



## **Fabric Dashboard**

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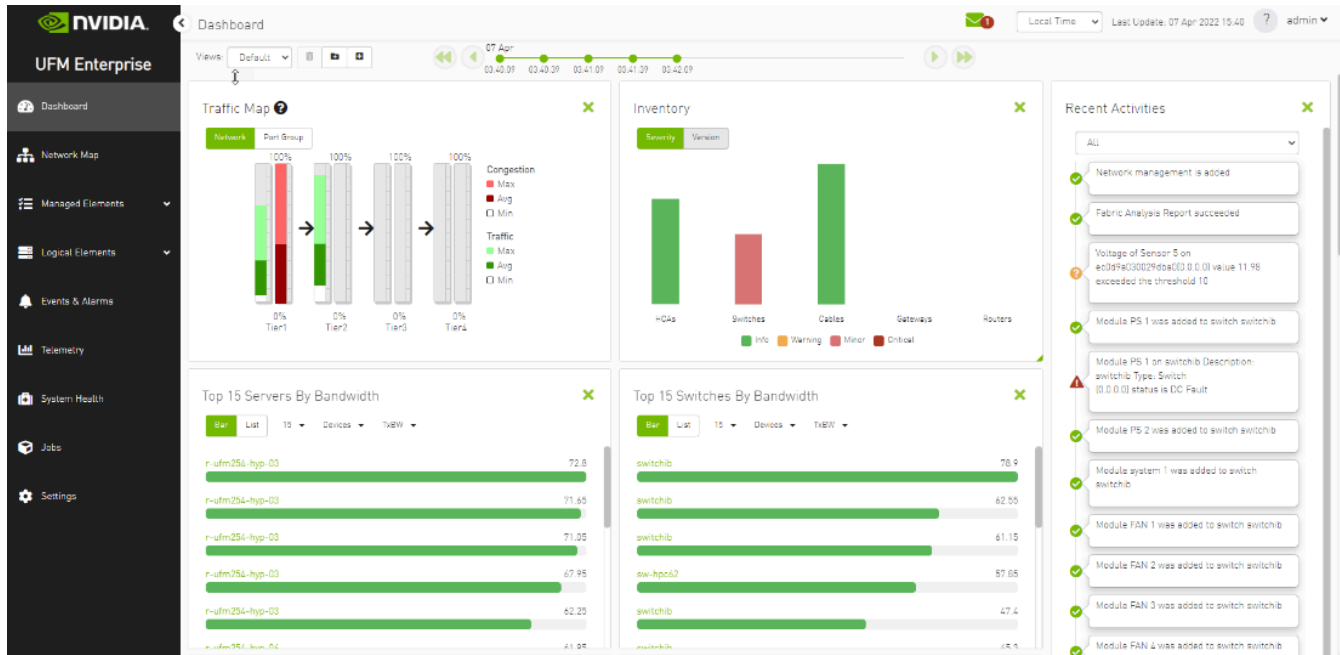
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Events History

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The dashboard window summarizes the fabric's status, including events, alarms, errors, traffic and statistics.

### Fabric Dashboard View

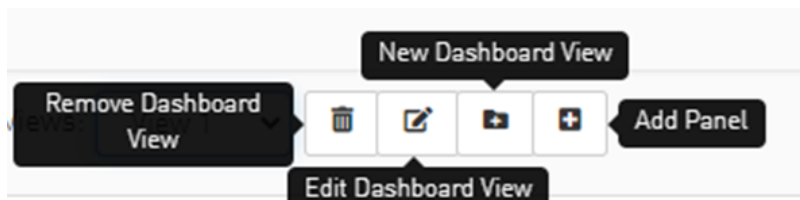


The Fabric Dashboard view consists of the following six dashboards, which provide real-time information about the fabric.

## Dashboard Views and Panel Management

UFM is installed with a default view of the most important panels. These panels are resizable and draggable. Users can customize their default view or create new views altogether

The dashboard views and panels are managed by a set of action buttons appearing at the top of the main dashboard screen:



Clicking on the Add Panel button will show a model to select which panels you wish to add to the current dashboard view.

**New Panels**

- All 12
- Health 2
- Monitoring 7
- Events and Alarms 3

**Inventory**

Severity: Info, Warning, Minor, Critical

Inventory: HCs, Switches, Cables, Gateways, Routers

**Fabric Health**

Switches: 3 (Normal: 2, Warning: 0, Minor: 0, Critical: 1)

Servers: 7 (Normal: 7, Warning: 0, Minor: 0, Critical: 0)

**Traffic Map**

Network: Port Group

Tier 1, Tier 2, Tier 3, Tier 4

**Levels Traffic Map**

Network: Port Group

L4, Core

**Top 5 Servers By Bandwidth**

Server	Bandwidth (TbW)
ufm-hsp07	23.184
r-ufm-254-hsp-03	22.376
r-ufm-254-hsp-04	18.456

**Top 10 Switches By Bandwidth**

Switch	Bandwidth (TbW)
sw-hsp02	183.16
sw-hsp02	145.2
switch01	39.552

**Top 5 Congested Servers**

Server	TCBW
r-ufm-254-hsp-03	4503
r-ufm-254-hsp-04	3847
ufm-hsp07	1842

**Top 5 Congested Switches**

Switch	TCBW
switch-07	96
switch01	84
sw-hsp02	4

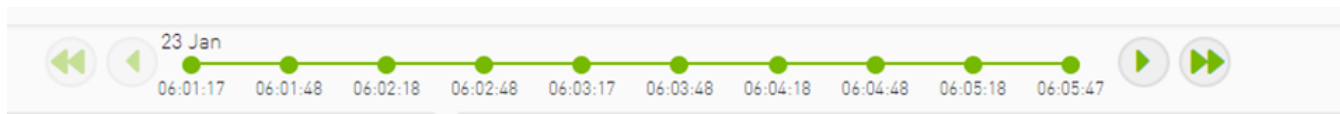
2 Panels Selected

Add Panels Cancel

## Dashboard Timeline Snapshots

Once the user is logged into the UFM Enterprise, the UFM will start recording snapshots of the dashboard panel data every 30 seconds.

The user is able to navigate between these snapshots and load the dashboard data of a specific data snapshot.



## Dashboard Panels

The Fabric Dashboard view consists of the following 12 panels, which are categorized into 3 main categories and provide real-time information about the fabric.

- Health:
  - Inventory
  - Fabric Health
- Monitoring:
  - Traffic Map
  - Levels Traffic Map
  - Top X Servers by bandwidth
  - Top X Switches by bandwidth
  - Top X congested servers
  - Top X congested switches
  - Top X utilized Pkeys
- Events and Alarms:
  - Recent Activities
  - Top X alarmed servers
  - Top X alarmed switches
  - Events History

## Top N Servers/Switches by Rx or Tx Bandwidth

The Top N servers/switches by Rx or Tx Bandwidth component shows the top elements that are transmitting or receiving the most bandwidth per second. These elements are classified top-down according to the defined Transmit (Tx) or Receive (Rx) bandwidth (MB/sec Rate).

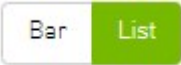

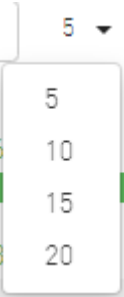
Bandwidth is measured as a rate in bytes/sec.

- Transmitted (Tx) bandwidth is measured by N server/switch ports in MB/sec
- Received (Rx) bandwidth is measured by N server/switch ports in MB/sec

**Note**

N can be 5, 10, 15, or 20.

The following table lists the icons of this component:

Options	Description
<p>List view</p> 	<p>Shows the top N elements as a list</p> <p>Each element is shown in a row with the name of the element and the bandwidth rate</p>
<p>Bar view</p> 	<p>Shows the top N nodes as a bar graph</p> <ul style="list-style-type: none"> <li>• X axis shows the rate as a value</li> <li>• Y axis shows the Node (server) name</li> </ul>
<p>Drop-down menu</p> 	<p>Selects the number of items to display</p> <p>Default: 10 nodes</p>

Options	Description
<p>Monitoring attributes</p> <p>TxBW ▼</p> <div style="border: 1px solid #ccc; padding: 5px; width: fit-content;"> <p>TxBW</p> <p>RxBW</p> </div>	<p>Selects the attribute for monitoring:</p> <ul style="list-style-type: none"> <li>• TxBW – Transmit Bandwidth</li> <li>• RxBW – Receive Bandwidth</li> </ul>
<p>View by port/element</p> <p>Devices ▼</p> <div style="border: 1px solid #ccc; padding: 5px; width: fit-content;"> <p>Devices</p> <p>Ports</p> </div>	<p>Switches view to top 5 elements by bandwidth or top 5 ports by bandwidth. Nodes view is presented by default.</p> <ul style="list-style-type: none"> <li>• Clicking a specific port in the ports view under the port column redirects to the ports table and highlights that particular port</li> <li>• Clicking a specific device in the devices view under the device column redirects to the Devices table and highlights that particular node</li> </ul>
<p>Filter toggle</p> <p>▼</p>	<p>Toggles the filter textbox</p>

### ***Top Servers/Switches by Bandwidth—Bar View***





**Top Servers/Switches by Bandwidth—List View**

### Top 15 Servers By Bandwidth

Bar List 15 Devices TxBW

5

Device	TxBW BandWidth (Gbps) ↓
r-ufm254-hyp-04	75.35
r-ufm254-09	74.6
r-ufm254-011	65.95
r-ufm254-04	64.7
r-ufm254-012	63.2

1 to 5 of 15 |< < Page 1 of 3 > >|



Right-clicking a device displays a list of the actions that can be performed. These actions (shown in the following screenshot) are the same actions available in the devices table (see [Devices Actions](#) table under [Devices Window](#)).

The screenshot shows a window titled "Top 15 Servers By Bandwidth" with a close button (X) in the top right. Below the title are controls: "Bar" and "List" buttons, a "15" dropdown, "Devices" and "TxBW" dropdowns, and a "5" dropdown. The main area is a table with two columns: "Device" and "TxBW BandWidth [Gbps]". The table lists five servers with their respective bandwidths. A context menu is open over the first server, listing actions: "Mark As Unhealthy", "Firmware Upgrade", "Add To Group", "Remove From Group", "Suppress Notifications", and "Add To Monitor Session".

Device	TxBW BandWidth [Gbps]
r-ufm254-hyp-03	38.8
r-ufm254-hy	40.1
ufm-host87	79.05
r-ufm254-01	47.6
r-ufm254-02	72.8

Right-clicking a port displays a list of the actions that can be performed. These actions (shown in the following screenshot) are the same actions available in the Ports table (see [Ports Window](#) for more information).

## Top N Congested Servers/Switches by Rx/Tx Bandwidth

The Top N Congested devices by Rx or Tx Bandwidth component shows the top congested devices, classified top-down according to the defined Transmit (Tx) or Receive (Rx) bandwidth.

Bandwidth is measured as congestion bandwidth rate (CBW) by percentage.

- For Tx, congestion is measured by N HCA ports.
- For Rx, congestion is measured by N switch ports connected to HCAs.

**Note**

N can be 5, 10, 15, or 20.

**Top N Congested Servers by Bandwidth—List View**

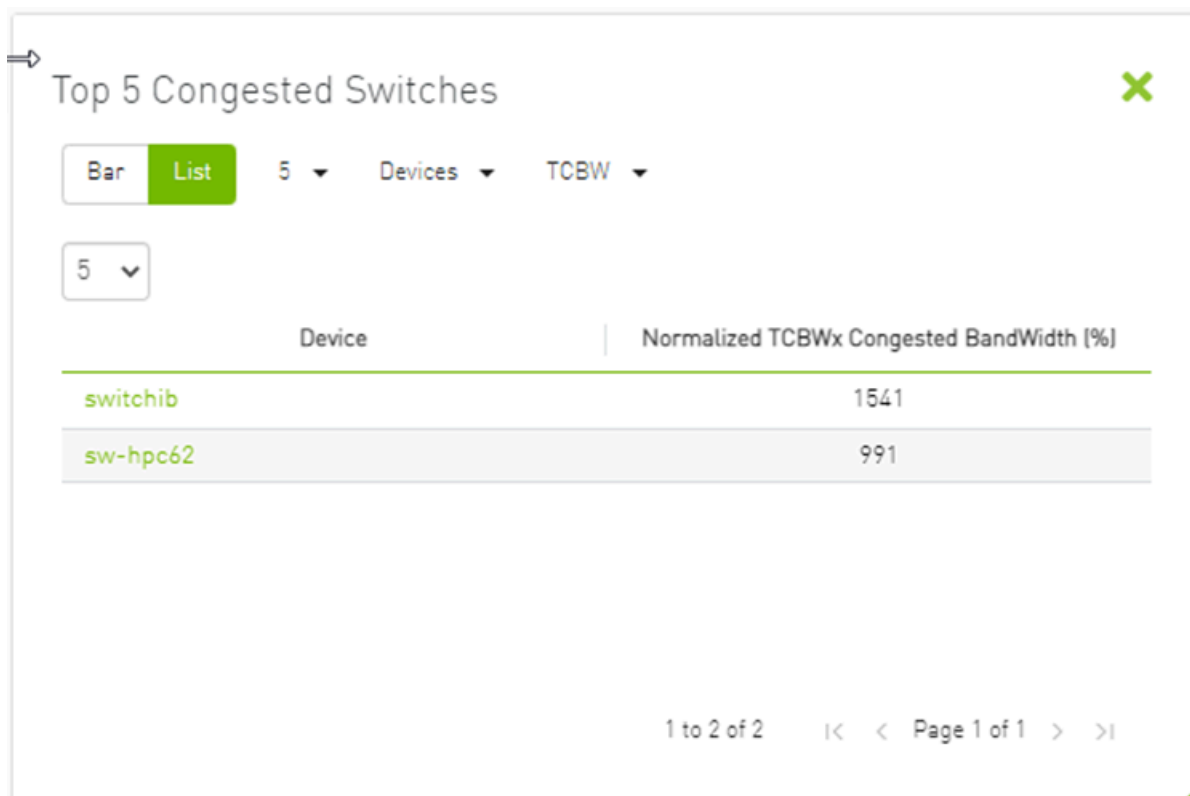
Top 5 Congested Servers

Bar List 5 Devices TCBW

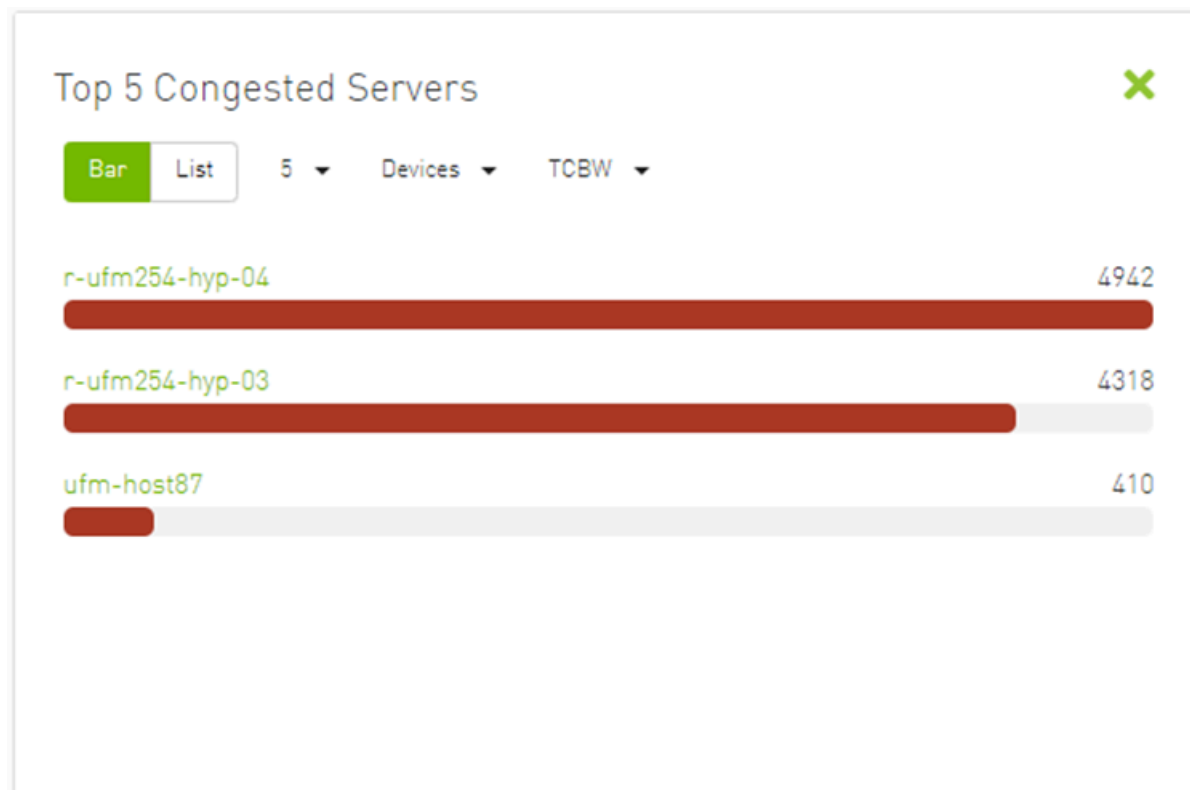
5

Device	Normalized TCBWx Congested BandWidth (%)
r-ufm254-hyp-04	3896
ufm-host87	3506
r-ufm254-hyp-03	3489

1 to 3 of 3 |< < Page 1 of 1 > >|


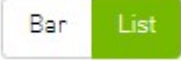
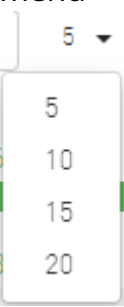
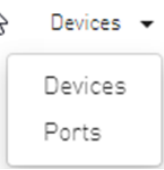
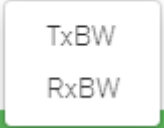


**Top N Congested Servers/Switches by Bandwidth—Bar View**



The following table describes the options available in this component.

## Top N Congested Devices by Rx/Tx Bandwidth

Options	Description
<p>Bar view</p> 	<p>Shows the top N congested devices as a bar graph</p> <ul style="list-style-type: none"> <li>• X axis shows the rate as a percentage</li> <li>• Y axis shows the congested Node (server) name</li> </ul>
<p>List view</p> 	<p>Shows the top N congested nodes as a list</p> <p>Each congested node is shown in a row with the name of the node and its picture. It also shows the bandwidth rate</p>
<p>Drop-down menu</p> 	<p>Enables selecting the number of top N congested nodes</p> <p>Default: 10 nodes</p>
<p>View by port/element</p> 	<p>Switches view to Top 5 elements By Bandwidth or Top 5 Ports By Bandwidth. Devices view is presented by default.</p> <ul style="list-style-type: none"> <li>• Clicking a specific port in the Ports view under the Port column redirects to the Ports table and highlights that particular port</li> <li>• Clicking a specific device in the Nodes view under the Device column redirects to the Devices table and highlights that particular node</li> </ul>
<p>Monitoring attributes</p> 	<ul style="list-style-type: none"> <li>• RCBW – Receive Congested Bandwidth (percentage)</li> <li>• TCBW – Transmit Congested Bandwidth (percentage)</li> </ul>

## Top N Utilized PKeys

Top N Utilized PKeys displays the top utilized PKeys based on the number of the PKey members.

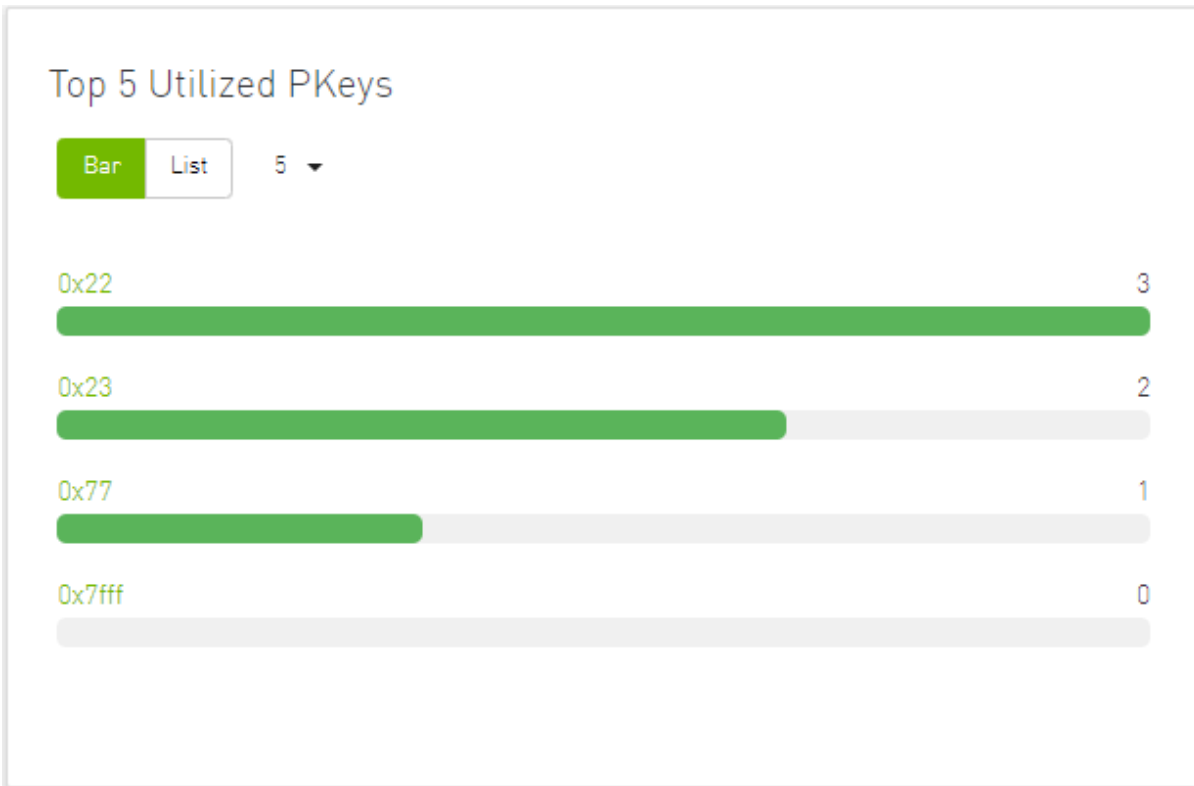
**Note**

N can be 5, 10, 15, or 20.

**Top N Utilized PKeys—List View**


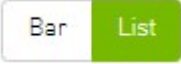
Pkey	# of GUIDs
0x22	3
0x23	2
0x77	1
0x7fff	0

**Top N Utilized PKeys—Bar View**



The following table describes the options available in this component.

### ***Top N Utilized PKeys***

Options	Description
Bar view 	Shows the top N <b><i>Utilized PKeys</i></b> as a bar graph <ul style="list-style-type: none"> <li>• X axis shows the number of members</li> <li>• Y axis shows the names of the PKeys</li> </ul>
List view 	Shows the top N <b><i>Utilized PKeys</i></b> as a list Each PKey is shown in a row with the name of the PKey and the number of its members
Drop-down menu	Enables selecting the number of top N <b><i>Utilized PKeys</i></b> Default: 10 <b><i>Utilized PKeys</i></b>

Options	Description
	

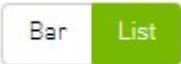

## Top N Alarmed Servers/Switches

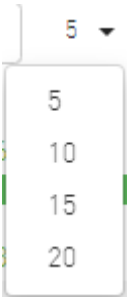

The Top N Alarmed Servers/Switches component shows the top nodes with alarms classified in a descending order. Alarmed nodes are measured according to the following:

- Severity – only the top nodes, in order of severity:
  - Critical
  - Minor
  - Warning
  - Normal
- Alarm – numbers (N can be 5, 10, 15, or 20)

The following table lists the components.

### *Top N Alarmed Servers/Switches*

Options	Description
<p>List view</p> 	<p>Shows the top N alarmed servers/switches as a list. Each alarmed device is shown in a row with the name of the node and the number of alarms.</p>
<p>Bar view</p> 	<p>Shows the top N alarmed devices as a bar graph.</p> <ul style="list-style-type: none"> <li>• X axis shows the number of alarms</li> <li>• Y axis shows the names of the alarmed nodes (servers)</li> </ul>

Options	Description
Drop down menu 	Enables selecting the number of top N alarmed nodes. Selects the number of items to display. Default: 10 alarmed nodes
Filter toggle 	Toggles the Filter textbox

### ***Top Alarmed Servers/Switches—List View***



Top 5 Alarmed Servers

Bar List 5

5

Device	Alarms
r-ufm254-hyp-03	9
r-ufm254-hyp-04	9
ufm-host87	7

1 to 3 of 3 |< < Page 1 of 1 > >|



### Top 5 Alarmed Switches ✕

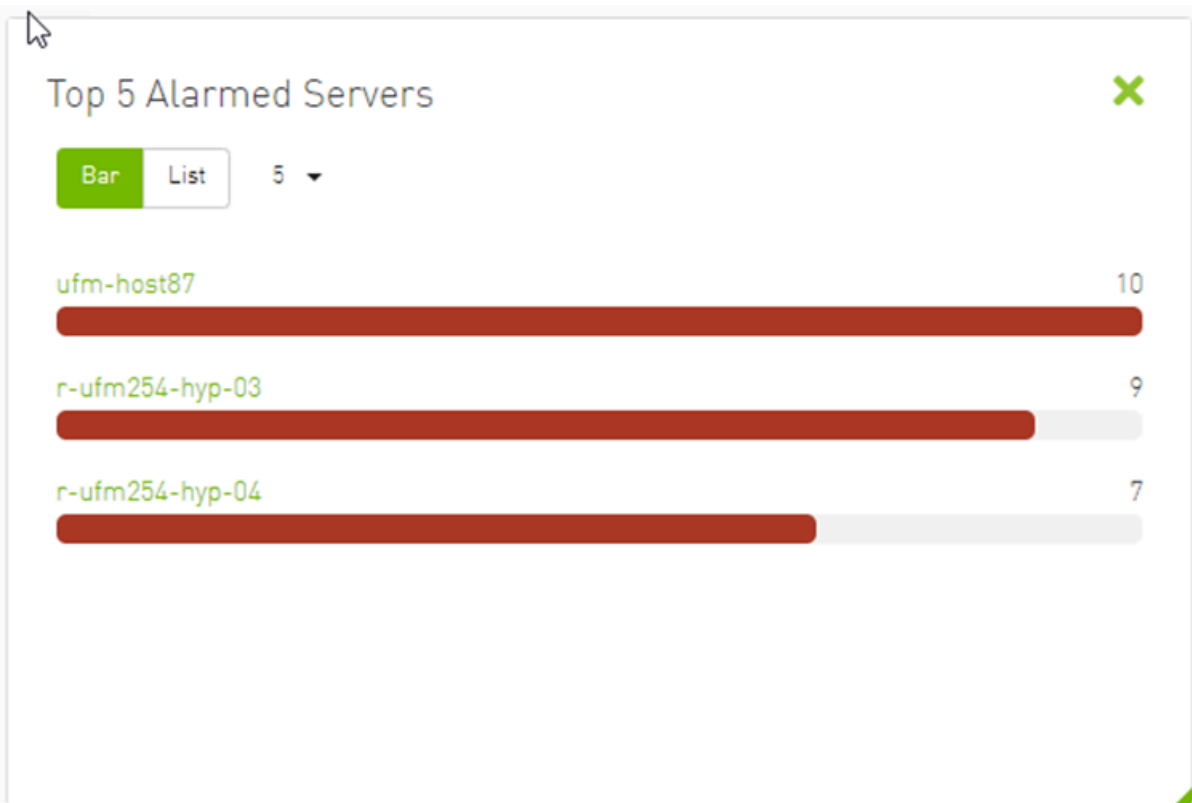
5 ▾

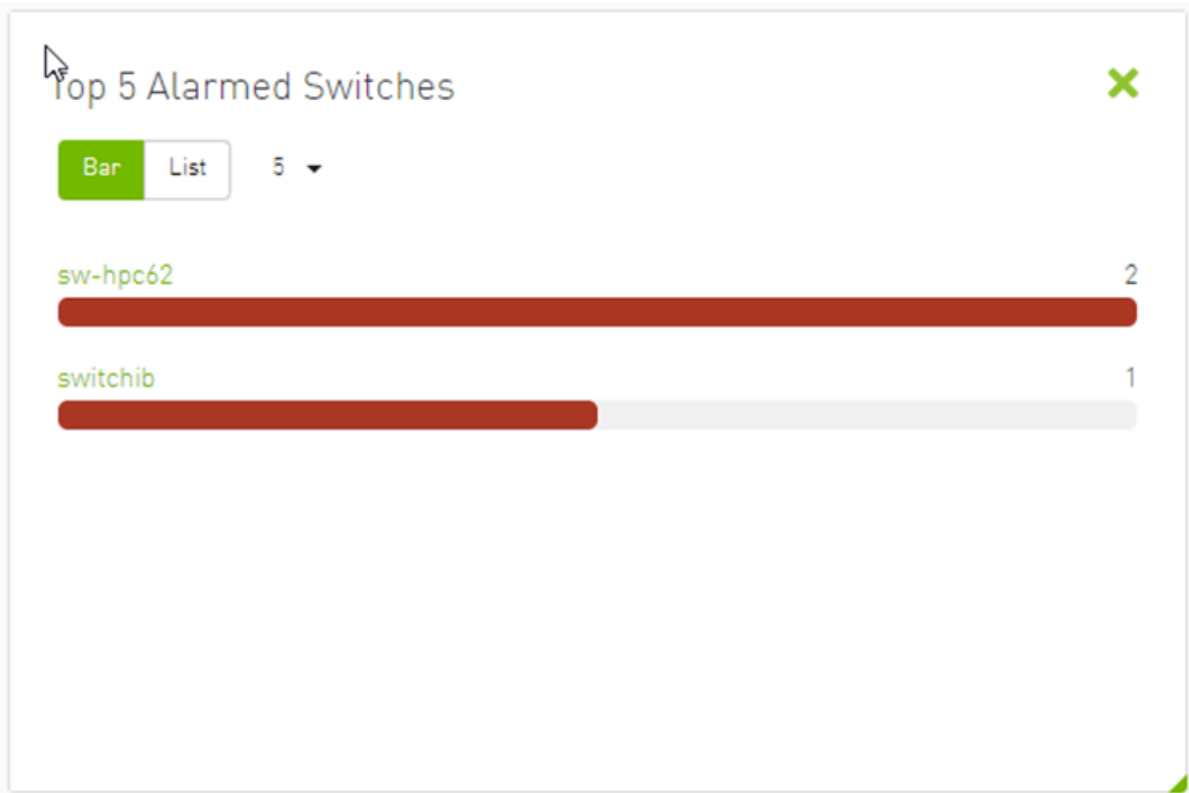
5 ▾

Device	Alarms
sw-hpc62	9
switchib	8

1 to 2 of 2    |< < Page 1 of 1 > >|

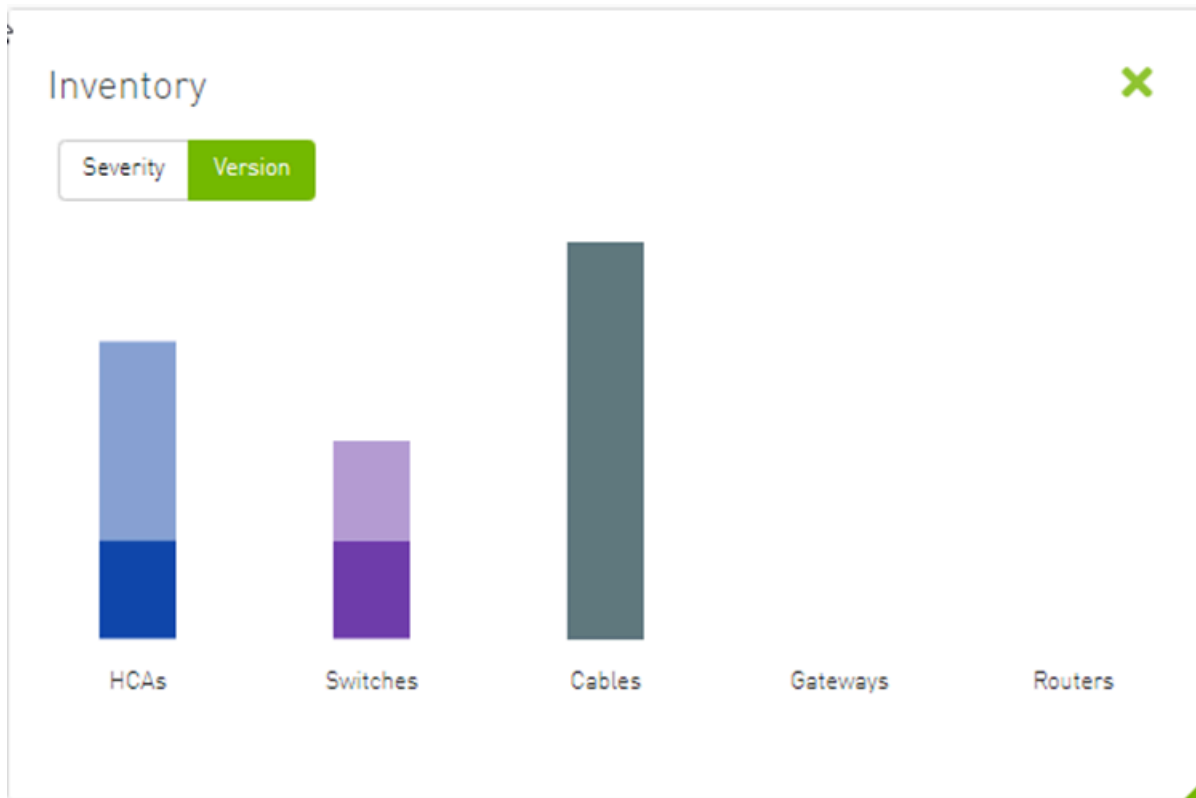
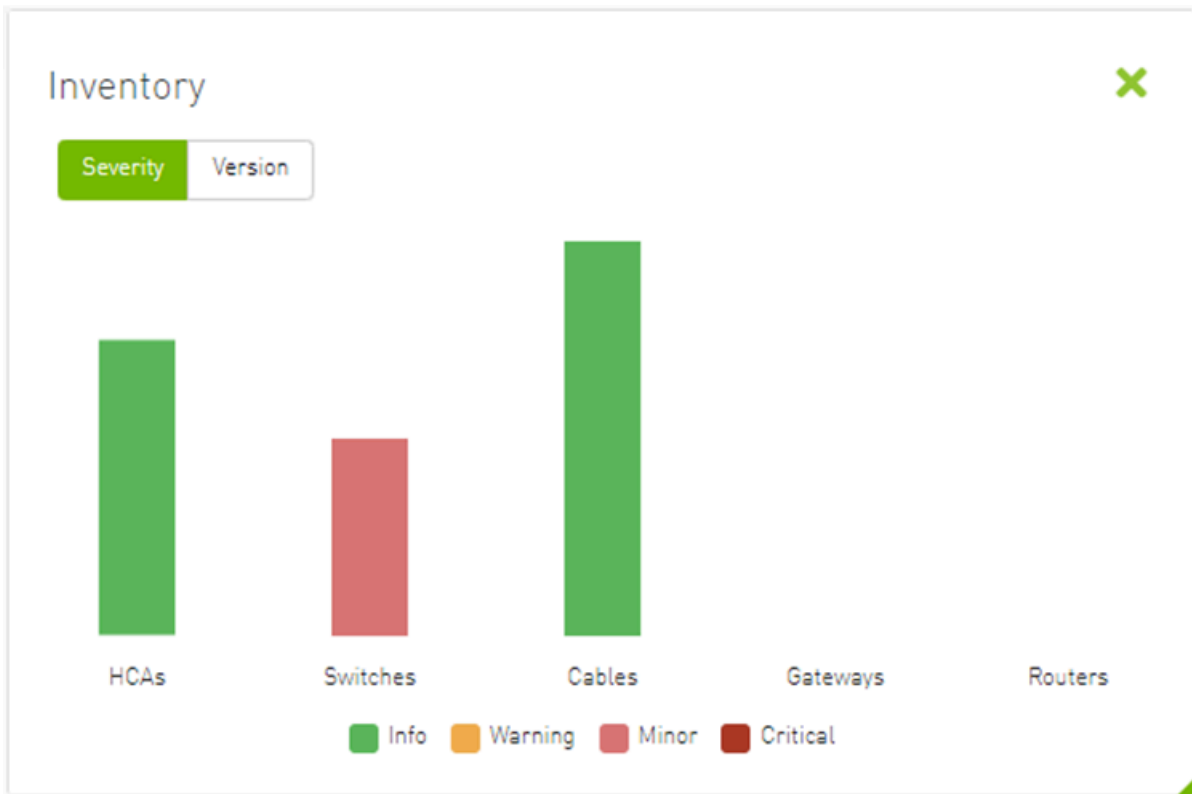
***Top N Alarmed Servers/Switches—Bar View***





## Inventory Summary

The Fabric Inventory Summary component shows a summary of your fabric inventory (HCAs, Switches, Gateways, Routers and Cables) categorized by the element's severity or firmware version.



Clicking on one bar element with specific severity/firmware version will redirect you to the clicked element's table.

# Fabric Utilization

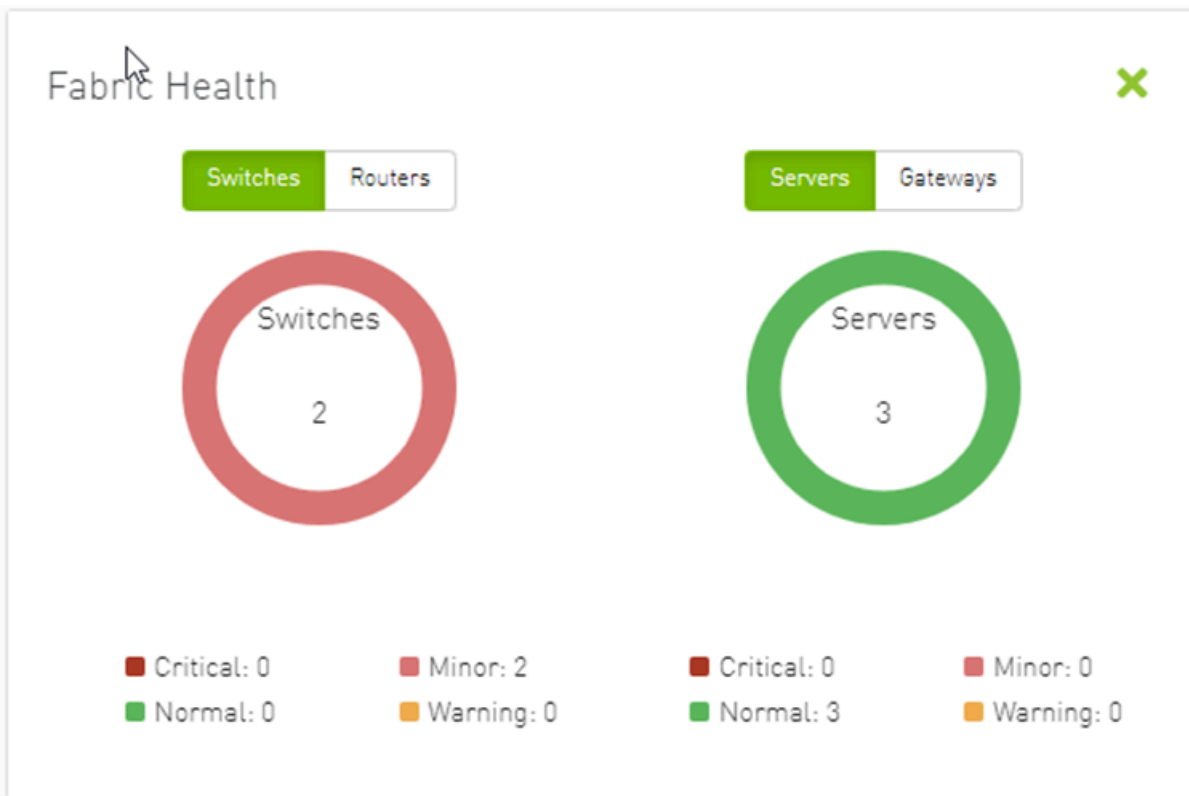
The Fabric Utilization component shows the number of alarmed objects, categorized by the alarm's severity. They are as follows:

1. Warning
2. Minor
3. Normal
4. Critical

If Server X has 2 minor alarms, 1 warning alarm and 2 critical alarms, and Server Y has 0 minor alarms, 2 warning alarms and 1 critical alarm, the **Fabric Resource Utilization** pie chart will show 2 servers in the critical slice, 2 servers in the warning slice and 1 server in the minor slice.

You can filter for both switches and nodes of a specific severity level by clicking the specific pie slice indicating the severity.

In the example below, the Devices table lists all the switches of severity level "Minor" after clicking the red (Minor) slice from the Switches pie chart.



Devices Local Time Last Update: 07 Apr 2022 17:01 admin

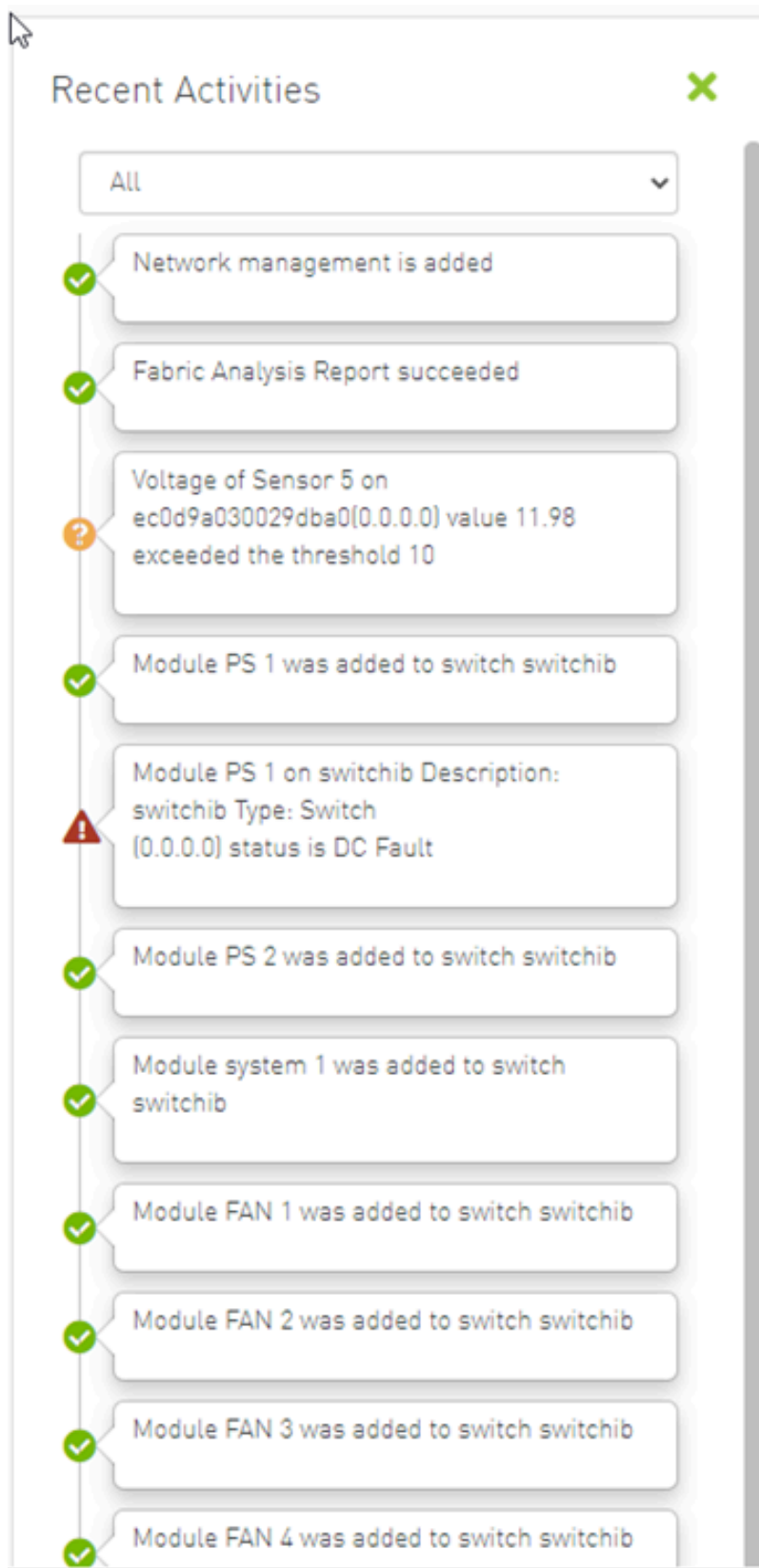
Showing 2 out of 5. Click to reset all filters

Severity	Name	GUID	Type	Model	IP	Firmware Version
Minor	sw-hpcc2	0x7ef4f00300a5a2a0	switch	MSR7600	N/A	15.1200.102
Minor	switchb	0x6e07fa03002f68a0	switch	EDR	N/A	15.2008.182P

Viewing 1-2 of 2

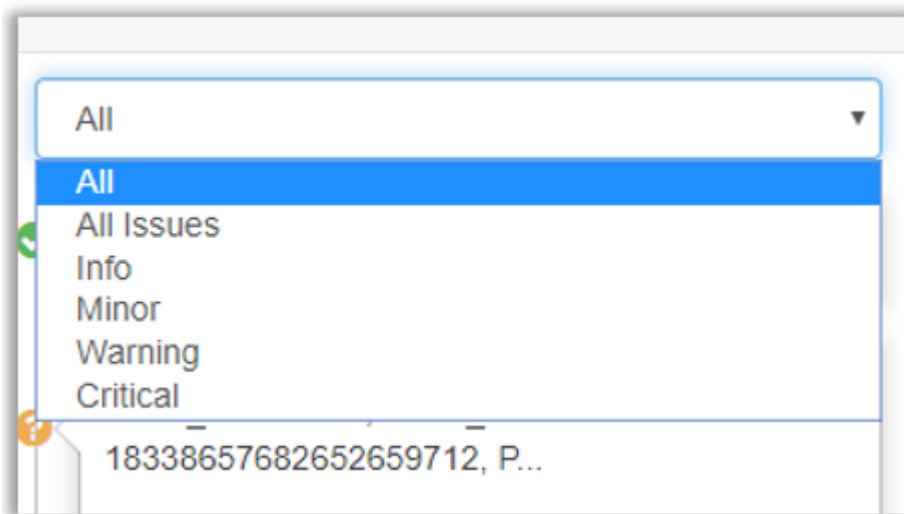
## Recent Activities

The Recent Activities component lists the recent events detected by the UFM system.



You can filter for the events you would like to see in one list using the drop-down menu that provides the following options:

- All – shows all recent activities
- All issues – shows all non-Info activities
- Info – shows all activities with Info severity or higher
- Minor – shows you all activities with Minor severity or higher
- Warning – shows you all activities with Warning severity or higher
- Critical – shows you all activities with Critical severity

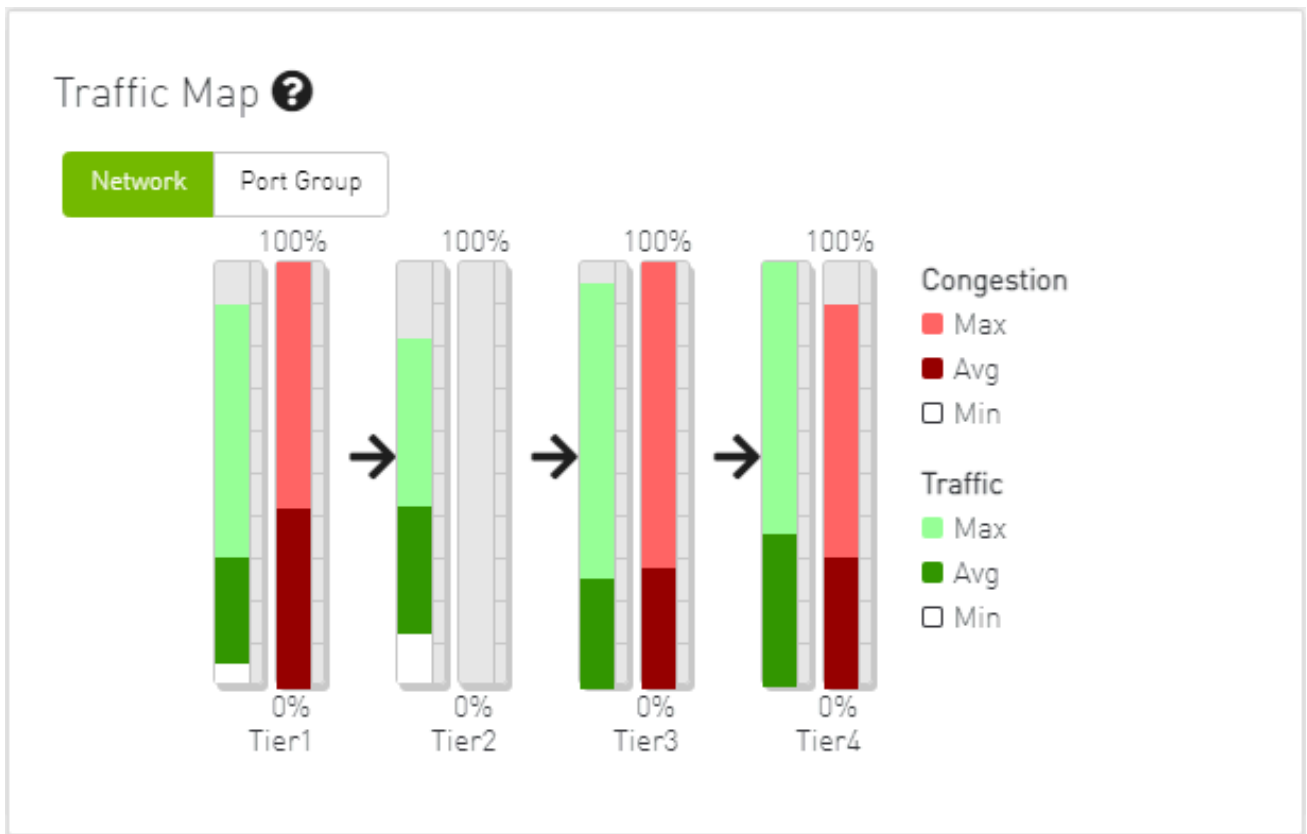


## Traffic Map

The Traffic Map dashboard shows the normal traffic versus congested traffic distributed on switch tiers and on port groups. This view, together with the **Top N Congestion** dashboard, gives a full status of the traffic congestion of the fabric.

## Network Traffic Map

Four double bars represent the transmitted bandwidth (normalized transmit data) and normalized congested bandwidth (CBW), both measured in bytes/sec with minimum, average, and maximum bandwidth values.



An explanatory window on traffic map opens once clicked on the

? icon.

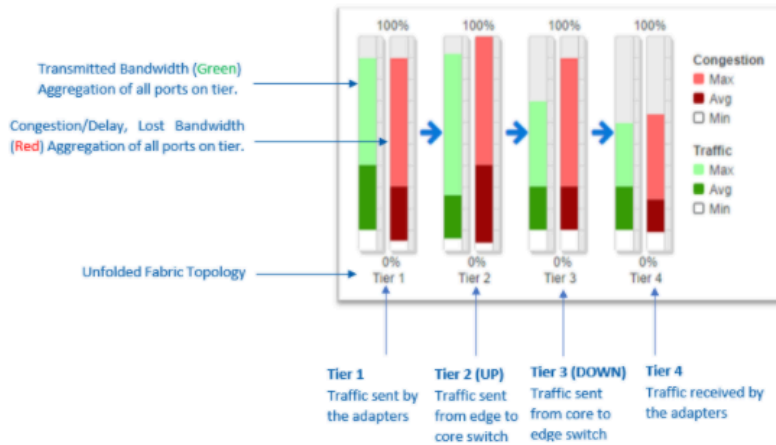


## Traffic Map Guide

Mellanox's unique Traffic Map provides a valuable real-time aggregate view of the fabric performance by showing the overall bandwidth utilization per switching tier coupled with congestion information.

### Reading the Traffic Map Chart

The Traffic Map contains four tiers; each tier is represented by a green and a red bar, as shown in the following Traffic Map Chart :



Color coding for each tier is as follows:

- The green the percentage of overall bandwidth generated by the specific tier. This bar is divided in light and dark green colors.
  - The light green indicates the peak port utilization.
  - The dark green indicates the average utilization.
- The red bar indicates the percentage of congestion (also referred to as lost bandwidth) in the specific tier. This bar is divided in red and dark red colors.
  - Red indicates the peak port congestion.
  - Dark red indicates the average congestion.

Close

The percentage of total theoretical bandwidth (TBW) is calculated based on the underlying InfiniBand technology (SDR, DDR, QDR, FDR or EDR). The speed can be viewed when checking the ports.

- The vertical axis shows the following:
  - Bandwidth (BW) is represented by a green bar and is measured in percentages
  - Congested Bandwidth (CBW) is represented by a red bar and is measured in percentages
  - Minimum, average, and maximum bandwidth are represented in each bar by a subset color

- The horizontal axis represents the tiers.

The bottom of the dashboard represents the tier-related transmitted traffic, which is divided into four segments by measurement ports:

- Tier 1 - represents the traffic injected by all adapters
- Tier 2 - represents the traffic sent from the edge switches to the core of the fabric (in case of a single Director switch, this tier indicates traffic utilization inside the Director between the line and fabric boards)
- Tier 3 - represents the traffic sent from the core to the edge switches
- Tier 4 - represents the traffic sent from the edge switch to the adapters

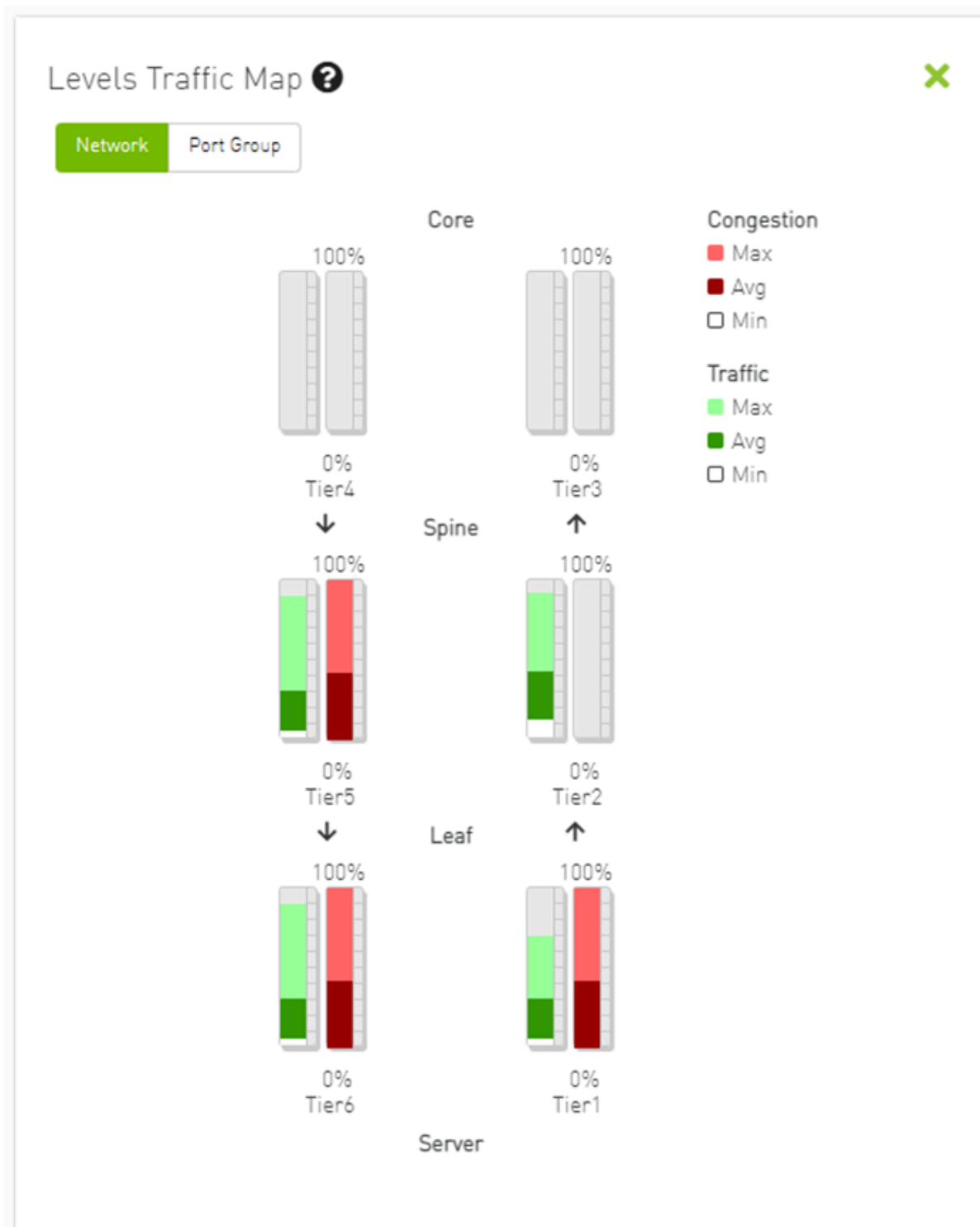
### **(i) Note**

The illustrations at the bottom of the tiers show a four-tier topology:

Server [tier 1] Switch [tier 2] Director Switch [tier 3] Switch [tier 4]  
Server.

## **Levels Network Traffic Map**

Different representation of the fabric traffic map that based on the devices/ports levels.



The level of the device/port is the distance between the device and the nearest server/gateway.

**Levels Calculations:**

- The levels calculations are configurable from the `gv.cfg` file under `TopologyLevels` section enable item and it is disabled by default.
- The levels names are configurable from the `gv.cfg` file under `TopologyLevels` section `levels` item and by default we are defining up to 4 levels levels equals server, leaf, spine, core
  - Server: hosts and gateways.
  - Leaf: switches and routers that are directly connected to the server
  - Spine: switches and routers that are directly connected to the leaf
  - Core: switches and routers that are directly connected to the spine

If the fabric has more than 4 levels, the level value will be  $L + \text{distance}$  e.g., L4, L5, L(N), and if levels was empty, the levels will start from L0, L1, L2, etc.

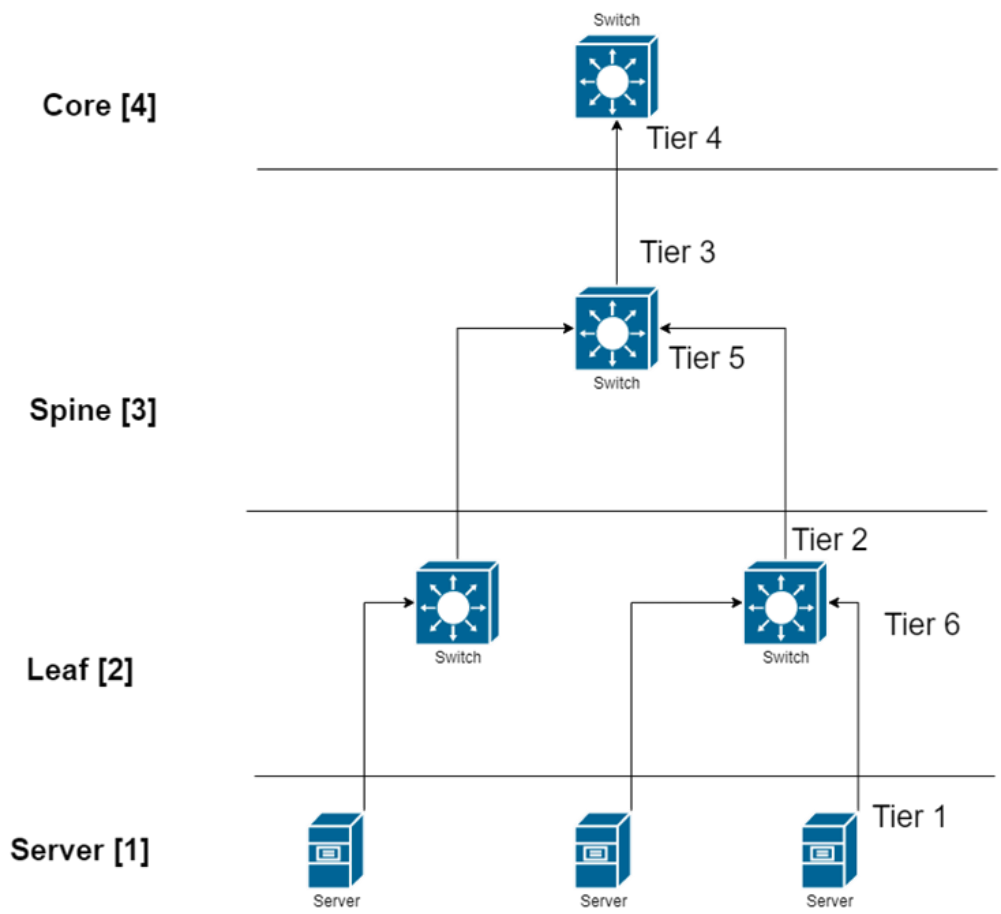
The levels calculations are done at either the discovery stage or once the topology changes.

Ports Tiers calculations based on the levels:

If the levels calculations is enabled, the port's tier will be calculated as the following steps:

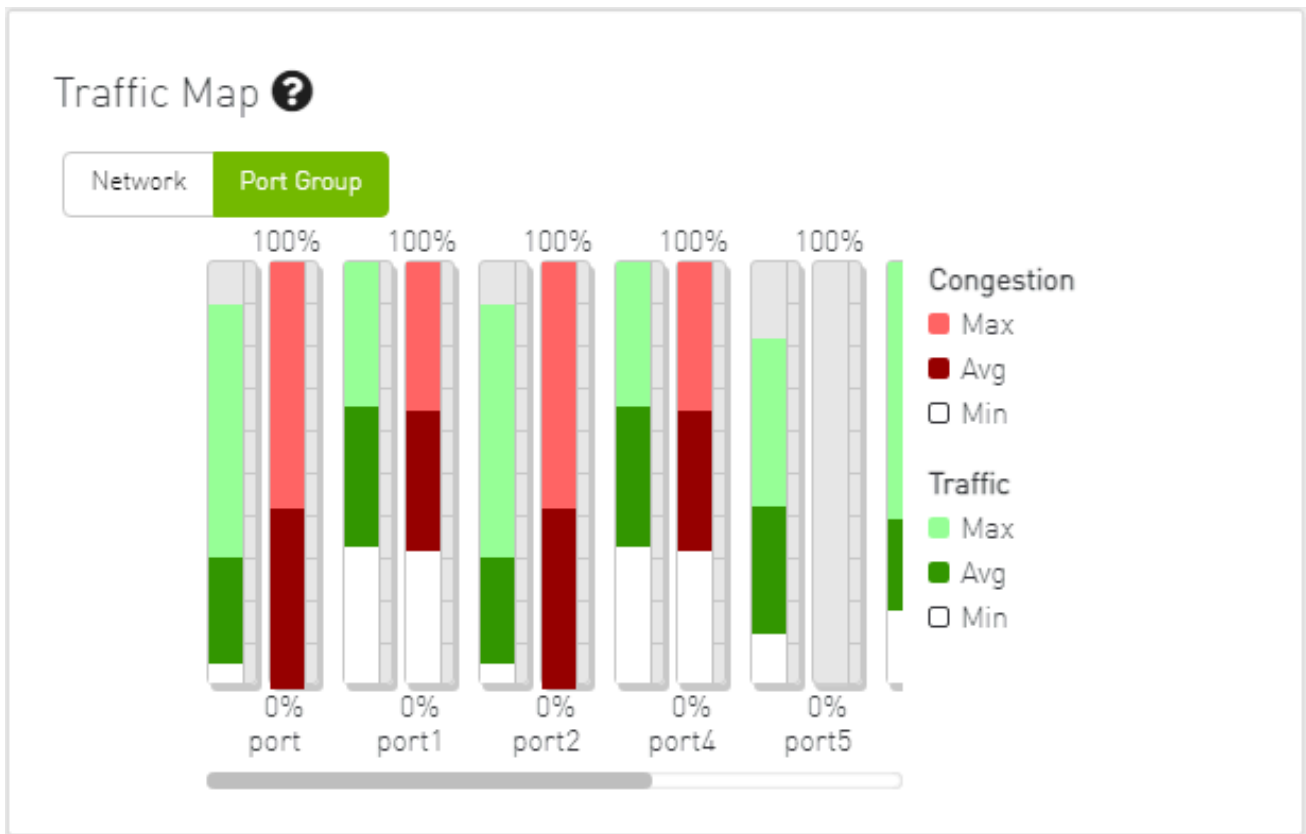
1. Get the level for both port's parent device and port's peer parent device
2. Decide whether the port's data flow is the up or down direction, by checking the order of the parent and peer parent level:
  1. If the parent's level order is less than or equals the parent peer level, then the port's flow is up and tier is the parent level order
  2. If the port's flow is down and the tier is the distance between the host to the root device and the distance between the root to the parent device

Example:



If the level calculations are disabled, the tier calculations will be done as mentioned in this section.

## Port Group Traffic Map



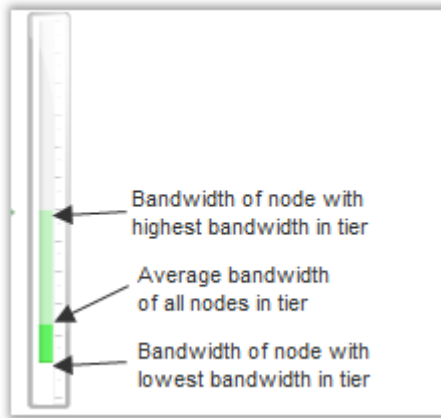
## Traffic Map Bar Chart

- **Bandwidth Bars**

The bandwidth graph shows how traffic is traversing the fabric and how traffic is being transmitted between the servers. For example, the following considerations could be evaluated:

- The size of the difference between max bandwidth and min bandwidth.
- The traffic that is flowing in the middle tiers and whether it would be more efficient to move the traffic to the edges to save the uplinks.

Bandwidth levels are measured in percentages, as shown below:

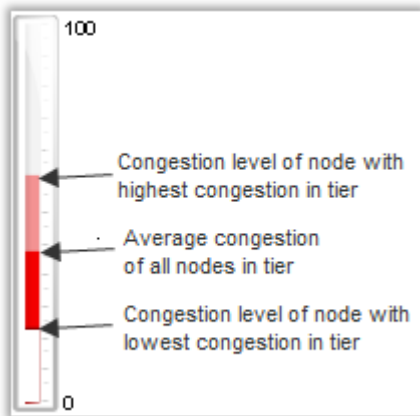


- **Congestion Bars**

The Congestion graph shows where congestion starts. For example, the following considerations could be evaluated:

- If congestion is in the first or second tier, there is probably a routing problem
- If there is no red bar, it means that there is no congestion or no routing problems

Congestion levels are measured in percentages, as shown:



## Events History

**Note**

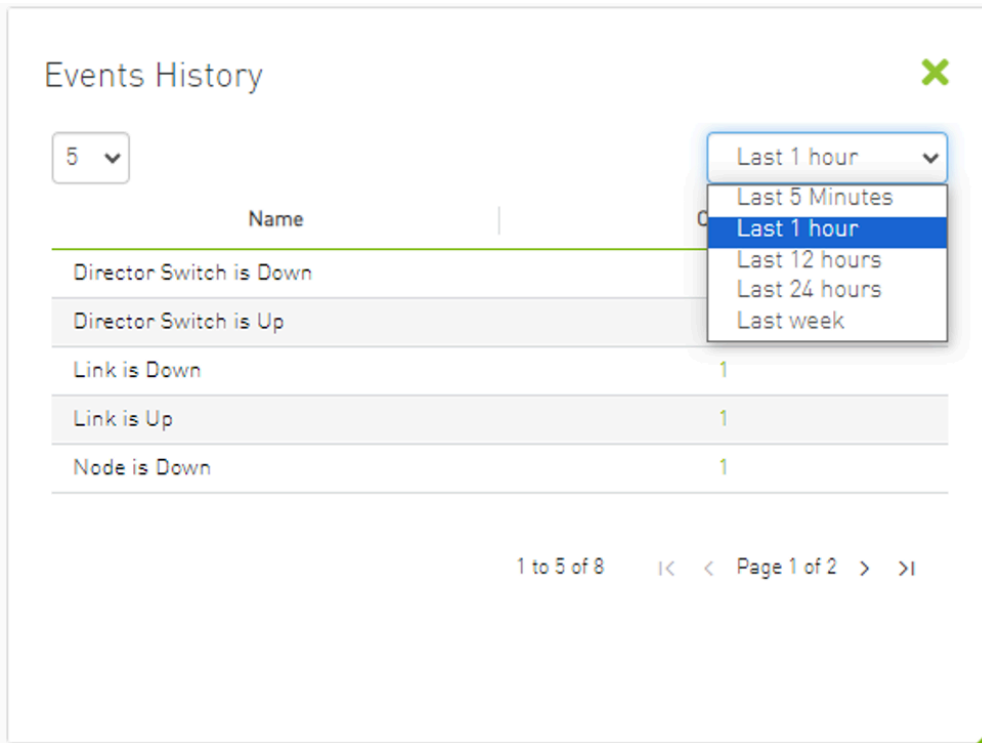
To view the Event History panel in the dashboard, the System Monitoring feature must be enabled. Otherwise, the panel will be hidden. Users can enable System Monitoring by setting the `system_monitoring_metrics` flag under the `SystemMonitoring` section in the `gv.cfg` file to true.

The Events History panel presents the topology change events in a table along with their respective counts.

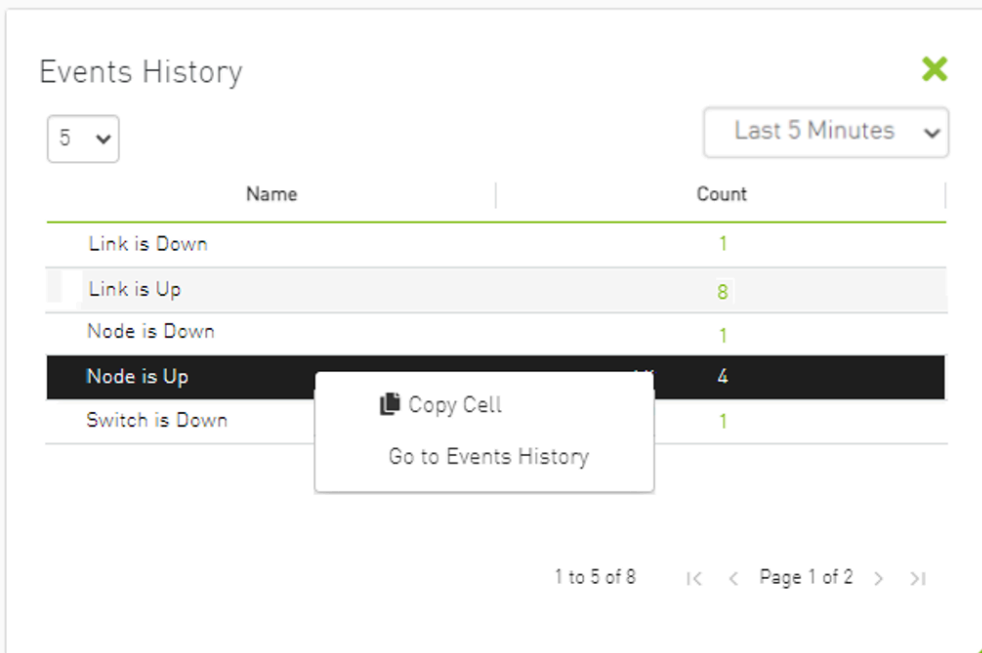
Name	Count
Link is Down	1
Link is Up	8
Node is Down	1
Node is Up	4
Switch is Down	1

The user can filter the event count by selecting the desired time interval.





Users can navigate to the 'Device/Link Status Events' tabs by either clicking on the counter value or by right-clicking and selecting 'Go to Events History'.



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