Bandwidth Utilization Reference Values

Feature history for bandwidth utilization Reference Values

Table 1: Feature History

Feature Name	Release Information	Description
Upstream and Downstream Bandwidth Reference Values	Cisco IOS XE Catalyst SD-WAN Release 17.16.1a Cisco Catalyst SD-WAN Manager Release 20.16.1	Use the upstream and downstream bandwidth reference values to govern how Cisco SD-WAN Manager displays interface utilization percentages in charts. The values also act as configurable thresholds that trigger interface-bw events when a network interface's utilization exceeds a defined point.

Bandwidth Utilization Reference Values

A bandwidth utilization reference value is a configurable parameter that

- specifies the upstream (egress) bandwidth and downstream (ingress) bandwidth for each interface, and
- acts as a reference for calculating bandwidth utilization and generating notifications.

You can configure bandwidth utilization reference values for each interface. Cisco SD-WAN Manager uses these reference values to display bandwidth utilization percentages in charts.

Generating Notifications

To receive notifications when the traffic bandwidth exceeds 85% utilization, configure reference values for both upstream (transmitted) and downstream (received) traffic. These values act as thresholds for generating the interface bandwidth events. The range is from 1 and 2,147,483,647 kbps.

The device samples the interface traffic each 10 seconds. If the received or transmitted bandwidth exceeds 85 percent of the configured value in 85 percent of the sampled intervals in a continuous 5-minute period, the device generates an SNMP trap. After the first trap is generated, sampling continues at the same frequency, but notifications are rate-limited to once per hour. A second trap is sent, and subsequent traps are sent, if the bandwidth exceeds 85 percent of the value in 85 percent of the 10-second sampling intervals over the next 1-hour period. If, after 1 hour, the device does not send another SNMP trap, the notification interval reverts to 5 minutes.

The upstream bandwidth and downstream bandwidth settings are solely for monitoring purposes and do not impose a bandwidth limit on the traffic. For example, in some network configurations, the full bandwidth of an interface may not be available. To ensure that utilization values reflect the available network bandwidth, set bandwidth utilization reference values lower than an interface's full speed.

You can verify the configured upstream and downstream bandwidth values using the **show interface detail** command, which displays the upstream bandwidth (tx-kbps) and downstream bandwidth (rx-kbps) fields usage.

You can monitor transport circuit bandwidth on Cisco IOS XE Catalyst SD-WAN devices and on Cisco SD-WAN Manager.

Monitoring Bandwidth Utilization with Interface Charts

Cisco SD-WAN Manager provides a chart showing bandwidth utilization for each interface of a device. To view the chart, from the Cisco SD-WAN Manager menu, choose **Monitor** > **Devices**, click a device and click **Interface**.

Configuring upstream or downstream reference values affects how the chart displays the percentages:

- No bandwidth utilization reference values configured: By default, devices calculate the bandwidth utilization value according to the interface speed of the connection.
- Bandwidth utilization reference values configured: If you configure bandwidth utilization reference values, devices calculate the bandwidth utilization value as a percentage of the reference point.

  For example, if you configure upstream bandwidth and downstream bandwidth values of 500 megabits per second, and if the downstream utilization is 500 megabits per second, the device reports downstream utilization as 100%.

Devices limit the calculated utilization value to 100% even if the traffic utilization is more than 100% of the configured reference value.

Restrictions for bandwidth utilization reference values

- Cisco SD-WAN Manager supports bandwidth data rate and utilization statistics only for a primary network interface, not a subinterface or loopback interface. You can still configure upstream and downstream bandwidth under a subinterface or loopback interface as a reference value or for per-tunnel QoS functionality.
- Configure upstream and downstream bandwidth references for service-side VPN interfaces using only a CLI template.

Configure bandwidth utilization reference values

Use one of these methods to configure bandwidth utilization reference values:

- Configuration group
- CLI commands
- Feature template

Configure bandwidth utilization reference values using a configuration group

Follow these steps to configure bandwidth utilization reference values using a configuration group

Before you begin

Minimum supported releases: Cisco IOS XE Catalyst SD-WAN Release 17.16.1a and Cisco Catalyst SD-WAN Manager Release 20.16.1

Procedure

Step 1 From the Cisco SD-WAN Manager menu, choose **Configuration** > **Configuration Groups**.

Step 2 Under Transport & Management Profile, click **...** adjacent to the transport profile, and choose **Edit**.

Step 3 Click the edit icon adjacent to Ethernet Interface.

Step 4 In the **Basic Configuration** section, enter the upstream and downstream bandwidth reference values.

Step 5 Click **Save**.

Configure bandwidth utilization reference values using CLI commands

This section provides example CLI configurations to configure upstream and downstream bandwidth reference values in Cisco SD-WAN Manager. For more information about using CLI templates, see *CLI Add-On Feature Templates* and *CLI Templates*.

By default, CLI templates execute commands in global config mode.

Procedure

Step 1 Enter the SD-WAN configuration mode.

Example:

```
sdwan
```

Step 2 Enter interface configuration mode.

Example:

```
interface interface-name
```

Step 3 Define the upstream or downstream bandwidth reference value in kbps.

Example:

```
bandwidth-upstream upstream-value
bandwidth-downstream downstream-value
```

Here is a complete configuration example for configuring upstream and downstream bandwidth reference values:

```
sdwan
!
interface GigabitEthernet1
bandwidth-upstream 10000
bandwidth-downstream 10000
```

Configure bandwidth utilization reference values using templates

Follow these steps to configure bandwidth utilization reference values using feature templates.

Procedure

Step 1 From the Cisco SD-WAN Manager menu, choose **Configuration** > **Templates**.

Step 2 Click **Feature Templates**.

Step 3 Do one of these:

- Click **Add Template**, choose a device, and create a Cisco VPN Interface Ethernet template.
- Edit an existing Cisco VPN Interface Ethernet template.

Step 4 In the **Basic Configuration** section, enter the upstream and downstream bandwidth reference values.

Step 5 Click **Update** to save the template.

Monitor Upstream and Downstream Bandwidth Reference Values

Monitor bandwidth utilization events

Follow these steps to monitor upstream and downstream bandwidth events using the Cisco SD-WAN Manager.

Procedure

Step 1 From the Cisco SD-WAN Manager menu, choose **Monitor** > **Logs** > **Events**.

Step 2 View the details of upstream and downstream bandwidth values in the device configuration section. The default name for interface bandwidth-related events is **interface-bw**.

Monitor bandwidth utilization reference values

Follow these steps to monitor bandwidth utilization reference values using Cisco SD-WAN Manager.

Procedure

Step 1 From the Cisco SD-WAN Manager menu, choose **Monitor** > **Devices**.

Step 2 Click the **Device** tab.

Step 3 Click the hostname of the device you want to monitor.

Step 4 From the **Applications** section, choose **Interface**.

Step 5 Click the **Chart Options** drop-down list and choose **Utilization**.

Step 6 Hover over the real-time or historical data points to view the utilization percentage.

Verify bandwidth utilization reference values

Monitor interface alarms

Use the **show platform software sdwan interface-alarm summary** command to display the bandwidth reference values for an interface in the alarm summary. This sample output shows the summary details of a GigabitEthernet interface alarm.

See Interface Alarm Summary, and Base and High Intervals for more information.

```
device# show platform software sdwan interface-alarm summary
```

```
============ Interface Alarm Summary ============
Interface Name      Upstream (kbps)  Downstream (kbps)   Base Interval(s)   High Interval(s)
GigabitEthernet1      10000               10000              300                3600
```