on page 42 shows both curved and straight lines for the same path.</p> <p>Figure 3: Example: Curved and Straight Line Path Depiction</p>  <ul style="list-style-type: none">Click the toggle button to draw a path through layers if the network includes transport layers.

Table 14: Topology Settings Options (*Continued*)

Tab	Description
General	<p>You can perform the following tasks:</p> <ul style="list-style-type: none"> Click the toggle button to: <ul style="list-style-type: none"> Enable animation while calculating the topology layout. Show or hide zoom slider: A vertical slider is displayed on the topology menu bar on the top right corner of the topology window. Enable or disable to zoom to selected node: With this option enabled, when you click the node entry in the network information table (the Node tab), the topology automatically centers the view on that selected node. Select a Label Size: Select one of the following values as the font size for the node and link labels: <ul style="list-style-type: none"> 8 10 12 14 16 18 20 Apply Opacity effects: Move this slider to select the percent opacity for unhighlighted topology map elements. Example below shows 100% and 20% opacity for comparison.

Table 14: Topology Settings Options *(Continued)*

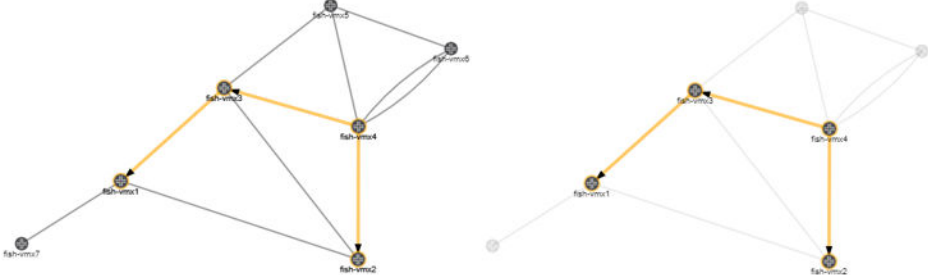
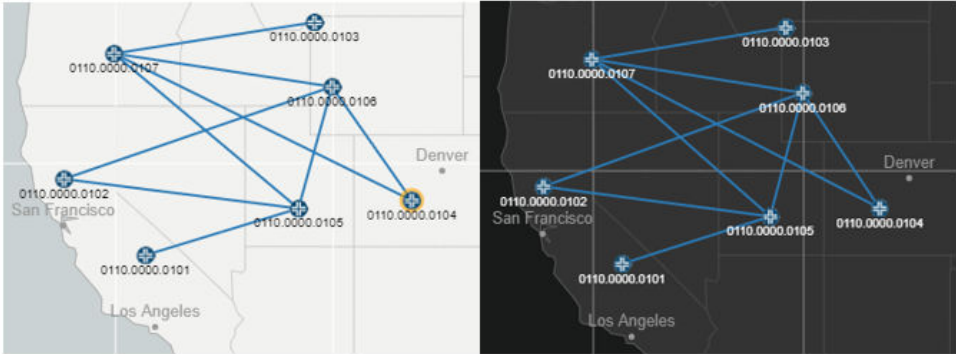
Tab	Description
	<div data-bbox="467 352 870 386">Figure 4: Example: Opacity Effects</div> <div data-bbox="475 457 1398 730"></div>

Table 14: Topology Settings Options (Continued)

Tab	Description
Map	<p>You can perform the following tasks:</p> <ul style="list-style-type: none">• Select a Light or Dark theme for the topology map. <p>Example below shows an example of the light and dark map styles.</p> <p>Figure 5: Example: Light and Dark Map Styles</p>  <ul style="list-style-type: none">• Show Graticules: Displays graticules (a grid of lines that is parallel to the meridians of longitude and the parallels of latitude) and labeling of major populated places.• Show World Map: You can select the type of map (based on color or labeling) to be displayed on the Topology page. Based on your selection, the topology map is updated immediately. You can select one of the following options:<ul style="list-style-type: none">• Pathfinder—Displays the topology on the greyscale world map.• Pathfinder No Labels—Displays the topology on the world map without highlighting the city or country names.• Thunderforest Atlas—Displays the topology map on a colored world map with city and country names highlighted.

Group Nodes

You can represent a collection of nodes on the topology map as a single entity called node groups.

To create a node group:

1. Click **Network > Topology**.

The Topology page is displayed with the topology map at the center and the network information table at the bottom of the page.

2. Select the nodes on the topology map by holding down the Shift key and left mouse button and dragging the mouse to create a rectangular selection box. All elements within the box are selected.
3. Right-click and select **Grouping > Group Selected Nodes**.

The Group Selected Nodes window appears.

4. Enter a name in the **Group Name** field.

NOTE: The group name should be alphanumeric and unique. It cannot be the same as any node ID or hostname.

5. Click **OK**.

The selected nodes are grouped and displayed as a single entity on the topology with a new Node Group icon highlighted in yellow.

The new group name is displayed in the **Grouping > Nodes & Groups** page when you right-click anywhere on the screen.

On the **Nodes & Groups** page, you can control how the group is displayed in the topology map. You can uncheck the Group Name checkbox to hide the node group on the topology map. When you expand a group in the Nodes & Groups list, the nodes are displayed individually on the map. When you collapse a group in the Nodes & Groups list, only the group name appears on the topology map represented by an icon.

NOTE: You can also double-click the Group Node icon to view the nodes separately on the topology map.

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Auto Grouping Nodes

Auto Grouping option enables you to use multiple rules in sequence to group nodes.

To auto group nodes:

1. Click **Network > Topology**.

The Topology page is displayed with the topology map at the center and the network information table at the bottom of the page.

2. Select the nodes on the topology map by holding down the Shift key and left mouse button and dragging the mouse to create a rectangular selection box. All elements within the box are selected.

3. Right-click and select **Grouping > Auto Grouping**.

Auto grouping pane is displayed on the right.

4. Hover over the **Add** list and select a rule type from one of the following:

- AS
- ISIS Area
- OSPF Area
- Site
- Regular Expression: Add a more specific rule by using regular expressions to group nodes by Hostname, IP address, or Type. You can find the first match for any case-sensitive expression.

NOTE:

- You can create one rule for each rule type.
- The Edit (pencil icon) function is only available for Regular Expression rules.
- You can change the order of the rules by clicking on a rule by selecting **Up** or **Down** from the **Move** list to reposition the rule in the list.
- You can also select the check box (at the bottom of the page) to apply auto-grouping to the nodes that you have selected on the topology map. By default, this is disabled.

5. Click **Submit**.

NOTE: To delete a rule, select the rule and click the Delete (trash can) icon. On the confirmation message, click **Yes**.

RELATED DOCUMENTATION

Ungroup Nodes

Nodes that are part of a node group are displayed as a single entity (node group icon) on the topology map. To view these nodes as discrete entities on the topology map, you must ungroup the nodes from the node group.

To ungroup nodes from an existing node group:

1. Click **Network > Topology**.

The Topology page is displayed with the topology map at the center and the network information table at the bottom of the page.

2. Right-click on the node group and select **Grouping > Ungroup Selected Nodes**. Alternatively, you can double-click the node group icon (highlighted in yellow) to ungroup the nodes on the topology map.

The nodes within the node group are ungrouped and are visible as separate nodes on the topology map. The node group is removed from the **Nodes & Groups** page (right-click anywhere on the **Topology** map and select **Grouping > Nodes & Groups**).

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Manage Layouts

From the **Map View** page, you can save topology map layouts, quickly load them to the topology map, edit the saved layouts, or delete saved layouts.

To save a map layout so you can quickly load it into the topology map:

1. Click **Network > Topology**.

The Topology page is displayed with the topology map at the center and the network information table at the bottom of the page.

2. Right-click on the topology map and select **Layout > Manage Map View**.

The Manage Map View pane is displayed on the right.

3. Click **Save**.

4. Enter a name for the current layout.

5. Enter a description for the current layout.

6. Specify whether the saved layout is to be shared with all operators (shared) or is to be available only to you (private).

7. Click **Save**.

The current layout is saved and listed on the Map View table.

NOTE: You can also right-click a blank part of the topology map pane and select **Save Default Map Layout** to save the current layout as your default. This action saves the current layout as your default, but does not change the name of the default map layout in the **Manage Layouts** window.

Table 15 on page 49 describes the functions you can perform on the saved layouts.

Table 15: Map View Window Buttons

Button	Functions
Load	Load the selected layout to the topology map.
Edit	<ul style="list-style-type: none"> Edit the name of the selected layout by clicking Edit > Rename. In the New Name field, enter the new name of the selected layout and click OK. Edit the description of the selected layout by clicking Edit > Change Description. In the New Description field, enter the new description for the selected layout and click OK. Set the selected layout as default by clicking Edit > Set to default. <p>NOTE: The default layout is displayed you log in to Paragon Automation for the first time.</p>
Delete	Select a layout from the list and click the delete (trash can) icon. On the confirmation message, click Yes . The layout is deleted and removed from the Map View list.

NOTE: You can also show/hide columns in the table by clicking the **More Options** (vertical ellipsis) icon and selecting the specific tabs you want to display.

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Top Menu Bar Overview

The top menu bar on the Topology (**Network > Topology**) page of the Paragon Planner displays:

- Name of the network model open currently
- Protocol that the network is using
- Selected Layer (Layer 3 or Tunnel Layer)—You can hover over this option to switch between layers. Layer 3 is the default. The topology map is updated based on your selection.
- Selected mode (Design or Simulation)—You can hover over this option to switch between the modes. In the Design mode, you can perform demand and tunnel path design, rerouting, sizing; and network resizing, optimization and analysis. For more information on simulation mode, see *No Link Title or Paragon Planner User Guide*.
- **Action** drop-down list where you can:
 - View network summary—Click **Show Network Summary** to open the Summary pane on the right displaying the network elements count, tunnel count with bandwidth information and hope count in the network.
 - Save Network—Saves your work to the Planner database.
 - Save Network As—Saves a copy of the network model to the Planner database with the name you specify. On the **Save A Network Model** page, enter a name for the network model and an optional description. The saved model is then available on the **Saved Network Models** page.
 - Detach Session—Detaches the network from your current working session.
 - Close Session—Deletes the session that you currently have open from the database. The entry is removed from the **Sessions** page. This is similar to deleting the session from the Sessions page directly by clicking the Delete (trash can) icon.

NOTE:

- Click the **refresh** icon to update the network model topology based on the latest information received from the server.
- The **lock** symbol indicates communication with the server. The symbol might turn red or orange if any action is pending from the server side.

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Simulation Mode Overview

From the top menu bar on the Planner **Topology** page, you can select the **Simulation** mode to specify the nodes or links you want to fail for the simulation run. You can see how the failure impacts link utilization, and demand/tunnel routing. Subsequent failures can also be performed by continuing the simulation using a different set of failed elements. Once the simulation is run, you can view the link changes, tunnel changes, and demand changes reports.

From the **Simulation** mode, you can:

- Fail a node—In the network information table, in the **Fail** column, click **Operation** to select the node for failure. Click **Run**. The node is marked with a red 'F' on the topology map to indicate its failure. The network information table is updated with the failed node details.
- Fail a link—In the network information table, in the **Fail** column, click **Operation** to select the link for failure. Click **Run**. The link is grayed out on the map and marked with a red 'F' symbol to indicate its failure. The network information table is updated with the failed link details.

NOTE: From the **More** list, you can view the link, tunnel, and demand changes reports generated after failing a node or link. You can also click **Download** to download the report as a CSV file to your system.

- Reset Simulation—Click **Reset Simulation** to revert back to the initial network state. All links and nodes are set to active and all demands are routed according to the state at which the simulation mode was entered.

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Network Information Table Overview

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- [About the Link Tab | 57](#)
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- [About the Tunnel Tab | 61](#)
- [Add a Single Tunnel | 61](#)
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- [About the Demand Tab | 67](#)
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The network information table at the bottom of the Planner Topology has tabs across the top which change according to the tab you select. Within the tables, each row represents an element. When you select one or more elements in the table, the corresponding elements are highlighted in the topology map.

The network information table displays detailed information about each network element in the following tabs:

- Node—View node information and add, edit, or delete nodes in the network. For more information, see ["Add a Node" on page 55](#) or ["Edit and Delete Nodes" on page 56](#).
- Link—View link information and add, edit, or delete links in the network. For more information, see ["Add a Link" on page 58](#) and ["Edit and Delete Links" on page 60](#).

- **Tunnel**—View tunnel information and add, edit, or delete tunnels in the network. For more information, see ["Add a Single Tunnel" on page 61](#), ["Add Multiple Tunnels" on page 63](#) and ["Edit and Delete Tunnels" on page 65](#).
- **Demand**—View information about user-created demands in the network. For more information, see ["About the Demand Tab" on page 67](#).
- **Interface**—View information about various interfaces (such as IPv4, MAC, and VRF) in the network. For more information, see ["Interface Tab Overview" on page 74](#).
- **SRLG/Facility**—View information about shared risk link group (SRLG) or Facilities and add, edit, or delete them. For more information, see ["SRLG/Facility Tab Overview" on page 75](#).
- **Filter Entries**—Filter the table entries by adding new filtering criteria.

Hover over the **Filter** (funnel) icon and select **Add Filter**. On the **Add Criteria** page, select the filtering criteria from the **Field** and **Condition** list, and enter the text to be compared in the **Value** field. Click **Add**.

The filtered table entries are listed and the filter criteria name is displayed above the table column names.

You can click the cross (X) icon (next to the filter name) to remove the filtering criteria.

NOTE:

- You can add multiple filtering criteria. Once you add the multiple filtering criteria, you can select the **And** condition to display the entries matching all the filtering criteria or select the **Or** condition to display the entries matching any one of the filtering criteria.
- **Quick filter:** Save the filtering criteria as quick filters. Once you have added all the filtering criteria, you can save a particular criteria or multiple criteria for future use by clicking **Save**.

On the **Save Filter** window, enter a name for the filter, optionally toggle the **Set as Default** button if you want to use this filtering criteria by default, and click **OK**.

The saved filters are displayed under **Quick Filters** when you hover over the Filter (funnel) icon. You can then apply these saved filters to the table entries.

- **Show/Hide Columns**—Choose to show or hide a specific column in the table.

Hover over the **More Options** (vertical ellipsis) > **Show/Hide Columns** and select the *Column-Name* check box of the columns you want to display in the table.

- **Reset Preference**—Reset the displayed columns to the default set of columns for each tab in the table.

Hover over the **More Options** (vertical ellipsis) and select **Reset Preference**.

- **Sort Entries**—Click the column name to highlight the up and down arrows next to the column name. Sort the table entries in ascending or descending order of that column by clicking the up or down arrow respectively.

NOTE:

- Click on the **refresh** icon at the bottom-left corner of the network information table to manually refresh the table entries.
- Click the **Display** list (bottom-right corner of the table) to select the number of row (50, 100, 200, or 500 entries) visible on the table.

About the Node Tab

IN THIS SECTION

- [Tasks You Can Perform](#) | 54

You can add, edit, or delete nodes from the **Node** tab of the network information table on the Topology (**Network > Topology**) page. You can also view detailed information about each node.

Tasks You Can Perform

- Add a node—See ["Add a Node" on page 55](#).
- Edit node properties and delete nodes—See ["Edit and Delete Nodes" on page 56](#).
- From the **More** list, you can:
 - View details of a node—Select the node and click **Show Detail**.
Alternatively, hover over a node and click the details icon or right-click a node and select **Show Detail**.

The Node-*Node Name* page appears, displaying details such as node coordinates, IP address, host name, layer name, and node type.

- Filter the selected node on the Topology Map. Only the selected node is displayed.
- Zoom in to the selected node on the Topology Map.
- Download node information—View detailed information about all the nodes displayed in the topology by clicking **Download**. You can choose to open the comma-separated values (CSV) file by using Excel or other applications, or save the file to your local system.

Add a Node

To add a new node to your network:

1. Click **Network > Topology**.
The Topology page is displayed with the topology map at the center and the network information table at the bottom of the page.
2. On the **Node** tab, click the Add (+) icon.
The Add Node page appears on the right.
3. Configure the node parameters as per [Table 16 on page 55](#).

NOTE: Fields marked with asterisk (*) are mandatory.

4. Click **Add**.
A confirmation message is displayed stating that the add node request is sent successfully. The new node is displayed under the **Node** tab and is updated on the topology map.

Table 16: Fields on the Add Node Page

Field	Descriptions
Properties	
Name	Enter a unique name for the node.
IPv4	Enter an IPV4 address for the node.
IPv6	Enter an IPv6 address for the node.

Table 16: Fields on the Add Node Page (*Continued*)

Field	Descriptions
Longitude	<p>Enter the longitude value of the node. Longitudes range from -180 to 180.</p> <p>NOTE:</p> <ul style="list-style-type: none"> • Positive longitudes are east of the Prime Meridian and negative values (precede with a minus sign) are west of the Prime Meridian. • You can either enter the values directly or use the up and down arrows to increment or decrement the values.
Latitude	<p>Enter the latitude value of the node. Latitudes range from -90 to 90.</p> <p>NOTE:</p> <ul style="list-style-type: none"> • Positive values of latitude are north of the equator and negative values (precede with a minus sign) are south of the equator. • You can either enter the values directly or use the up and down arrows to increment or decrement the values.
Hardware	Select the required hardware vendor from the list.

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Edit and Delete Nodes

IN THIS SECTION

- [Edit Node Parameters](#) | 57
- [Delete Nodes](#) | 57

Edit Node Parameters

To edit node properties:

1. Click **Network > Topology**.

The Topology page is displayed with the topology map at the center and the network information table at the bottom of the page.

2. On the **Node** tab, select the node you want to edit.
3. Click the edit (pencil) icon.

The Edit Node page appears.

4. Edit the fields as described in [Table 16 on page 55](#).
5. Click **Edit**.

A confirmation message is displayed stating that the edit node request is sent successfully.

Delete Nodes

To delete a node from the topology:

1. Click **Network > Topology**.

The Topology page appears.

2. On the **Node** tab, select the node that you want to delete.
3. Click the delete (trash can) icon.

A confirmation message appears.

4. Click **Yes**.

The node is deleted from the topology map and is removed from the network information table.

About the Link Tab

IN THIS SECTION

- [Tasks You Can Perform](#) | 58

You can add, edit, or delete links from the **Link** tab of the network information table on the Topology (**Network > Topology**) page. You can also view detailed information about each node.

Tasks You Can Perform

- Add a link—See ["Add a Link" on page 58](#).
- Edit link properties and delete link—See ["Edit and Delete Links" on page 60](#).
- From the **More** list, you can:
 - View details of a link—Select the link and click **Show Detail**.
Alternatively, hover over a link and click the details icon or right-click a link and select **Show Detail**.

The *Link-Link Name* page appears, displaying interface details such as node, IP address, interface name, link utilization and bandwidth details.
 - Filter the selected link on the Topology Map. Only the selected node is displayed.
 - Zoom in to the selected link on the Topology Map.
- Download link information—View detailed information about all the links displayed in the topology by clicking **Download**. You can choose to open the comma-separated values (CSV) file by using Excel or other applications, or save the file to your local system.

Add a Link

To add a link in the topology map:

1. Click **Network > Topology**.

The Topology page is displayed with the topology map at the center and the network information table at the bottom of the page.

2. On the **Link** tab, click the Add (+) icon.

The Add Link page appears.

3. Configure the link fields as per the [Table 17 on page 59](#).

NOTE: Fields marked with asterisk (*) are mandatory.

4. Click **Add**.

A confirmation message appears stating that the request is successfully submitted. The new link is displayed under the **Link** tab.

Table 17: Fields on the Add Link Page

Field	Description
Properties	
Name	Enter a name for the link.
Node A	Click the Node A list and select the name of the ingress (source) node from the list.
Node Z	Click the Node Z list and select the name of the egress (destination) node from the list.
Type	Select the type of link you want to add from the list.
Bandwidth AZ and ZA	<p>Enter the bandwidth (in bps) for each direction (Node A to Z and from Z to A). You must enter a number immediately followed by K (Kbps), M (Mbps), or G (Gbps). For example, 10M signifying 10 Mbps.</p> <p>NOTE: If you enter a value without units, bps is applied.</p>
Protocols	Select one or more protocols that you want to enable on the link. You can also enable any of the protocols listed in the Protocols table by toggling the respective button. If you do enable any of these protocols, you have the option to specify additional tunnel metrics (per direction; AZ and ZA) by clicking on the empty space under the metric. Once you are done adding the metric values, click the tick icon.

RELATED DOCUMENTATION

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Edit and Delete Links

IN THIS SECTION

- [Edit Link Parameters](#) | 60
- [Delete Links](#) | 60

Edit Link Parameters

1. Click **Network** > **Topology**.

The Topology page is displayed with the topology map at the center and the network information table at the bottom of the page.

2. On the **Link** tab, select the link that you want to edit.
3. Click the edit (pencil) icon.

The Edit Link page appears.

4. Edit the fields as per [Table 17 on page 59](#).
5. Click **Edit**.

A confirmation message is displayed stating that the request was submitted successfully.

Delete Links

1. Click **Network** > **Topology**.

The Topology page appears displaying the network information table at the bottom.

2. On the **Link** tab, select the link that you want to delete.
3. Click the delete (trash can) icon.

A confirmation message appears.

4. Click **Yes**.

The link is deleted from the topology map and is removed from the network information table.

About the Tunnel Tab

IN THIS SECTION

- [Tasks You Can Perform](#) | 61

You can use the **Tunnel** tab in the network information table on the Topology (Network > Topology) to view and manage tunnels (label-switched paths or LSPs) in the network.

Tasks You Can Perform

- Add a single tunnel. See ["Add a Single Tunnel" on page 61](#).
- Add multiple tunnels. See ["Add Multiple Tunnels" on page 63](#).
- Edit or delete multiple tunnels. See ["Edit and Delete Tunnels" on page 65](#).
- From the **More** list, you can:
 - View details of a tunnel—Select the tunnel and click **Show Detail**.
Alternatively, hover over a link and click the details icon or right-click on a link and select **Show Detail**.

The Tunnel- *Tunnel Name* page appears, displaying from/to node details and tunnel planned properties.
 - Edit All—You can edit tunnel parameters such as Planned Bandwidth, Setup, and Hold for all the tunnels in the topology by selecting **More > Edit All**. See ["Edit and Delete Tunnels" on page 65](#)..
 - Delete All—You can delete all the tunnels in the topology by selecting **More > Delete All**. On the confirmation page, click **Yes**. A confirmation message is displayed stating that the delete all request is sent. All tunnels are removed from the network information table.

Add a Single Tunnel

To add a single tunnel:

1. Select **Network > Topology**.

The Topology page appears displaying the network information table at the bottom.

2. In the **Tunnel** tab, select **Add > Tunnel**.

The Add Tunnel page appears.

3. Complete the configuration on each tab according to the guidelines in No Link Title.

NOTE: Fields marked with an asterisk (*) are mandatory.

4. Click **Add**.

A confirmation message appears on the top of the page, indicating that a provision tunnel request is successfully created.

The tunnel then appears in the Tunnel tab of the network information table and is updated on the Topology map.

Table 18: Fields on the Add Tunnel Page

Field	Description
Name	Enter a unique name for the tunnel.
Node A	From the list, select the node that you want to use as the ingress node.
Node Z	From the list, select the node that you want to use as the egress node.
Planned Bandwidth	<p>Specify the planned bandwidth (along with valid units, with no space between the bandwidth and units) for the tunnel.</p> <p>If you specify a value without units, bps is applied.</p> <p>Valid units are:</p> <ul style="list-style-type: none"> • B or b (bps) • M or m (Mbps) • K or k (Kbps) • G or g (Gbps)

Table 18: Fields on the Add Tunnel Page *(Continued)*

Field	Description
Setup	<p>Specify the setup priority for the tunnel traffic.</p> <p>Priority levels range from 0 (highest priority) through 7 (lowest priority). The default is 7, which is the standard MPLS tunnel definition in Junos OS.</p> <p>Based on the setup priority, the PCE determines whether a new tunnel can be established, by preempting an existing tunnel. The existing tunnel can be preempted if the setup priority of the new tunnel is higher than that of the existing tunnel and the preemption releases enough bandwidth for the new tunnel.</p>
Hold	<p>Specify the hold priority for the tunnel traffic.</p> <p>Priority levels range from 0 (highest priority) through 7 (lowest priority). The default is 7, which is the standard MPLS tunnel definition in Junos OS.</p> <p>Based on the hold priority, the PCE determines whether the tunnel can be preempted or not. If the hold priority for a tunnel is higher, it is unlikely for the tunnel to be preempted.</p>

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Add Multiple Tunnels

You can provision multiple tunnels at once in the network topology from the **Add Multiple Tunnels** page.

To provision multiple tunnels:

1. Select **Network > Topology**.

The Topology page appears.

2. In the **Tunnel** tab, select **Add > Multiple Tunnels**.

The Add Multiple Tunnels page appears.

3. Complete the configuration on each tab according to the guidelines in No Link Title.

NOTE: Fields marked with an asterisk (*) are mandatory.

4. Click **Add**.

A confirmation message appears on the top of the page, indicating that an add tunnel request was successfully created.

The tunnels then appear in the Tunnel tab of the network information table on the Topology page.

Table 19: Fields on the Add Multiple Tunnels Page

Field	Description
<i>Properties</i>	
ID Prefix	Specify a prefix to be applied to the names of all the tunnels that are created.
Node A List	<p>Select one or more nodes to be part of the Node A list.</p> <p>For a full mesh tunnel to be created, you can specify the same nodes for Node A and Node Z by clicking the <i>Copy Node Z List</i> link (that is located above the list). All the nodes that you specify in the Node Z List are added to the Node A List.</p>
Node Z List	<p>Select one or more nodes to be part of the Node Z list.</p> <p>For a full mesh tunnel to be created, you can specify the same nodes for Node Z and Node A by clicking the <i>Copy Node A List</i> link (that is located above the list). All the nodes that you specified in the Node A List are added to the Node Z List.</p>
Planned Bandwidth	<p>Specify the planned bandwidth (along with valid units, with no space between the bandwidth and units) for the tunnel. If you specify a value without units, bps is applied.</p> <p>Valid units are:</p> <ul style="list-style-type: none"> • B or b (bps) • M or m (Mbps) • K or k (Kbps) • G or g (Gbps) <p>Examples: 50M, 1000b, 25g.</p>

Table 19: Fields on the Add Multiple Tunnels Page *(Continued)*

Field	Description
Setup	<p>Specify the setup priority for the tunnel traffic.</p> <p>Priority levels range from 0 (highest priority) through 7 (lowest priority). The default is 7, which is the standard MPLS tunnel definition in Junos OS.</p> <p>Based on the setup priority, the PCE determines whether a new tunnel can be established, by preempting an existing tunnel. The existing tunnel can be preempted if the setup priority of the new tunnel is higher than that of the existing tunnel and the preemption releases enough bandwidth for the new tunnel.</p>
Hold	<p>Specify the hold priority for the tunnel traffic.</p> <p>Priority levels range from 0 (highest priority) through 7 (lowest priority). The default is 7, which is the standard MPLS tunnel definition in Junos OS.</p> <p>Based on the hold priority, the PCE determines whether the tunnel can be preempted or not. If the hold priority for a tunnel is higher, it is unlikely for the tunnel to be preempted.</p>

RELATED DOCUMENTATION

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Edit and Delete Tunnels

SUMMARY

You can edit or delete a single tunnel, multiple tunnels, or all tunnels. Editing or deleting all tunnels is helpful in completing these tasks quickly as there are usually many tunnels in a network that would paginate across multiple pages in the network information table.

IN THIS SECTION

- [Edit Tunnel Parameters | 66](#)
- [Delete Tunnels | 66](#)

Edit Tunnel Parameters

To edit the parameters configured for a tunnel:

1. Select **Network > Topology**.

The Topology page appears displaying the network information table at the bottom.

2. In the **Tunnel** tab, select the tunnel for which you want to edit the parameters, and click the **Edit** (pencil) icon.

The Edit Tunnel page appears, displaying the same fields that are presented when you add a tunnel.

NOTE: You can edit tunnel parameters such as Planned Bandwidth, Setup, and Hold for all the tunnels in the topology by selecting **More > Edit All**. On the **Edit All Tunnels** page, enter the values for the parameters that you want to edit and click **Edit**. A confirmation message is displayed stating that the edit multiple tunnel request is sent.

3. Modify the parameters as needed. Based on the type of tunnel that you selected, see ["Add a Single Tunnel" on page 61](#) or ["Add Multiple Tunnels" on page 63](#) for more information on these parameters.
4. Click **Edit** to save your changes.

You are returned to the Topology page, where a confirmation message appears on the top of the page, indicating that an edit tunnel change request was successfully created. The tunnel parameters are then updated.

Delete Tunnels

To delete one or more tunnels:

1. Select **Network > Topology**.

The Topology page appears displaying the network information table at the bottom of the page.

2. In the **Tunnel** tab, select the tunnels that you want to delete, and click the **Delete** (trashcan) icon.

An alert message appears, asking you to confirm the delete operation.

NOTE: You can delete all the tunnels in the topology by selecting **More > Delete All**. On the confirmation page, click **Yes**. A confirmation message is displayed stating that the delete all request is sent. All tunnels are removed from the network information table.

3. Click **OK**.

You are returned to the Topology page, where a confirmation message appears, indicating that the delete tunnel change request was successfully created. The selected tunnels are then deleted.

About the Demand Tab

IN THIS SECTION

- [Tasks You Can Perform](#) | 67

You can view detailed information about the user-created demands in the network from the **Demand** tab in the network information table.

Tasks You Can Perform

- Add a demand—See ["Add a Single Demand" on page 68](#).
- Add multiple demands—See ["Add Multiple Demands" on page 70](#).
- Download demand information—To view detailed information of all the demands displayed in the network information table, click **Download**. You can choose to open the comma-separated values (CSV) file with Excel or other applications, or save the file to your local system.
- From the More list, you can perform the following tasks:
 - View details of a demand—To view details of a demand, select the demand and click **Show Detail**.

Alternatively, hover over a demand and click the details icon that appears. You can also right-click on a demand and select **Show Detail**.

The Demand-*Demand Name* page appears, displaying the details, such as From Node, To Node, and Planned Properties of the demand.

- Edit all demands—To edit properties (Planned Bandwidth, Setup, and Hold) of all the demands in the network, click **Edit All**.
The Edit All Demands page appears. Edit the parameters as required and click **Edit**. A confirmation message appears on the top of the page, indicating that the edit multiple demands request is sent successfully. The updated parameters are then displayed in the Demand tab of the network information table.
- Delete all demands—To delete all demands in the network, click **Delete All**. A confirmation message appears on the top of the page, indicating that all demands are deleted.
- Edit one or more demands—See ["Edit and Delete Demands" on page 72](#).
- Delete one or more demands—See ["Edit and Delete Demands" on page 72](#).

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Add a Single Demand

You can add demands in your network to perform a what-if analysis of traffic flow in the network.

To add a single demand:

1. Select **Network > Topology**.
The Topology page is displayed with the topology map at the center and the network information table at the bottom of the page.
2. In the Demand tab, select **Add > Demand**.
The Add Demand page appears on the right side of the page.
3. Configure the demand parameters as explained in [Table 20 on page 68](#).

NOTE: Fields marked with an asterisk (*) are mandatory.

4. Click **Add**.
A confirmation message is displayed on top of the page, indicating that the add demand request is sent successfully. You can then view this demand in the Demand tab of the network information table.

Table 20: Fields on the Add Demand Page

Field	Description
Properties	
Name	Enter a unique name for the demand. The name can contain only alphanumeric characters and some special characters (greater than (>), less than (<), colon (:), underscore (_), and hyphen (-)).
Node A	From the list, select the name of the ingress (source) node of the demand.
Node Z	From the list, select the name of the egress (destination) node of the demand.

Table 20: Fields on the Add Demand Page (*Continued*)

Field	Description
Planned Bandwidth	<p>Specify the planned bandwidth (along with valid units, with no space between the bandwidth and units) for the demand.</p> <p>If you specify a value without units, bps is applied.</p> <p>Valid units are:</p> <ul style="list-style-type: none"> • B or b (bps) • M or m (Mbps) • K or k (Kbps) • G or g (Gbps)
Setup	<p>Specify the setup priority for the demand.</p> <p>Priority levels range from 0 (highest priority) through 7 (lowest priority), which is the default.</p> <p>Based on the setup priority, the PCE determines whether a new demand can be established, by preempting an existing demand. The existing demand can be preempted if the setup priority of the new demand is higher than that of the existing demand and the preemption releases enough bandwidth for the new demand.</p>
Hold	<p>Specify the hold priority for the demand.</p> <p>Priority levels range from 0 (highest priority) through 7 (lowest priority), which is the default.</p> <p>Based on the hold priority, the PCE determines whether the demand can be preempted or not. If the hold priority for a demand is higher, the demand may not be preempted.</p>

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About the Demand Tab 67

Add Multiple Demands

You can add multiple demands at a time to perform a what-if analysis of traffic flow in the network.

To add multiple demands:

1. Select **Network > Topology**.
The Topology page is displayed with the topology map at the center and the network information table at the bottom of the page.
2. In the Demand tab, select **Add > Multiple Demands**.
The Add Multiple Demands page appears on the right side of the page.
3. Configure the demand parameters as explained in [Table 21 on page 70](#).

NOTE: Fields marked with an asterisk (*) are mandatory.

4. Click **Add**.
A confirmation message appears on the top of the page, indicating that the add multiple demands request is sent successfully. You can then view the new demands in the Demand tab of the network information table.

Table 21: Fields on the Add Multiple Demands Page

Field	Description
Properties	
ID Prefix	<p>Specify the prefix that is automatically added to the names of the demands.</p> <p>For example, if you specify the ID prefix as xyz, the demand name is assigned as xyz_Node A_Node Z.</p>

Table 21: Fields on the Add Multiple Demands Page *(Continued)*

Field	Description
Node A List	<p>From the list, select one or more ingress (source) nodes of the demand. To select all the ingress nodes, select Select All.</p> <p>To create meshed demands, you must specify the same nodes for Node A and Node Z by clicking the Copy Node Z List link. All the nodes that you specify in the Node Z List are added to the Node A List.</p>
Node Z List	<p>From the list, select one or more egress (destination) nodes of the demand. To select all the egress nodes, select Select All.</p> <p>To create meshed demands, you must specify the same nodes for Node A and Node Z by clicking the Copy Node A List link. All the nodes that you specify in the Node A List are added to the Node Z List.</p>
Planned Bandwidth	<p>Specify the planned bandwidth (along with valid units, with no space between the bandwidth and units) for the demands.</p> <p>If you specify a value without units, bps is applied.</p> <p>Valid units are:</p> <ul style="list-style-type: none"> • B or b (bps) • M or m (Mbps) • K or k (Kbps) • G or g (Gbps)

Table 21: Fields on the Add Multiple Demands Page *(Continued)*

Field	Description
Setup	<p>Specify the setup priority for the demands.</p> <p>Priority levels range from 0 (highest priority) through 7 (lowest priority), which is the default.</p> <p>Based on the setup priority, the PCE determines whether a new demand can be established, by preempting an existing demand. The existing demand can be preempted if the setup priority of the new demand is higher than that of the existing demand and the preemption releases enough bandwidth for the new demand.</p>
Hold	<p>Specify the hold priority for the demands.</p> <p>Priority levels range from 0 (highest priority) through 7 (lowest priority), which is the default.</p> <p>Based on the hold priority, the PCE determines whether the demand can be preempted or not. If the hold priority for a demand is higher, the demand may not be preempted.</p>

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Edit and Delete Demands

SUMMARY

IN THIS SECTION

 [Edit Demand Parameters | 73](#)

You can edit the parameters of one or more demands to suit your network requirements. You can also delete one or more demands when you no longer need them.

Edit Demand Parameters

To edit the parameters configured for one or more demands:

1. Select **Network > Topology**.

The Topology page is displayed with the topology map at the center and the network information table at the bottom of the page.

2. In the Demand tab, do one of the following:

- Select the demand for which you want to edit the parameters, and click the Edit (pencil) icon.

The Edit Demand page appears, displaying the same fields as the Add Demand page. See ["Add a Single Demand" on page 68](#) for more information on these parameters.

- Select multiple demands for which you want to edit the parameters, and click the Edit (pencil) icon.

The Edit Multiple Demands page appears, displaying the same fields as the Add Multiple Demands page. See ["Add Multiple Demands" on page 70](#) for more information on these parameters.

3. Modify the parameters as needed.

4. Click **Edit** to save your changes.

You are redirected to the Topology page, where a confirmation message appears on the top of the page, indicating that the edit demand request is sent successfully. You can then view the updated parameters in the Demand tab of the network information table.

Delete Demands

To delete one or more demands:

1. Select **Network > Topology**.

The Topology page appears displaying the network information table at the bottom of the page.

2. In the Demand tab, select the demands that you want to delete, and click the **Delete** (trash can) icon. An alert message appears, asking you to confirm the delete operation.

3. Click **OK**.

You are returned to the Topology page, where a confirmation message appears, indicating that the selected demands are deleted.

SEE ALSO

[About the Demand Tab | 67](#)

Interface Tab Overview

IN THIS SECTION

- [Tasks You Can Perform | 74](#)

You can view detailed information about interfaces associated with different nodes in the topology map from the **Interfaces** tab.

Interfaces cannot be added, modified, or deleted from the network information table.

Tasks You Can Perform

- Download interface information—Click **Download** to download detailed information about all the existing interfaces in the topology in CSV format.
- From the **More** List, you can:
 - View detailed information about the interface by clicking **Show Detail** or click the Details icon displayed next to the interface name when you hover over it. A pop-up appears displaying the traffic and protocol details about the selected interface.
 - Reload the network—When there is a large number of interfaces, you can click **Reload** to clear the interface back-end cache and reload the data (table entries) from the database.

RELATED DOCUMENTATION

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SRLG/Facility Tab Overview

IN THIS SECTION

- [Tasks You Can Perform | 75](#)

Shared Link Risk Group (SRLG) information can be received from BGP-LS or Transport controller, whenever a path optimization occurs or whenever some event triggers rerouting. The information from these sources is merged and displayed on the UI. You cannot add, edit, or delete SRLGs from the **SRLG/Facility** tab of the network information table on the Planner Topology (**Network> Topology**) page.

Tasks You Can Perform

- View details about the SRLG/Facility by clicking the details icon when you hover over the SRLG/facility name or click **More > Show Detail**.

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4

CHAPTER

Simulation

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About the Failure Simulation Page

IN THIS SECTION

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The Simulation menu enables you to run various failure scenarios which helps to analyze and evaluate a networks' resiliency.

By default, Paragon Planner simulation mimics the actual hardware. However, you can also adjust simulation parameters for experimentation or to simulate "what-if" scenarios.

You can design a simulation to fail any or all of following network elements:

- Nodes
- Links
- Site
- SRLG/Facility
- Parallel Links

NOTE: The failure simulation scenario is based on the layer mode that you select from the Utility bar in the Topology page (**Network > Topology**). When you run a failure simulation in **Tunnel Layer** mode, all demands are ignored. This reduces the simulation run time. When you run a failure simulation in **Layer 3** mode, all the demands are included in the simulation.

Planner provides the following failure simulation types:

- Single—Fails all the network elements of a given type one at a time.
 - Exhaustive Node Failure: Exhaustively fails every single node in the network.
 - Exhaustive Link Failure: Exhaustively fails every single link in the network.
 - Exhaustive Site Failure: Exhaustively fails all sites in the network. A site file is required to define nodes within the same site. Nodes that are not grouped within a site are considered sites by themselves.

- Exhaustive SRLG/Facility Failure: Fails all facilities in the network. A facility file is required to define node and trunk facility associations.
- Exhaustive Parallel Links Failure: Exhaustively fails all links between all node pairs.
- Double or Triple (Multiple):
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.

Tasks You Can Perform

You can perform the following tasks:

- Run a new failure simulation. For more information, see ["Add a Simulation Event" on page 79](#).
- Delete an existing failure simulation—Select the failure simulation and click the Delete (trashcan) icon. On the confirmation message, click **Yes**. The simulation is removed from this page.
- From the **More** list, select **More > Detail** to view information about existing simulations.
- Show/Hide Columns—Choose to show or hide a specific column in the table.

Hover over the **More Options** (vertical ellipsis) > **Show/Hide Columns** and select the *Column-Name* check box of the columns you want to display in the table.

- Reset Preference—Reset the displayed columns to the default set of columns for each tab in the table.

Hover over the **More Options** (vertical ellipsis) and select **Reset Preference**.

- Sort Entries—Click the column name to highlight the up and down arrows next to the column name, to sort the table entries in ascending or descending order.

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[Paragon Planner Web UI Overview](#) | 6

Add a Simulation Event

To add a new exhaustive simulation event and view the generated simulation reports:

1. Select **Simulation > Failure Simulation**.

The Failure Simulation page appears.

2. Click the Add (+) icon.

The Run Failure Simulation Page appears.

3. Configure the fields as per [Table 22 on page 79](#).

NOTE: Fields marked with asterisk (*) are mandatory.

4. Click **Run**.

The failure simulation details are listed on the Failure Simulation page.

To view the generated simulation reports, click on the **Details** icon when you hover over the simulation name or click **More > Detail**. On the **Simulation Details** page, under the **Files** tab, click on the **view** link next to each report to view the selected *report-name* in a new page. Click **Download** to download the *report-name* to your local system as a CSV file. For more information, see *View Maintenance Reports* in the *Paragon Automation User Guide*.

Table 22: Fields on the Run Failure Simulation Page

Field	Description
Failure Type	<p>From the list, select one of the following types of failure:</p> <ul style="list-style-type: none"> • Single • Double • Triple <p>NOTE: The default exhaustive failure combination is Single.</p>
Cases to Simulate	<p>Select one of the following:</p> <ul style="list-style-type: none"> • All: To simulate all possible failure combinations exhaustively • Custom Count: To randomly simulates a specified number of failures. If you select this option, specify the number in the Count field.

Table 22: Fields on the Run Failure Simulation Page (*Continued*)

Field	Description
Failure Elements	<p>From the list, select one or more of the following network elements on which you wish to run the exhaustive failure simulation:</p> <ul style="list-style-type: none"> • Nodes • Links • Site • SRLG/Facility • Parallel Links <p>NOTE: No network elements are selected by default. You must select at least one network element type.</p>
Description	Enter a text description for this simulation.
Reports	
Report ID	<p>Report ID is automatically populated.</p> <p>NOTE: You can also enter a specific text Report ID. But, if you use the same ID for multiple simulations, the reports will be overwritten by the results from the latest simulation.</p>

Table 22: Fields on the Run Failure Simulation Page *(Continued)*

Field	Description
Optional Report	<p>Select any of the following optional reports that you want generated after the simulation:</p> <ul style="list-style-type: none"> • Demand Over Tunnel Utilization: Generates report of the demand traffic on each tunnel • Demand on Oversubscribed Link • Detailed Reroute: Reports detailed information on demands that rerouted during the failure simulation. • Peak Group Transit Statistics: Reports the maximum number and bandwidth of demands in the network • Include events in Peak Link Utilization: In the Peak Link Utilization report, information is provided regarding the event triggering the peak link utilization, indicating which failure type triggered the peak link simulation (for example, node, link, or facility) and the name of the element. With this option unchecked, the simulation event is reported only for the planned period (based on the demand file) and worst failure scenario among the periods of the traffic load file. If this option is checked, the simulation event is also displayed for all of the individual periods (up to 24).
Advanced	

Table 22: Fields on the Run Failure Simulation Page *(Continued)*

Field	Description
Reroute Behavior	<p>Select one of the following routing method to be used for the simulation:</p> <ul style="list-style-type: none"> • Default only—Routing without fast reroute. • Fast Reroute only: Fast Reroute is used to protect MPLS traffic engineering tunnels during node or link failures. It accomplishes this with SONET-like restoration times by locally repairing the tunnels at the point of failure, using backup tunnels that bypass the failure while waiting for the head-end routers to establish a new tunnel. The short restoration times are especially desirable for real-time applications such as voice over IP, which often cannot tolerate high delays. • Default with Fast Reroute (default)

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5

CHAPTER

Reports

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View Demand Changes Reports

You can generate and view the demand changes report to know how the simulated failure impacts the traffic demand. This report is generated when you simulate the failure of nodes or links.

To access the demand changes report, select **Simulation** from the top menu bar of the **Topology** page. In the network information table that appears, select **Demand Changes** from the **More** list.

You can also click **Download** to download the report as a comma-separated values (CSV) file to your system.

[Table 23 on page 84](#) explains the fields displayed in the demand changes report.

Table 23: Demand Changes Report

Field	Description
Name	The name of the demand.
Node A	The name of the ingress (source) node of the demand.
Node Z	The name of the egress (destination) node of the demand.
New Path	The routing path of the demand obtained after simulation.
Orig Path	The routing path of the demand before simulation.
New Path Cost	The changed cost associated with the routing path after simulation.
Orig Path Cost	The cost associated with the routing path before simulation.
Path Cost Change	The difference between the cost associated with the routing path after simulation and the cost associated with the routing path before simulation.
New # Hops	The number of hops associated with the demand after simulation.

Table 23: Demand Changes Report (*Continued*)

Field	Description
Orig # Hops	The number of hops associated with the demand before simulation.
# Hops Change	The difference between the number of hops associated with the demand after simulation and the number of hops associated with the demand before simulation.
New Delay	The delay (in milliseconds) associated with the demand after simulation.
Orig Delay	The delay (in milliseconds) associated with the demand before simulation.
Delay Change%	The percentage change in the delay associated with the demand after simulation and the delay associated with the demand before simulation.
New BW	The bandwidth associated with the demand after simulation.
Original BW	The bandwidth associated with the demand before simulation.

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