

# UHD100T32

Release 1.1

User Guide

# Notices

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# Documentation conventions

The following documentation conventions are used in this guide:

## Describing interactions with the UI

You can interact with products by using different input methods: keyboard, mouse, touch, and more. So in most parts of the user documentation, generic verbs have been used that work with any input method. In cases where input-neutral verbs do not work, mouse-specific verbs are used as the first choice, followed by touch-specific verbs as the second choice.

See the following table for examples on how you can interpret the different input methods.

Input-neutral	Mouse	Touch
Select <b>Modify</b> .	Click <b>Modify</b> .	Tap <b>Modify</b> .
Select <b>Accounts &gt; Other accounts &gt; Add an account</b> .	Click <b>Accounts &gt; Other accounts &gt; Add an account</b> .	Tap <b>Accounts &gt; Other accounts &gt; Add an account</b> .
To open the document in Outline view, select <b>View &gt; Outline</b> .	To open the document in Outline view, click <b>View &gt; Outline</b> .	To open the document in Outline view, tap <b>View &gt; Outline</b> .
Select <b>Protocols</b> .	Click the <b>Protocols</b> tab.	Tap <b>Protocols</b> .
-NA-	Double-click the <b>Client</b> wizard.	Double-tap the <b>Client</b> wizard.
Open the <b>Packages</b> context menu.	Right-click <b>Packages</b> to open the shortcut menu.	Long tap <b>Packages</b> to open the shortcut menu.

## Deprecated words

The following words have been replaced with new words, considering the audience profile, our modern approach to voice and style, and our emphasis to use input-neutral terms that support all input methods.

Old usage...	New usage...
shortcut menu, right-click menu	context menu
click, right-click	select
drag and drop	drag

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# **CHAPTER 1 Overview of UHD**

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The UHD100T32 User Guide describes UHD and its usage. It helps you to configure the UHD test equipment with minimal efforts by using the UHD web UI.

## **Introduction to UHD**

UHD100T32 is the industry's first test solution that is purpose-built to address the density challenges of validating 100 GE devices and networks in a more cost-effective way. In just a 1U form-factor, the fixed chassis provides 32 QSFP28 100 GE ports, ready for use cases that range from white box production-line testing to data center pre- and post-deployment testing.

UHD100T32 has fan out modes, which support 100/50/40/25/10 GE speeds. It also includes technology for layer 2 to 3 traffic generation and analysis. Optional routing protocols are available that include OSPF, BGP, ISIS, and RFC 2544 benchmark test capabilities.

## **Introduction to the UHD web UI**

UHD web app is a web-based client UI for layer 2 to 3 traffic generation test application, and is most commonly used to test routing and switching networks.

UHD web app supports multiple concurrent users and sessions, and allows multiple users to access a session, or a user to access multiple sessions simultaneously.

UHD web app has a built-in REST API browser that helps users to configure the test tool through a UI, and then correlate the change directly to REST commands.



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## CHAPTER 2 Prerequisites

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Following are the prerequisites to install UHD100T32:

### Software requirement

- UHD100T32 1.1

### Hardware requirement

- UHD100T32 fixed chassis

### Supported browsers

- Google Chrome 75 or later
- Mozilla Firefox 49 or later
- Microsoft Edge 44.17763.1.0 or later



**Note:** We recommend you to use Adobe Reader for viewing the UHD User Guide.

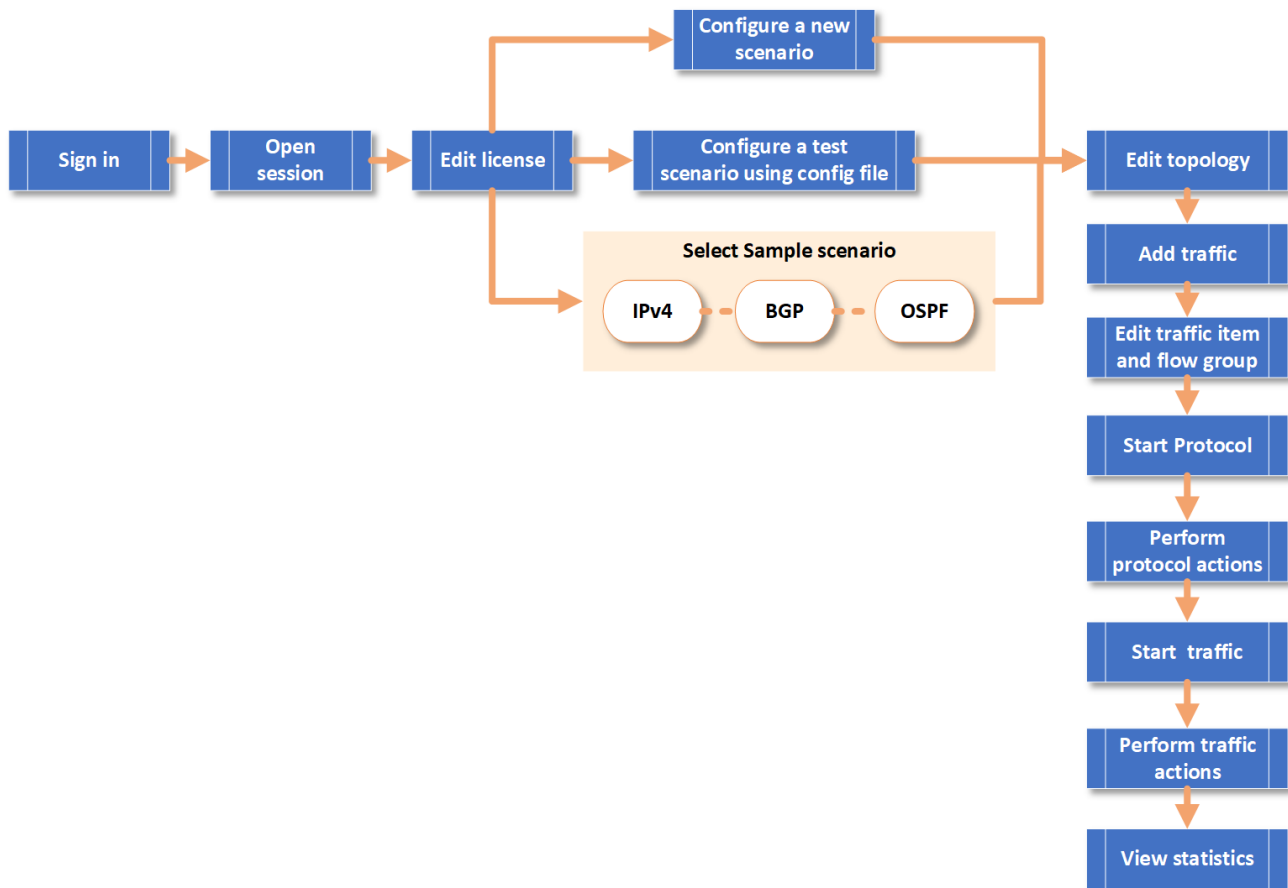
---

- Apple Safari 12.1.1 or later

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## CHAPTER 3 UHD Workflow

The following image shows the UHD workflow:



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## CHAPTER 4 How do I...

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The 'How do I' section contains a list of topics that will help you to configure UHD by using the UHD web UI.

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## Sign in to UHD

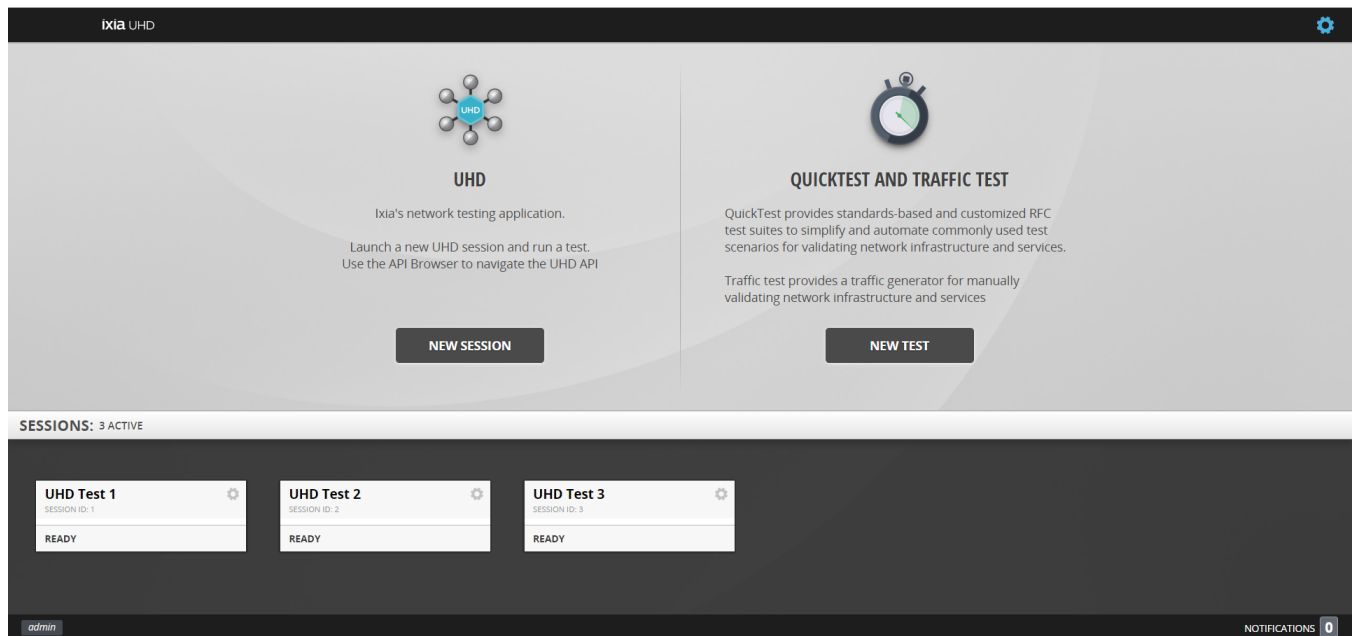
To sign in to the UHD fixed chassis, do the following:

1. Provide the IP address of the UHD fixed chassis in the URL.
2. Enter your credentials and select **LOGIN**.

## Open a session


The web UI allows you to create new sessions and work with multiple sessions. You can also work with the existing sessions.

- To create a new session, in the UHD section, select **NEW SESSION**.
- To open an existing session, select a session from the saved sessions in the **SESSIONS** section.



## Edit license settings

To edit a license, do the following:

1. Select  from the top right corner and select **SETTINGS**.
2. In the **License** section, edit the license settings as follows:
  - a. Select a value for **Licensing Mode**. **Mixed** is the default licensing mode.
  - b. In the **License Servers** box, keep the default value, which is `localuhd`.
  - c. Select a value from the **Tier Level** list.

---

 **Note:** For Perpetual licenses, you can keep the default license settings. For Subscription licenses, select the correct tier from the **Tier Level** dropdown.

---

UHD automatically saves the changes.

## Define TAP settings

This section describes the major tasks required to define layer 1 QSFP28 TAP settings for UHD.

To define the TAP settings, do the following:

1. Sign in to the admin shell.
2. Use the `uhd_tapctl` to define layer 1 QSFP28 TAP settings for UHD.

Usage: `uhd_lltap [command] [args]`

Available commands:

- `set <port # between 1-32> <tx-pre-tap> <tx-main-tap> <tx-post-tap>`
- `get <port # between 1-32>`

Examples:

- `uhd_tapctl set 1 6 0 0`
- `uhd_tapctl get 1`

Example output:

```
$ uhd_tapctl get 1
Port, Lane, TxPre, TxMain, TxPost
1,0,4,0,0,
1,1,4,0,0,
1,2,4,0,0,
1,3,4,0,0,
```



```

kcos-framework-shell-85b5d56959-bqmk8:~$ uhd_tapctl

uhd_tapctl is beta utility to set/get layer 1 QSFP28 tap settings for UHD
Usage: uhd_l1tap [command] [args]

Commands:

    set <port # between 1-32> <tx-pre-tap> <tx-main-tap> <tx-post-tap>
    get <port # between 1-32>

Examples:

    uhd_tapctl set 1 6 0 0
    uhd_tapctl get 1
kcos-framework-shell-85b5d56959-bqmk8:~$ uhd_tapctl get 1
Port, Lane, TxPre, TxMain, TxPost
1,0,4,0,0,
1,1,4,0,0,
1,2,4,0,0,
1,3,4,0,0,
kcos-framework-shell-85b5d56959-bqmk8:~$ uhd_tapctl set 1 6 0 0
kcos-framework-shell-85b5d56959-bqmk8:~$ uhd_tapctl get 1
Port, Lane, TxPre, TxMain, TxPost
1,0,6,0,0,
1,1,6,0,0,
1,2,6,0,0,
1,3,6,0,0,
kcos-framework-shell-85b5d56959-bqmk8:~$ █

```

## Configure a new scenario

To configure a new scenario, do the following:

1. On the **Overview** page, select **Add**.
2. In the **Select Protocols** pane, select the protocols from the list of supported protocols, for example, IPv4.
3. After you select a protocol, the **Ports** pane appears. Type the chassis IP or DNS in the **Enter Chassis IP or DNS** list, and then select **Add**.
4. Select the available ports under the chassis and select **New Topology**. To understand the status of ports, see [Port status](#) .
5. UHD creates a new topology for you. Configure the topology according to your requirements.

---

 **Note:** You can add multiple topologies before you close the topology window.

---

## Start traffic

To start traffic, on the **Traffic** page, select **Traffic** to start traffic.

## Configure a test scenario by using a config file

You can configure test scenarios by uploading the ixncfg or json configuration files. To upload a configuration file, do the following:

1. Select **Overview**.
2. Select **Files**, and then select **Browse to upload a file** to upload an ixncfg config file, for example, ISIS\_L3.ixncfg.
3. After you upload the file, you can edit the topology according to your needs and you can start the test.

## Clear the current configurations and save a new configuration

To clear the current configurations and to save a new configuration, do the following:


1. Select **Files**, and then select **New** to clear the current configuration.
2. Select **Save As** to save a new configuration.

## Select a scenario from the list of sample scenarios

You can choose the test scenarios from the sample scenarios or recently used scenarios. To open a sample scenario, do the following:

1. In the **Samples** section, select a sample scenario that you want to test. The test topology for the selected scenario appears.
2. Configure the topology according to your needs.

---


 **Note:** Currently, the sample scenarios of IPv4, BGPv4, ISIS, and OSPFv2 are available in UHD.

---

## Edit a topology

After you create or select a scenario, UHD shows an interactive topology that you can edit.

To edit the topology, do the following:

1. Select the different parts of the interactive topology to view the respective settings in the bottom pane.
2. Edit the columns with the  icon.
3. Type your value and select **Enter**. UHD automatically saves you changes.

## Add traffic

You can configure the traffic streams on the ports. To add a traffic stream, do the following:

1. Select the **Traffic** page.
2. Select **Add**, and then select **Add Traffic Item** to open the **Add Traffic** pane.

3. Select the traffic type from the list.
4. Select the source and destination ports from the **Sources** and **Destinations** sections respectively.
5. Select **New Traffic Item**.

---

 **Note:** Changing mesh settings is optional.

---

## Edit traffic item and set up flow groups

The **Traffic Item** grid and the **Flow Groups** grid are interactive. You can edit the fields in the grid and save the configuration.

---

 **Note:** Editing the traffic item and setting up the flow groups is optional.

---

### Edit traffic item

To edit a traffic item, do the following:

1. Select **Traffic Item** to view flow groups grid.
2. Select the **Frame Size** column, edit the value in **Frame Size**, and then select **OK**.

### Set up flow group

To set up flow groups, create the flow groups based on the selectable packet fields. One flow group per high-level stream is created for each selected field.

## Start a protocol

You can start a protocol by using any one of the following methods on the **Protocol** page:

- Select **Test**, and then select **Start**. This initiates the complete test scenario, which includes connecting to ports, starting protocols, and starting traffic.
- Select **Protocol** to start all the protocols configured in the test session.

## Perform protocol actions

To perform the various protocol actions, do the following:

1. On the **Protocols** page, select **Actions** to open the **Protocol Actions** pane.
2. Select a protocol from the **Protocols** list and select the action that you want to perform on the selected protocol from the **GLOBAL ACTIONS** list and the **SELECTED ITEMS** list.
  - From the **GLOBAL ACTIONS** list, do the following:
    - Select **Connect Ports** to connect to the topology.
    - Select **Ports** to view the **Port Picker** window to edit the port selection.
    - Select **Apply Changes** to apply the changes.

- From the **SELECTED ITEMS** list, do the following:
  - Select **Start Selected** to start the selected protocol.
  - Select **Stop Selected** to stop the selected protocol.
  - Select **Abort Selected** to remove the configured plug-ins from the port CPU to return the protocols to the unconfigured state.
  - Select **Restart Down Sessions** to restart the failed sessions to generate the flows on the selected traffic item.

## Perform traffic actions

To perform the various traffic actions, do the following:

1. On the **Protocols** page, select **Actions** to open the **Traffic Actions** pane.
2. Select a traffic item from the **Traffic Items** list and select the action that you want to perform from the **Traffic Actions** pane.
  - From the **ALL ITEMS** list, do the following:
    - Select **Delete All** to delete all the traffic items.
    - Select **Generate All** to generate the flows of all the traffic items that you created.
    - Select **Start All** to start traffic for all the traffic items.
    - Select **Stop All** to stop traffic for all the traffic items.
  - From the **TRAFFIC ITEM** list, do the following:
    - Select **Delete Traffic Item** to delete the selected traffic item.
    - Select **Generate Traffic Item** to generate the flows of the selected traffic item.
    - Select **Start** to start the selected traffic item.
    - Select **Stop** to stop the selected traffic item.
    - Select **Pause** to pause traffic on the selected traffic item.
    - Select **Duplicate Traffic Item** to create a duplicate copy of the item.
    - Select **Convert To Raw** to create a duplicate of the selected traffic item to send traffic on a port-to-port basis, without the use of protocol interfaces.

## View statistics

You can view the traffic statistics from the **Statistics** page. You can also view the different statistics such as port statistics, traffic flow statistics, and layer 2 to 3 traffic test summary statistics.

To view the port statistics, do the following:

1. Select **Statistics**.
2. In the left pane, under **Ports**, select **Port Statistics**. The port statistics appears.

To view layer 2 to 3 traffic test summary statistics, do the following:

1. Select **Statistics**.
2. In the left pane, under **Traffics**, select **L2-L3 Test Summary Statistics**. The layer 2 to 3 test summary statistics appears.

To view flow statistics, do the following:

1. Select **Statistics**.
2. In the left pane, under **Traffics**, select **Flow Statistics**. The flow statistics appears.

## View API

You can view the UHD APIs in the UHD API browser. The API data is available in a hierarchical format in this browser. You can access each level of the hierarchy with a view of peers, attributes, executables, errors, and child levels.

To open the API browser, select  on the top menu.

## CHAPTER 5 UI

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The 'UI' section contains a list of topics describing the UI labels of UHD web UI.


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### UI: Port status

The following table shows the different statuses of the ports:

Port	Status
	Port is available.
	Port is down.
	Port is unavailable.
	Port is assigned to a topology in the configuration file.
	Port is assigned to the selected topology.

	Another user has reserved this port.
---	--------------------------------------

## UI: Open Session

The following table shows the names and descriptions of the UI labels on Open Session page:

Port	Status
NEW SESSION	Select to create a new session in the UHD section.
SESSIONS	Select to open an existing session from the list of the saved sessions.

## UI: License settings

The following table shows the names and descriptions of the UI labels on License setting page:

Port	Status
Version	Version of Web UI and UHD.
Preferences	Select <b>Port Ownership</b> to automatically clear ownership when starting protocol.
License	Select the details of the license: <ul style="list-style-type: none"> <li>• Licensing Mode: Select the license mode. Available modes are:                             <ul style="list-style-type: none"> <li>■ Mixed</li> <li>■ Perpetual</li> <li>■ Subscription</li> </ul> <hr/> <div style="border: 1px solid #ccc; padding: 2px;"> <span style="font-size: 0.8em;">i</span> <b>Note: Mixed</b> is the default licensing mode.                             </div> </li> <li>• License Servers: The name of the license server. Keep default to <code>localuhd</code>.</li> <li>• Tier Level: Select the tier level. Available levels are:                             <ul style="list-style-type: none"> <li>■ Tier 1</li> <li>■ Tier 2</li> <li>■ Tier 3</li> </ul> <hr/> <div style="border: 1px solid #ccc; padding: 2px;"> <span style="font-size: 0.8em;">i</span> <b>Note:</b> For Perpetual licenses, you can keep the default license settings. For Subscription licenses, select the correct tier from the <b>Tier Level</b> dropdown.                             </div> </li> </ul>
Diagnostic	<ul style="list-style-type: none"> <li>• Select <b>Current Instance</b> to run diagnostics.</li> <li>• Select <b>Past Instances</b> to view historical diagnostic data.</li> </ul>

## UI: Overview

The following table shows the names and descriptions of the UI labels on Overview page:

Port	Status
Files	Create, open, save, or delete a configuration file.
Test	Start or stop a test.
Add	Select to add topology, device group, chained device group, stack, protocol, and network group.
Protocol	Run protocol.
Delete	Delete the selected item.
Actions	<p>Protocol actions. Following are the available actions:</p> <ul style="list-style-type: none"> <li>• Global Actions: <ul style="list-style-type: none"> <li>■ Connect Ports: Select to connect ports.</li> <li>■ Release Ports: Select to release the connected ports.</li> <li>■ Apply Changes: Select to apply the changes.</li> </ul> </li> <li>• Selected Item <ul style="list-style-type: none"> <li>■ Start Selected: Start selected protocol session.</li> <li>■ Stop Selected: Stop selected protocol session.</li> <li>■ Abort Selected: Immediately stops all network stack processes for the selected protocol.</li> <li>■ Restart Down Sessions: Restarts failed protocol sessions.</li> <li>■ Abort: Immediately stops all network stack processes for the selected element in the navigation tree, without attempting to terminate the sessions with the DUT. It also removes the configured plug-ins from the port CPU, returning the protocols to the unconfigured state.</li> </ul> </li> <li>• Device Group <ul style="list-style-type: none"> <li>■ Start</li> <li>■ Stop</li> <li>■ Abort</li> </ul> </li> </ul>

## UI: Traffic

The following table shows the names and descriptions of the UI labels on Traffic page:

Port	Status
------	--------



Files	Create, open, save, or delete a configuration file.
Test	Start or stop a test.
Add	Select to add topology, device group, chained device group, stack, protocol, and network group.
Traffic	Run traffic.
Delete	Delete the selected item.
Actions	<p>Traffic actions. Following are the available actions:</p> <ul style="list-style-type: none"> <li>• All Item: <ul style="list-style-type: none"> <li>■ Delete All: Delete all traffic items.</li> <li>■ Generate All: Generate traffic for all traffic items.</li> <li>■ Apply All: .</li> <li>■ Start All: Start all traffic items.</li> <li>■ Stop All: Stop all traffic items.</li> </ul> </li> <li>• Selected Item <ul style="list-style-type: none"> <li>■ Delete Traffic Item: Delete the selected traffic item.</li> <li>■ Generate Traffic Item: Generate traffic for the selected traffic item.</li> <li>■ Duplicate Traffic Item: Create a copy of the selected traffic item.</li> <li>■ Convert to Raw: Create a new raw version of the selected traffic item, which will have all of the encapsulation and payload information of the original now-raw version.</li> </ul> </li> <li>• Selected Flow Group <ul style="list-style-type: none"> <li>■ Start: Start traffic for the selected flow group.</li> <li>■ Stop: Stop traffic for the selected flow group.</li> <li>■ Pause: Pause traffic for the selected flow group.</li> </ul> </li> </ul>
Traffic Items	This section shows information for all traffic items.
Traffic Item	The name of the traffic item.
State	<p>The current transmit state of the traffic item, options include the following:</p> <ul style="list-style-type: none"> <li>• Start: If this button is green you can select it to start transmitting traffic on this traffic item.</li> <li>• Pause: If this button is blue you can select it to pause traffic on this traffic item.</li> <li>• Stop: If this button is red you can select it to stop traffic on this traffic item.</li> </ul>
Enabled	Activate the selected traffic item. The default is turned on.

Scr/Dest Mesh	The traffic flow meshing type between the different source endpoint and destination endpoint pairs, which can be as follows: <ul style="list-style-type: none"> <li>• One-One</li> <li>• Many to Many</li> <li>• Fully Meshed</li> </ul>
Route Mesh	The traffic flow type between each pair of source route endpoint and destination route endpoint, which can be as follows: <ul style="list-style-type: none"> <li>• One-One</li> <li>• Fully Meshed</li> </ul>
Bi-Directional	Allow traffic to be sent in forward and reverse destination.
Statistics Tracking	Select tracking filters for generating statistics.
Destination	Destination of the traffic.
Sources	Source of the traffic.
Stack	Stack used for generating traffic.
Frame Size	The packet size for this endpoint set.
Frame rate	The packet rate for this endpoint set.
Payload	The payload pattern of the configured encapsulation set.
Flow Groups	This section shows information for all flow groups.
State	The state of the flow group's transmit port.
Enabled	If selected, the corresponding flow group is turned on. When not selected, the flow groups do not get applied to the transmit ports. Only enabled flow groups can be started. They can be enabled only when traffic is stopped.
Tx Port	The name of the transmit port.
Rx Port	The name of the receiving ports.
Flow Name	The name of the flow group.
Stack	Stack used by this flow group.
Packets	Select to preview the packets.
Frame Size	The frame size used by this flow group.

Frame Rate	The frame rate used by this flow group.
Frame Payload	The type of frame payload used by this flow group.
Applied Frame Size	This field cannot be edited.
CRC	The type of CRC error used by this flow group.
Preamble Size	The preamble size used by this flow group.
Transmission	The transmission mode used by this flow group.
Dest MAC Address	The destination MAC address for this flow group.
Src MAC Address	The source MAC address for this flow group.

## UI: Protocol

The following table shows the names and descriptions of the UI labels on Protocol page:

Port	Status
Topology	Name of the topology used in this protocol.
Ports	Ports used in the topology.
Device Group	The identifier of the device group in the topology.
Multiplier	Ratio of protocol elements, or protocol instances, that are created when a stack is instantiated.
Count	Count of devices.
Stack	Name of the stack.
Enable GRATARP or RARP	Select this check box to activate the Send GRATARP or RARP function, where you can choose to send either GRATARP or RARP packets during the IPv4/Ethernet stack startup.
Send GRATARP or RARP	Select from the following options to send the packet when the IPv4/Ethernet stack starts: <ul style="list-style-type: none"> <li>• Send GRATARP</li> <li>• Send RARP</li> </ul>

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