Cisco Telemetry Broker

User Guide 2.0.1

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Introduction

This guide provides a reference for the Cisco Telemetry Broker Manager web interface.

Cisco Telemetry Broker (at times referred to as CTB in this document) enables you to ingest network telemetry from many inputs, transform the telemetry format, and forward that telemetry to one or multiple destinations.

Audience

This guide is designed for the person responsible for maintaining network telemetry flow and monitoring network telemetry.

Common Terms

The following terms appear in this guide:

Abbreviation	Description
Destinations	Locations to which Cisco Telemetry Broker forwards telemetry. Cisco Telemetry Broker supports multiple types of destinations.
Exporters	Devices on a customer's network that forward traffic to an Input on the Cisco Telemetry Broker. Exporters are typically defined by an IP address.
Inputs	Ways in which Cisco Telemetry Broker collects or receives telemetry from a customer network. Cisco Telemetry Broker supports multiple types of inputs.
Rules	User-defined logic that tells Cisco Telemetry Broker how to forward telemetry from a single input to a single destination.
Telemetry	Any type of data that the Customer produces that is useful for analytical purposes. Examples include UDP packets, IPFIX, syslog, and JSON.

If you are currently using UDP Director, note that you can import your existing forwarding rules as an XML file and import it into Cisco Telemetry Broker. You need to make sure you do this before you add any destinations. For more details, see Import UDP Director Configuration.

Configure Accessibility Features

In order to have access to configure available website accessibility features, you must use Chrome as your browser when using the Cisco Telemetry Broker Manager web interface. Following are examples of some accessibility features you won't have the ability to configure if you use a browser other than Chrome. (This list is not comprehensive.)

The ability to do the following:

- Highlight each item on a web page
- Show color in compact tab bar
- Specify to never use certain font sizes

Common Abbreviations

The following abbreviations appear in this guide:

Abbreviation	Description
DMZ	Demilitarized Zone (a perimeter network)
DNS	Domain Name Server
FC	Flow Collector
FS	Flow Sensor
FTP	File Transfer Protocol
Gbps	Gigabits per second
GB	Gigabyte
HTTPS	Hypertext Transfer Protocol (Secure)
ISE	Identity Services Engine
Mbps	Megabits per second
NAT	Network Address Translation
NIC	Network Interface Card

Abbreviation	Description
NTP	Network Time Protocol
PCIe	Peripheral Component Interconnect Express
SNMP	Simple Network Management Protocol
SPAN	Switch Port Analyzer
SSH	Secure Shell
TAP	Test Access Port
UDPD	UDP Director
UPS	Uninterruptible Power Supply
URL	Universal Resource Locator
USB	Universal Serial Bus
VLAN	Virtual Local Area Network
VM	Virtual Machine

Alerts

When one or more alerts exist for an entity (any configured destination, input, or broker node), a status indicator is displayed next to the associated main menu heading, along with a number.

This number reflects the number of entities in that entity category that contain an alert. The status indicators for the Inputs page are further broken down by each of the Input's three sub pages: UDP Inputs, Virtual Private Cloud (VPC) Flow Logs, and Microsoft Network Security Group (NSG) Flow Logs. On each of those pages, a status indicator is displayed for each entity that has an issue.

When an entity has multiple issues (for example, a destination simultaneously being unreachable and not having any rules, or an input not have any destinations and also being inactive), Cisco Telemetry Broker considers this one issue. It does not calculate the number of issues based on the individual number of existing issues. So, for example, if an entity has 5 different issues, Cisco Telemetry Broker considers this 1 issue, not 5 issues.

Overview

This page provides a snapshot of the configuration settings, system health, main metrics, and licensing information for your Cisco Telemetry Broker system.

Access the Overview Page

From the Cisco Telemetry Broker main menu, choose **Overview**, or click the Cisco logo (in the upper left corner of the page).

View the Following Components

Destinations

This component displays telemetry for the last 24 hours for the following information:

- The number of destinations that have been configured in Cisco Telemetry Broker.
- The amount of telemetry sent to all destinations.
- The average daily rate of telemetry sent to all destinations. The average value is calculated from the last 30 days of telemetry.
- The number of destinations not accepting telemetry that is being sent to them (represented by the number in the Unreachable field). When you click this number, the Destinations page opens. The list of destinations that are unreachable are listed here.
- Each segment on the doughnut chart displays the amount of telemetry sent to each destination. When you hover your cursor over a segment of this chart, you can view the following information:
    - the destination name
    - the amount of telemetry sent to this specific destination for the last 24 hours

Inputs

This component displays telemetry for the last 24 hours for the following information:

- The number of inputs that have been configured in Cisco Telemetry Broker.
- The amount of telemetry received from all inputs.
- The average value is calculated from the last 30 days of telemetry.
- The number of inputs for which no rule has been configured. This number is represented by the number in the **No Destination** field.

- Each segment on the doughnut chart displays the amount of telemetry received from each input. When you hover your cursor over a segment of this chart, you can view the following information:
    - the input name
    - the amount of telemetry received from this specific input for the last 24 hours

Broker Nodes

This section is grouped by cluster, under the associated cluster name. If no high availability clusters exist, all broker nodes are grouped under the "No Cluster" subheading.

- Each arc shows the percentage of the broker node's received rate against the node's theoretical capacity. The arc is marked with the applicable color. Refer to the following table for an explanation of an arc's color.

Color	Definition
Red (Critical)	The percentage of capacity reached for the broker node is 100%.
Orange (Warning)	The percentage of capacity reached for the broker node is from 80% to 99.99%.
Blue (Informational)	The percentage of capacity reached for the broker node is < (less than) 80%.

- To access a broker node's page, click the node's name.
- If a broker node has any alerts, they are displayed underneath the node. They are marked by a white *X* on a red background with a short explanation.

Alerts

The Alerts component lists the last 10 alerts that have either occurred and are still active, or that have been resolved. Alerts in red are still active, and alerts in gray have been resolved. The list begins with the newest alert at the top and ends with the oldest alert at the bottom. To view additional alerts, click the **See more...** link at the bottom of the list.

- The number of unresolved alerts and the number of all alerts in Cisco Telemetry Broker is displayed in the upper right corner of this component.

- By default, the list of all the unresolved alerts is displayed. To see a list of all the alerts, click the All filter option in the top right corner of this component.
- Under each alert is information about the associated entity (for example, broker node or destination) as well as the time the alert occurred.
- When an alert is no longer valid (has been resolved), the alert is
    - dimmed
    - marked with a check mark, and
    - noted with the time it was resolved.
- When you click a link that appears under each alert name, either the associated Broker Node page or the Destinations page opens, depending on the alert type.

CPU

For both the Manager node and each broker node, this component shows telemetry for the last 30 days for the following information:

- Number of CPUs available.
- Percentage used of the available CPUs (represented by the bar color).
- The 1-minute load average per the number of available CPUs for each broker node (to see this data, hover over the broker node name.)

Refer to the following table for an explanation of the color displayed on each bar.

Color	Definition
Red (Critical)	The percentage of maximum CPU load reached for the node is 100%.
Orange (Warning)	The percentage of maximum CPU load reached for the node is from 80% to 99.99%.
Blue (Informational)	The percentage of maximum CPU load reached for the node is < (less than) 80%.

Licensing

This component displays telemetry for the last 14 days.

- The dotted blue line shows the average GB per day for the last 7 days. To see this number, hover your cursor over the dotted line. This number is the entitlement number sent to Smart Software Licensing for calculating license fees, and it will match the value displayed on the Telemetry Broker Smart Licensing page.
- Each bar in the chart represents a different day. The bar at the rightmost side of the chart represents the previous day and then proceeds to each prior day as you move to the left.
- To see the exact amount of GB received for a specific day, hover your cursor over the associated bar. The date associated with this bar is also displayed.
- If a product is not yet registered, a warning displays in the upper right corner showing how many days remain until the trial license expires.

Telemetry Flows

This component displays telemetry for the last 24 hours.

- The different types of telemetry received by all inputs (represented by telemetry on the left side of the chart) and sent to all destinations (represented by telemetry on the right side).
- To show the exact value for a flow, hover your cursor over the flow to open its tooltip.
- For SCA destinations, the telemetry statistics displayed here represent uncompressed data sent to SCA. Therefore, these statistics may be disproportionate to the actual telemetry sent (represented in the Destinations component).

Metrics

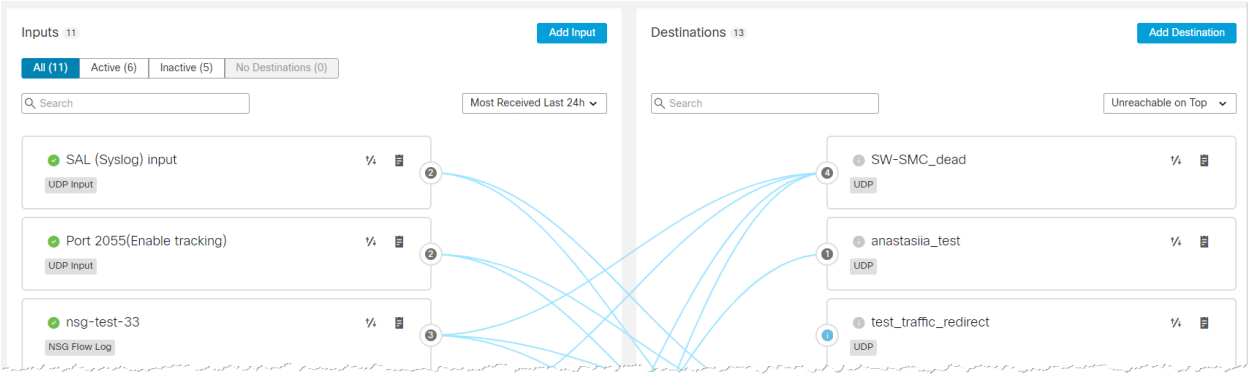
The tables in this component display the following data for the last 24 hours:

Total Received Rate The total amount of telemetry received from all inputs.

Total Sent Rate The total amount of telemetry sent to all destinations.

Data Flow

Use this page to easily see which inputs and destinations are assigned to each other. Keep in mind that multiple destinations can be assigned to 1 input, and 1 destination can be assigned to multiple inputs. On this page you can also view alerts, data flow information, and other details related to your configured inputs and destinations.



View Data Flows

The lines you see that connect various inputs to various destinations represent the rules that exist between those particular inputs and destinations. For information about adding rules, refer to the "Add a Rule for a Destination" section in the **Destinations** chapter.

You can view the data flows for any input or destination by clicking or hovering over the card for that particular input or destination.

> To deselect a card, click it again or click anywhere outside the card (including clicking on another card).

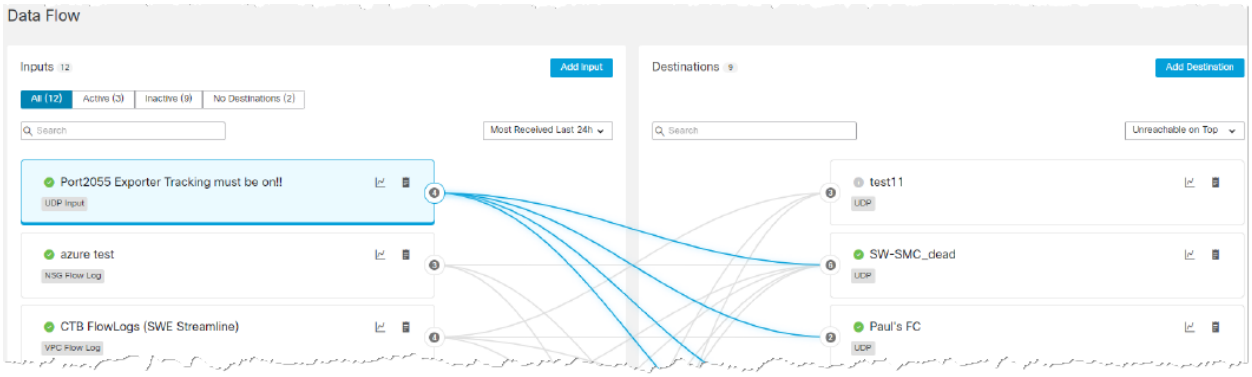
Refer to the following table to learn what visual changes occur when you click vs. when you hover over a card. These visual changes enable you to more easily see the information related to the card you have chosen.

Click vs. Hover

When you ...	The ...
Click a card	• Border of the card turns dark blue. • Card interior becomes light blue. • Data flow lines for that input or destination turn dark blue. All other lines on the Data Flow page turn gray.
Hover over a card	• Border of the card turns dark blue. • Card interior remains white. • Data flow lines for that input or destination turn dark blue. All other lines on the Data Flow page remain light blue.
Click a card, then hover over another card	• Border of the card turns dark blue. • Card interior remains white. • Data flow lines for that input or destination turn dark blue. All other lines on the Data Flow page remain gray. • The card you clicked retains its selected status.

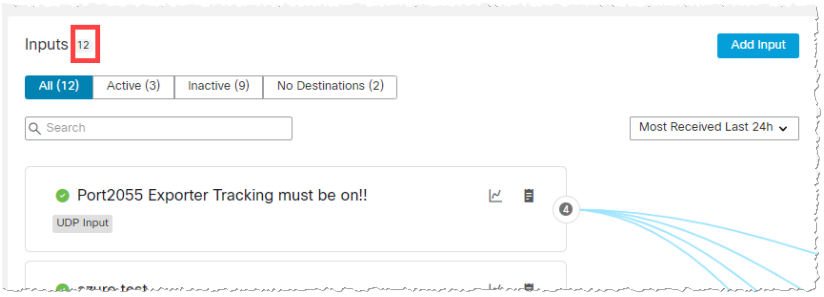
Example: In the image below, the user has clicked the first input card on the Inputs list.

Example:

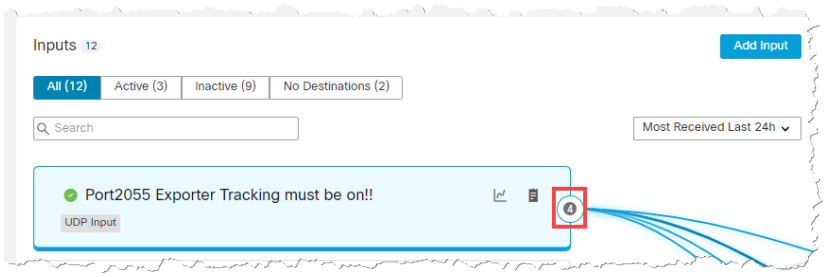
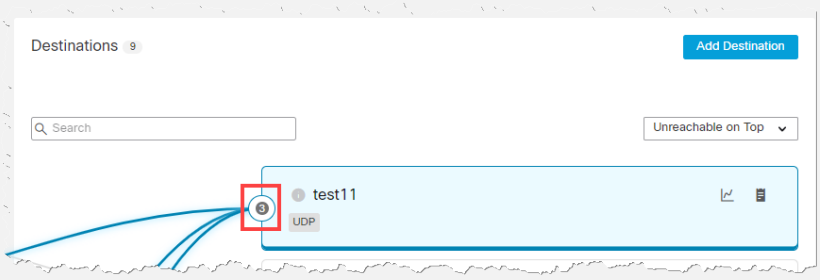


View Snapshot Information

Total Configured Inputs and Destinations

To view the total number of configured ...	Refer to the encircled number displayed next to the ...
Inputs	Inputs title at the top of the Inputs list. 
Destinations	Destinations title at the top of the Destinations list. 

Total Assigned Inputs and Destinations

To view the total number of ...	Refer to the encircled number displayed on the associated ...
Destinations assigned to a particular input	Input card. 
Inputs assigned to a particular destination	Destination card. 

Data Flow Rates

To see the following information for an input or destination, hover your cursor over the (**Graph**) icon. The following information is displayed:

- The Receive Rate for all telemetry received from this input for the last 24 hours.
- The Sent Rate for all telemetry sent to this destination for the last 24 hours.

Details

To see detailed information for an input or destination, click the (**Details**) icon.

When you click the **Details** icon within

- an input card, the Inputs page for that input opens.
- a destination card, the Destinations page for that destination page opens.

Alerts and Status Indicators

To view the description for an existing alert or status indicator for a specific input or destination, hover your cursor over the associated icon. For a list of Cisco Telemetry Broker alerts, see **Appendix B: Supported Alerts**.

Search for an Input or Destination

You can use any of the following entities to filter your search results.

Filter Buttons

You can filter your search by using any of these filters: All, Active, Inactive, and No Destination (inputs that are not assigned to any destinations). To choose a filter, click the associated button at the top of the Inputs list.

> When you use one or more filters, all filters are ANDed together; therefore, all returned results must match the search criteria for all of the filters.

Search Field

In the Search field, type the name of the input or destination (depending on which list you are in) for which you are searching. As you start to type your entry, the field dynamically filters to display a list of entries that contains any of the characters you have entered.

Keep in mind that you can create multiple inputs with the same name, and vice versa with destination names. Port numbers among broker nodes can also be duplicated. So if you search for an input or destination for which there are more than one with the same name, or search for a port number that has been duplicated on two or more broker nodes, all matching entries will be displayed on the Data Flow Page after your search has finished processing.

Clear Filters

- If you receive one or more results but do not see any for which you are searching, it could be that you have configured too many filters. In this instance, we recommend that you eliminate one filter at a time to see if any of your intended results show.
- If you do not see any results, click **Clear Filters** and reconfigure your search criteria.

Sorting Options

You can use these drop-down lists to sort the data in both the Inputs list and the Destinations list.

Inputs List Within the Inputs list, change the option in the Most Received Last 24h drop-down list. Other options are as follows:

- Most Recently Seen
- Most Destinations
- Highest Received Rate

Destinations List Within the Destinations list, change the option in the Unreachable on Top drop-down list. Other options are as follows:

- Highest Sent Rate
- Most Sent Last 24h
- Most Recently Added

Import UDP Director Configuration

From either the UDP Director or the Manager that manages the UDP Director, you can export your current UDP Director destination and rule configuration as an XML file and import it into Cisco Telemetry Broker. For more details, see Import UDP Director Configuration.

> ⚠ Once you have created your first destination, you no longer have the option to import a UDP Director configuration.

> ⚠ Importing a UDP Director configuration overwrites your current Cisco Telemetry Broker configuration, including all currently configured inputs, destinations, and rules.

Add a Destination

To add a destination, click **Add Destination** in the upper right corner of the Destinations list.

For information about how to add destinations, see **Destinations** .

Add an Input

To add an input, click **Add Input** in the upper right corner of the Inputs list.

For information about how to add inputs, see the applicable topic (depending on the type of input you are adding) listed below:

- **UDP Inputs**
- **VPC Flow Logs**
- **NSG Flow Logs**

Destinations

Cisco Telemetry Broker supports sending telemetry to the following types of destinations:

- **UDP Destinations** A destination that receives UDP data at a specific IP address and port.
- **SCA Destination** A destination that points data to a customer-owned Secure Cloud Analytics account.

  Configuring an SCA destination can limit system performance (in terms of uploaded FPS). Factors that can contribute to this are the size of flow records, the compression achievable for those flow records, and the bandwidth available for which to send telemetry from the broker nodes to Secure Cloud Analytics.

  Under most circumstances, assuming less than 100 bytes per flow record, Cisco Telemetry Broker should be able to send:

  - 40K FPS per broker node (assuming there exists 8 cores per broker node) for a virtual deployment.
  - 300K FPS per broker node for a hardware deployment (M6).

Cisco Telemetry Broker sends telemetry to destinations. A rule describes the telemetry that a destination would like to receive from a particular telemetry stream.

The Cisco Telemetry Broker Destinations page shows graphs of all your destinations. For each destination you can see the following information:

- Destination name
- IP address and port (for UDP destinations only)
- Telemetry received over the past day
- If the destination is actively receiving telemetry and is reachable by the Manager node
- Inputs and exporters sending telemetry to the destination

From this page, you can add additional destinations as well as modify and update them. For each destination, you can add additional rules and receive telemetry from different telemetry inputs. You can configure multiple rules (1 telemetry input per rule) per destination.

Import UDP Director Configuration

> Please note that importing UDP Director destination and rule configurations is optional.

From either the UDP Director or the Manager that manages the UDP Director, you can export your current UDP Director destination and rule configuration as an XML file and import it into Cisco Telemetry Broker.

> Once you have created your first destination, you no longer have the option to import a UDP Director configuration.

> Importing a UDP Director configuration overwrites your current Cisco Telemetry Broker configuration, including all currently configured inputs, destinations, and rules.

Export Your UDP Director Configuration

1. Log in to the UDP Director console as an **admin**.
2. Click the **Configuration** tab.
3. Click **Forwarding Rules**.
4. Choose **Export (Export the configuration file to local system)**.
5. Save the file to your workstation.

Export Your UDP Director Configuration From a Manager

1. Log in to the Web App as **sysadmin**.
2. Click the ⚙ (**Global Settings**) icon.
3. From the drop-down menu, choose **UDP Director Configuration**.
4. Click the **Actions** menu.
5. Choose **Export Forwarding Rules**.
6. Click **Save**.

Import Your UDP Director Configuration into Cisco Telemetry Broker

You can import your UDP Director Configuration only before you configure any destinations.

1. Log in to the Cisco Telemetry Broker Manager node.
2. Click the **Destinations** tab.

3. Click **Upload XML File**.
4. Choose the applicable file and click **Open**.

Reachability Check

The Reachability Check feature alerts users of destinations that are unreachable or unresponsive so they can mitigate any network damage caused by the forwarding of telemetry to a non-existent destination.

The feature crafts zero-length UDP packets and sends them to the configured UDP port of the destination. The broker nodes then listens for ICMP Host Unreachable or Port Unreachable responses to determine if the destination is unreachable. The absence of any response indicates that the destination is most likely receiving telemetry.

The Reachability Check feature is available only for non-Secure Cloud Analytics destinations. You can disable this feature on a per destination basis. Disable this feature if your destination or firewall rule configuration will result in false positive alerts.

For information about how to configure this setting, see the following topic, "Add a UDP Destination," or the "Configure Reachability Check" topic in **Destination Details**.

For information about how to configure the amount of time before Cisco Telemetry Broker marks a telemetry input as inactive, see **General**.

Add a Destination

Add a UDP Destination

1. In the upper right corner of the page, click **Add Destination > UDP Destination**.
2. Enter a destination **Name**.
3. Enter a **Destination IP Address** and **Destination UDP Port** for this destination.
4. If you want to be alerted of destinations that are unreachable or unresponsive, enable the (**Reachability Check**) icon (the bar is blue when enabled). For more information about the Reachability Check feature, see .

> - The Reachability Check feature is available only for non-Secure Cloud Analytics destinations.
> - Disable this feature if your destination or firewall rule configuration will result in false positive alerts.

5. Click **Save**.

Add a Secure Cloud Analytics (SCA) Destination

- In Cisco Telemetry Broker, you can add only 1 SCA Destination per system.
- Cisco Telemetry Broker extracts flow data from NetFlow V5, NetFlow V9, and IPFIX packets, and sends this data to Secure Cloud Analytics.
- If your Cisco Telemetry Broker deployment contains light telemetry, it may take up to 20 minutes for telemetry to appear on the Destinations page after you add an SCA destination.

Before you add an SCA destination, you need to obtain an SCA Service Key and the SCA Host URL. Secure Cloud Analytics uses this key to authenticate Cisco Telemetry Broker, and Cisco Telemetry Broker uses the URL to send telemetry to Secure Cloud Analytics.

Locate the key and the URL

1. Log in to Secure Cloud Analytics.
2. From the main menu, click **Settings > Sensor**.
3. Locate and copy the Service key and the Service host at the bottom of the page.

Add the SCA destination

1. Log in to Cisco Telemetry Broker.
2. In the upper right corner of the page, click **Add Destination > SCA Destination**.
3. Enter a destination **Name**.
4. Enter the **SCA Service Key**. Ensure that you paste the entire key.
5. Enter the **SCA Host URL**. Ensure that you paste the entire URL.
6. Click **Save**.

Once you've configured Secure Cloud Analytics as a Cisco Telemetry Broker destination, you should be able to see telemetry from Cisco Telemetry Broker in the Secure Cloud Analytics Event Viewer within 30 minutes. If you do not, please contact swatchc-support@cisco.com with your portal URL for assistance.

Edit a Destination

1. In the row containing the applicable destination, click the (**Edit**) icon.
2. In the Edit Destination dialog that opens, update the following fields:

- For UDP Destinations: **Destination Name** and the **Check Destination Availability** toggle switch. You cannot edit the Destination IP Address and Destination UDP Port fields.
- For SCA Destinations: **Destination Name**, **SCA API Key**, and **SCA URL**.

3. Click **Save**.

Remove a Destination

When you delete a destination, that destination is still available for selection in the metric graphs, but the name associated with it is the term "Destination" followed by the destination's ID and the phrase "deleted." For example, Destination (ID 10) deleted. The graphs still include data from the deleted destination as long as data exists for that destination. Once the data expires, the associated destination is no longer available for selection from any of the Per Destination drop-down lists (located on the Broker Nodes page).

To remove a destination, complete the following steps:

1. In the row containing the applicable destination, click the **(Remove)** icon.
2. In the Remove Destination dialog that opens, click **Remove**.

Add a Rule for a Destination

> A rule always consists of just 1 input and 1 destination. However, note that an input can send data to more than one particular destination. You would simply create another rule to do that.

1. In the row containing the applicable destination, in the lower left corner, click **+ Add Rule**.
2. From the **Select Input** drop-down list, choose the desired input name.
3. (Conditional) If you choose a UDP input, the **Track data received against these subnets** field opens. This field serves as a filter mechanism to determine which traffic is sent to the destination. Only traffic coming from exporter IPs within the specified subnet will be forwarded. Enter the subnets over which this destination will receive the applicable telemetry. Separate entries with a comma.

   If you leave the **Track data received against these subnets** field empty, it will default to a single subnet that includes all traffic.

   - For IPv4 IP subnets, the CIDR IP address range will be 0.0.0.0/0.
   - For IPv6 IP subnets, the CIDR IP address range will be ::/0.

4. Click **Add Rule**.

View Details of a Destination

You can view more detailed information about a particular destination. To do this, click the desired destination name located in the upper left corner of its row. For information about this page, see the next section, **Destination Details**.

Destination Details

On this page you can view more detailed information about a particular destination. To view the details of a destination, do the following:

- On the Destinations tab, click the desired destination name located in the upper left corner of its row.

  The Destination Details page for that destination opens.

On this page you can view the following information:

- Destination name, IP address, and port over which it receives telemetry (for UDP destinations only).
- Type of destination (for SCA destinations only).
- Status of the destination and the last time it received telemetry.
- Number of telemetry inputs from which this destination is receiving telemetry.
- Bytes received from Cisco Telemetry Broker and the rate (in bits per second) at which it was received.
- The rules configured for this destination with details for each rule, including the number of exporters configured to send data to a particular input, configured either with a single node or multiple nodes. (This number is displayed in the Exporters column in the Rules table.)

  Note that this number will not necessarily correspond to the number displayed on the Input Details page (within the parentheses after the Exporters title at the top left corner of the Exporters section). This, too, is the number of unique exporters configured to send data to a specific input. Refer to the following to determine whether or not these numbers will match:

  - If a single exporter has been configured to send data to a single node configured under the same input, then these numbers will match.

- If a single exporter has been configured to send data to 2 nodes configured under the same input, then the number on the Destinations Details page will be double the number on the Input Details page.
- If a single exporter has been configured to send data to 3 nodes configured under the same input, then the number on the Destinations Details page will be triple the number on the Input Details page, and so on.

> The occurrence of these numbers not matching should rarely occur. To avoid this problem, we recommend that you configure inputs with only one broker node or one cluster. Conversely, you can create two separate UDP inputs that listen on the same UDP port but are assigned to different broker nodes or clusters.

Metrics: Sent Rate

In the Metrics section you will see a Sent Rate table. This table shows telemetry that inputs have sent to this destination over time per the following filters you can use to filter the telemetry (you can choose more than one option from each drop-down list):

> For SCA destinations, you can filter the telemetry in this table only per broker node or per the total amount received.

- Per Telemetry Type
- Per Input
- Per Exporter
- Per Broker Node
- Total

You can view these metrics over several time frames by clicking any of the following desired time frames in the upper right corner of the Metrics table:

- Last hour
- Last 4 hours
- Last day
- Last week
- Last month

Configure Reachability Check

If you want to be alerted of destinations that are unreachable or unresponsive, in the upper right corner of the page, enable the (**Reachability Check**) icon (the bar is blue when enabled). For more information about the Reachability Check feature, see the "Reachability Check" section in **Destinations**.

- The Reachability Check feature is available only for non-Secure Cloud Analytics destinations.
- Disable this feature if your destination or firewall rule configuration will result in false positive alerts.

Edit a Destination

1. In the upper right corner of the page, click the (**Edit Destination**) icon.
2. In the Edit Destination dialog that opens, update the following fields:
   - For UDP Destinations: **Destination Name** and the **Check Destination Availability** toggle switch. You cannot edit the Destination IP Address and Destination UDP Port fields.
   - For SCA Destinations: **Destination Name**, **SCA API Key**, and **SCA URL**.
3. Click **Save**.

Remove a Destination

When you delete a destination, that destination is still available for selection in the metric graphs, but the name associated with it is the term "Destination" followed by the destination's ID and the phrase "deleted." For example, Destination (ID 10) deleted. The graphs still include data from the deleted destination as long as data exists for that destination. Once the data expires, the associated destination is no longer available for selection from any of the Per Destination drop-down lists (located on the Broker Nodes page).

To remove a destination, complete the following steps:

1. In the upper right corner of the page, click the **(Remove Destination)** icon.
2. In the Remove Destination dialog that opens, click **Remove**.

Add a Rule for a Destination

A rule always consists of just 1 input and 1 destination. However, note that an input can send data to more than one particular destination. You would simply create another rule to do that.

1. In the Rules section, click **+ Add Rule**.
2. From the **Select Input** drop-down list, choose the desired input name.
3. (Conditional) If you choose a UDP input, the **Track data received against these subnets** field opens. This field serves as a filter mechanism to determine which traffic is sent to the destination. Only traffic coming from exporter IPs within the specified subnet will be forwarded. Enter the subnets over which this destination will receive the applicable telemetry. Separate entries with a comma.

   If you leave the **Track data received against these subnets** field empty, it will default to a single subnet that includes all traffic.

   - For IPv4 IP subnets, the CIDR IP address range will be 0.0.0.0/0.
   - For IPv6 IP subnets, the CIDR IP address range will be ::/0.
4. Click **Add Rule**.

Inputs

Cisco Telemetry Broker supports sending telemetry from the following types of inputs:

- **UDP Inputs** An input that consumes UDP telemetry and sends it to our destinations.
- **VPC Flow Logs** An input that consumes Amazon Web Services (AWS) VPC Flow Logs from an s3 bucket, transforms them into IPFIX, and sends the IPFIX to your destinations.
- **NSG Flow Logs** An input that consumes Azure NSG Flow Logs from an Azure Storage Account, transforms them into IPFIX, and sends the IPFIX to your destinations.

To access the various Input tabs, from the Cisco Telemetry Broker main menu, choose **Inputs**.

> ⚠ To begin collecting telemetry, you first need to create one or more Inputs within the Cisco Telemetry Broker.

You need to configure inputs based on the type of telemetry that you want Cisco Telemetry Broker to process. For example, if you are interested in collecting UDP packets on port 2055 on all broker nodes, you should create a UDP Input configured to listen on port 2055. Alternatively, if you are only interested in processing VPC Flowlog Telemetry, you should create a VPC Flowlog Input.

Import UDP Director Configuration

From either the UDP Director or the Manager that manages the UDP Director, you can export your current UDP Director destination and rule configuration as an XML file and import it into Cisco Telemetry Broker. For more details, see Import UDP Director Configuration.

> ⚠ Once you have created your first destination, you no longer have the option to import a UDP Director configuration.

> ⚠ Importing a UDP Director configuration overwrites your current Cisco Telemetry Broker configuration, including all currently configured inputs, destinations, and rules.

View Inputs

1. From the Cisco Telemetry Broker main menu, choose **Inputs**.
2. Click the applicable tab to view any of the following:
    - **UDP Inputs**
    - **VPC Flow Logs**
    - **NSG Flow Logs**

UDP Inputs

Cisco Telemetry Broker enables you configure UDP inputs to listen on specific UDP ports for incoming UDP telemetry. You can see the following information on the Input tab:

- Input name, input port, and type of telemetry received
- Status of the input and the last time it received telemetry
- Assigned broker nodes and clusters
- Number of destinations configured for this input
- Bytes received and the rate (in bytes per second) for the last 24 hours

You can filter this telemetry by different criteria. Simply choose one of the following criteria types from the drop-down menu at the top of the page:

- Most Received Last 24h
- Most Recently Seen
- Most Destinations
- Highest Received Rate

In the Search field, the placeholder text informs you for which columns you can perform a search. As you start to type your entry, the table dynamically filters to display a list of entries that contain the characters you have entered.

Add a UDP Input

1. On the Inputs tab, click the **UDP Inputs** tab.
2. In the upper right corner of the page, click **Add UDP Input**.

    The ADD UDP Input dialog opens.
3. In the UDP Port field, enter the UDP port that will listen for UDP telemetry.
4. In the UDP Input name, enter the name for this input.

5. Cisco Telemetry Broker tracks every exporter that sends telemetry to a UDP input. However, when you have many unique exporters sending telemetry to a single UDP input, you may need to disable Exporters Tracking to ensure the system does not suffer performance issues.

   To disable exporters tracking, check the **Disable Exporters Tracking** check box in the Add UDP Input dialog (the dialog that opens in Step 2). When you disable Exporter Tracking, metrics are no longer calculated for each exporter. However, you can still view the aggregate metrics that are still being processed by the UDP input, though your system will have the following limitations:

   - **Input Details page** The Exporters section no longer displays per-exporter metrics. (This page opens when you click an input name on the UDP Inputs tab.) However, it will display the number of exporters seen by each broker node configured for the associated input.
   - **Broker Nodes Details page** The Per Exporter drop-down list for the Received Rate graph no longer includes exporters from any UDP Inputs where exporter tracking has been disabled. (This page opens when you click a broker node name on the Broker Nodes tab.)

> For more information about exporters tracking, see the "Exporters" section in **UDP Input Details** .

5. In the Assign HA Clusters section, check the applicable check boxes for the HA clusters to which you want this input added.
6. In the Assign Broker Nodes section, check the applicable check boxes for the nodes to which you want this input added.

> If a node is included in an HA Cluster option in the Assign HA Cluster section on this dialog, it will not be listed in the Assign Broker Nodes section, and vice versa.

7. Click **Save**.

Edit a UDP Input

1. In the row containing the applicable UDP Input, click the (**Edit**) icon.
2. In the Edit UDP Input dialog that opens, make your edits and click **Save**.

Remove a UDP Input

When you delete an input, Cisco Telemetry Broker stops receiving telemetry on the specified port and deletes any rules associated with this input.

That input is still available for selection in the metric graphs, but the name associated with it is the term "Input" followed by the Input's ID and the phrase "deleted." For example, Input (ID 10) deleted. The graphs still include data from the deleted input as long as data exists for that input. Once the data expires, the associated input is no longer available for selection from any of the Per Input drop-down lists (located on the Destinations and Broker Nodes pages).

To remove a UDP input, complete the following steps:

1. In the row containing the applicable UDP Input, click the **(Remove)** icon.
2. In the Remove UDP Input dialog, click **Remove**.

View Details of a UDP Input

You can view more detailed information about a particular UDP input. To do this, in the row containing the applicable UDP input, click the input name. For information about this page, see the next section, **UDP Input Details** .

UDP Input Details

On this page you can view more detailed information about a UDP input. To view the details of a UDP input, do the following:

- On the UDP Inputs tab, in the row containing the applicable UDP input, click the input name.

  The UDP Input Details page for that input opens.

On this page you can view the following information:

General

- UDP Input's display name, the receiving UDP port, and its assigned broker nodes and clusters
- UDP Input's status (this indicates whether or not this UDP Input's port is currently receiving telemetry)
- Number of destinations assigned to the UDP Input
- Bytes received from Cisco Telemetry Broker and the rate (in bytes per second) for the last 24 hours

Rules

The list of rules assigned to this UDP Input, including the IP address and port of the destination in each rule. Note that an IP address is not listed for a rule that is associated with an SCA destination.

Exporters

You can view the following information about individual exporters which are assigned to a specific port:

- The number of unique exporters configured to send data to a specific input. This number is displayed within parentheses after the Exporters title at the top left corner of the Exporters section.
- Exporter name.
- Type of telemetry received.
- Exporter's status (this indicates whether or not this UDP input's port is currently receiving telemetry from the exporter).
- Number of destinations assigned to the exporter.
- Bytes received and the rate (in bytes per second) for the last 24 hours.

In the Search field, the placeholder text informs you for which entity you can perform a search. As you start to type your entry, the table dynamically filters to display a list of entries that contain the characters you have entered.

Cisco Telemetry Broker tracks every exporter that sends telemetry to a UDP input. However, when you have many unique exporters sending data to a single UDP input, you may need to disable exporters tracking to ensure the system does not suffer performance issues.

To disable exporters tracking, check the **Disable Exporters Tracking** check box.

When you disable Exporter Tracking, metrics are no longer calculated for each exporter. However, you can still view the aggregate metrics that are still being processed by the UDP input, though your system will have limitations. For information about these limitations, see the "Add a UDP Input" section in **UDP Inputs**.

Although metrics are no longer calculated for each exporter, data for that exporter is still shown for as long as data exists for the time set for the Retention Interval.

Example: The Retention Interval is 8 days. An exporter stopped sending data on August 10, so it will retain data from August 10–18. Today is August 20.

- If you filter a chart for 7 days or 30 days, the chart continues to show data for that exporter, since August 10–18 falls within 7–30 days ago.
- If you filter a chart for 4 hours or 24 hours, the chart no longer shows data for that exporter, since August 10–18 falls outside the last 48 hours.

Metrics: Received Rate

In the Metrics section you will see a Received Rate table. This table shows telemetry that destinations have received from this UDP input over time per the following filters you can use to filter the telemetry. You can choose more than one option from each drop-down list.

- Per Exporter
- Per Broker Node

You can view these metrics over several time frames by clicking any of the following desired time frames in the upper right corner of the Metrics table:

- Last hour
- Last 4 hours
- Last day
- Last week
- Last month

Edit a UDP Input

1. In the upper right corner of the page, click the  (**Edit UDP Input**) icon.
2. In the Edit UDP Input dialog that opens, make your edits and click **Save**.

> You cannot edit the UDP port.

Remove a UDP Input

When you delete an input, Cisco Telemetry Broker stops receiving telemetry on the specified port and deletes any rules associated with this input.

That input is still available for selection in the metric graphs, but the name associated with it is the term "Input" followed by the Input's ID and the phrase "deleted." For example, Input (ID 10) deleted. The graphs still include data from the deleted input as long as data exists for that input. Once the data expires, the associated input is no longer available for selection from any of the Per Input drop-down lists (located on the Destinations and Broker Nodes pages).

To remove a UDP input, complete the following steps:

1. In the upper right corner of the page, click the  **(Remove UDP Input)** icon.
2. In the Remove UDP Input dialog that opens, click **Remove**.

VPC Flow Logs

Cisco Telemetry Broker enables you to configure VPC Flow Log inputs to consume AWS VPC Flow Logs from an s3 bucket, transform them into IPFIX, and send the IPFIX to your destinations. You can manage these inputs from the table on the VPC Flow Logs tab, where you can view each existing input in the system and related information, including the following:

- Input name, IPv4 or IPv6 address, and S3 bucket name
- Status of the input and the last time it received telemetry
- Assigned broker nodes and clusters
- Number of destinations configured for this input
- Bytes received and the rate (in bytes per second) for the last 24 hours

You can view this telemetry over the following time frames. Simply choose one of these options from the Drop-down menu in the upper right corner of the page.

- Most Received Last 24h
- Most Recently Seen
- Most Destinations
- Highest Received Rate

In the Search field, the placeholder text informs you for which columns you can perform a search. As you start to type your entry, the table dynamically filters to display a list of entries that contain the characters you have entered.

Add and Edit a VPC Flow Log

For information on how to add and edit a VPC Flog Log, see the **Integrations** section.

Edit a VPC Flow Log

1. In the row containing the applicable VPC flow log, click the  (**Edit**) icon.
2. In the Edit VPC Flow Log dialog that opens, make your edits and click **Save**.

Remove a VPC Flow Log

1. In the row containing the applicable VPC flow log, click the  **(Remove)** icon.
2. In the Remove VPC Flow Log dialog, click **Remove**.

View Details of a VPC Flow Log

You can view more detailed information about a particular VPC flow log. To do this, in the row containing the applicable VPC flow log, click the flow log name. For information about this page, see the next section, **VPC Flow Log Details**.

VPC Flow Log Details

On this page you can view more detailed information about a VPC flow log. To view the details of a VPC flow log, do the following:

- On the VPC Flow Logs tab, in the row containing the applicable VPC flow log, click the input name.

  The VPC Flow Log Details page for that flow opens.

On this page you can view the following information:

General

You can view the following information:

- Input name, S3 bucket, region, and if applicable, assigned broker nodes used to receive telemetry
- Status of the input and the last time it received telemetry
- Number of destinations configured for this input
- Bytes received and the rate (in bytes per second) for the last 24 hours

Rules

The list of rules assigned to this VPC Flow Log, including the IP address and port of the destination in each rule. Note that an IP address is not listed for a rule that is associated with an SCA destination.

Metrics: Received rate

In the Metrics section you will see a Received Rate table. This table shows telemetry that destinations have received from this VPC Flow Log over time per the following filters you can use to filter the telemetry. You can choose more than one option from each drop-down list.

- Per Broker Node

- The received rate over these different time frames:
    - Last hour
    - Last 4 hours
    - Last day
    - Last week
    - Last month

Edit a VPC Flow Log

1. In the upper right corner of the page, click the  (**Edit VPC Flow Log**) icon.
2. In the Edit VPC Flow Log dialog that opens, make your edits and click **Save**.

Remove a VPC Flow Log

1. In the upper right corner of the page, click the  **(Remove VPC Flow Log)** icon.
2. In the Remove VPC Flow Log dialog that opens, click **Remove**.

NSG Flow Logs

Cisco Telemetry Broker enables you to configure NSG Flow Log inputs to consume Azure NSG Flow Logs from an Azure Storage Account, transform them into IPFIX, and send the IPFIX to your destinations. You can manage these inputs from the table on the NSG Flow Logs tab, where you can view each existing input in the system and related information, including the following:

- Input name, IPv4 or IPv6 address, and Blob Service SAS URL
- Status of the input and the last time it received telemetry
- Assigned broker nodes and clusters
- Number of destinations configured for this input
- Bytes received and the rate (in bytes per second) for the last 24 hours

You can view this telemetry over the following time frames. Simply choose one of these options from the Drop-down menu in the upper right corner of the page.

- Most Received Last 24h
- Most Recently Seen
- Most Destinations
- Highest Received Rate

In the Search field, the placeholder text informs you for which columns you can perform a search. As you start to type your entry, the table dynamically filters to display a list of entries that contain the characters you have entered.

Add an NSG Flow Log

> ⚠ In this section we assume you have set up your Azure account to enable NSG Flow Logs. For instructions on configuring your Azure account, refer to **Azure Configuration**.

1. On the Inputs page, click the **NSG Flow Logs** tab.
2. In the upper right corner of the page, click **Add NSG Flow Log**.
3. In the **Blob Service SAS URL** field, enter the Azure sas_url you obtained when you configured NSG Flow Logs for your Azure account.
4. In the **Input Name** field, enter the input IP address name.
5. In the **Input IP Address** field, enter the input IP address to assign to this Flow Log. Cisco Telemetry Broker uses this IP address as the input address when sending IPFIX generated from the NSG Flow Log. It should be an internal IP address and should not conflict with other IP addresses on your network.

   Cisco Telemetry Broker places the following restrictions on the Input IP address value to ensure proper brokering of packets. If any of the following conditions are not met, Cisco Telemetry Broker displays the following error message:

   - Input IP address must not overlap with the subnet of the Assigned Node's Telemetry interface.
   - Input IP address must not conflict with any existing input IP addresses in the system.
   - Input IP address must not conflict with any destination IP addresses in the system.
6. From the **Assigned Broker Node** drop-down list, choose the assigned broker node. This broker node processes all Flow Log telemetry from the storage account.
7. Choose one or more destinations to ingest the Flow Log telemetry. Note that Cisco Telemetry Broker transforms NSG Flow Logs to IPFIX.
8. Click **Save**.

Edit an NSG Flow Log

In the row containing the applicable NSG flow log, click the (**Edit**) icon.

In the Edit NSG Flow Log dialog that opens, make your edits and click **Save**.

Remove an NSG Flow Log

In the row containing the applicable NSG flow log, click the **(Remove)** icon.

In the Remove NSG Flow Log dialog, click **Remove**.

View Details of a NSG Flow Log

You can view more detailed information about a particular NSG flow log. To do this, in the row containing the applicable NSG flow log, click the flow log name. For information about this page, see the next section, **NSG Flow Log Details**.

NSG Flow Log Details

On this page you can view more detailed information about an NSG flow log. To view the details of a NSG flow log, do the following:

- On the NSG Flow Logs tab, in the row containing the applicable NSG flow log, click the input name.

  The NSG Flow Log Details page for that flow log opens.

On this page you can view the following information:

General

You can view the following information:

- Input name, Blob Service SAS URL, URL expiration date, and if applicable, assigned broker nodes used to receive telemetry
- Status of the input and the last time it received telemetry
- Number of destinations configured for this input
- Bytes received and the rate (in bytes per second) for the last 24 hours

Rules

The list of rules assigned to this NSG Flow Log, including the IP address and port of the destination in each rule. Note that an IP address is not listed for a rule that is associated with an SCA destination.

Metrics: Received rate

In the Metrics section you will see a Received Rate table. This table shows telemetry that destinations have received from this NSG Flow Log over time per the following filters you can use to filter the telemetry. You can choose more than one option from each drop-down list.

- Per Broker Node

- The received rate over these different time frames:
    - Last hour
    - Last 4 hours
    - Last day
    - Last week
    - Last month

Edit an NSG Flow Log

1. In the upper right corner of the page, click the  (**Edit NSG Flow Log**) icon.
2. In the Edit NSG Flow Log dialog that opens, make your edits and click **Save**.

Remove an NSG Flow Log

1. In the upper right corner of the page, click the  **(Remove NSG Flow Log)** icon.
2. In the Remove NSG Flow Log dialog that opens, click **Remove**.

Broker Nodes

The Cisco Telemetry Broker Nodes Overview shows details about all of your broker nodes, including the following:

- Broker node name
- Admin interface (Management Network) IPv4/IPv6 addresses
- Telemetry interface IPv4/IPv6 addresses
- Capacity of the broker node
- The high availability cluster to which the broker node belongs (if any)
- Received and Sent rate in bps
- Status of the broker node and the last time the Manager node communicated with it

You can filter this telemetry by the following criteria. Simply choose one of the following criteria types from the drop-down menu at the top of the page:

- Highest Received Rate
- Most Recently Seen

In the Search field, the placeholder text informs you for which columns you can perform a search. As you start to type your entry, the table dynamically filters to display a list of entries that contain the characters you have entered.

Add a Cluster

For cluster-related information and tasks, see **High Availability Clusters** and **Cluster Tasks**.

View Details of a Broker Node

You can view more detailed information about a particular broker node. To do this, in the applicable row, click the desired broker node name in the Broker Node Name column. For information about this page, see the next section, **Broker Node Details**.

Broker Node Details

To view the details of a broker node, do the following:

- On the Broker Nodes page, in the Broker Nodes table, click the applicable broker node name in the Broker Node Name column.

You can view the following information in the General section:

- Host name and management network IP address
- Status of the input and the last time it received telemetry
- Received rate (in bytes per second) for the last 24 hours
- Sent rate (in bytes per second) for the last 24 hours

The Telemetry interface section contains the following information:

- Interface index
- Interface name
- MAC Address
- PCI Address
- Capacity in bps
- IPv4 address/mask
- IPv4 gateway address
- IPv6 address/mask
- IPv6 gateway/address
- Interface MTU (bytes)

Edit a Broker Node

To edit a broker node, complete these steps:

1. In the Telemetry Interface section, click the **(Edit)** icon and make your desired changes.
2. Click **Save**.

Remove a Broker Node

When you remove a broker node from the Manager node, that broker node is deleted from the database, and it is no longer assigned to any of the inputs and destinations to which it was previously assigned. Though the broker node is still available for selection in the metric graphs, the name associated with it changes to the term "Broker Node" followed by the Broker Node's ID and the phrase "deleted." For example, Broker Node (ID 10) deleted.

The graphs still include data from the deleted broker node as long as data exists for that broker node. Once the data expires, the associated broker node is no longer available for selection from any of the Per Broker Node drop-down lists (located on the Destinations and Inputs pages).

Note the following rules regarding the removal of a broker node:

- To ensure that the configuration information is deleted, you must run `ctb-manage` and select **deactivate**.
- If you do not complete the actions described in the previous bullet, the broker node continues to run with the previously saved configuration, and it does so without sending statistics to the Manager node.
- If you add back a previously deleted broker node to the same Manager node, you still need to configure it as a new appliance (assign a telemetry IP address, assign inputs, etc.)

To remove a broker node, complete these steps:

1. In the upper right corner, click the **(Remove Broker Node)** icon.
2. In the Remove dialog, click **Remove**.

Metrics

Details of the Metrics information are described below. The Metrics section shows telemetry this broker node receives over time, both by input and by destination.

Received Rate table

This table shows telemetry that this broker node has received over time, per the following filters you can use to filter the telemetry. You can choose more than one option from each drop-down list.

- Per Input
- Per Exporter
- When the **Compare to Capacity Toggle** icon is disabled (), you can view the current Received Rate values (in 1-minute intervals) for telemetry received from the applicable input(s) . (You must first click **Last 1h** from the time frame options bar in the upper right corner of the table.) Move your cursor over the x_axis (the horizontal line that reflects the time) to find a specific minute in time.
- When the **Compare to Capacity Toggle** icon is enabled (), you can view the Received Rate values as they compare to the threshold. Rates that exceed the 90 percent threshold need to be investigated, as these are cause for concern.

You can view these metrics over several time frames by clicking any of the following desired time frames in the upper right corner of the table:

- Last hour
- Last 4 hours

- Last day
- Last week
- Last month

Sent Rate table

This table shows telemetry that this broker node has sent over time to the destination(s) you select from the **Per Destination** drop-down list.

- When the **Compare to Capacity Toggle** icon is disabled (), you can view the current Sent Rate values (in 1-minute intervals) for telemetry sent to the applicable destination(s) . (You must first click **Last 1h** from the time frame options bar in the upper right corner of the table.) Move your cursor over the x_axis (the horizontal line that reflects the time) to find a specific minute in time.
- When the **Compare to Capacity Toggle** icon is enabled (), you can view the Sent Rate values as they compare to the threshold. Rates that exceed the 90 percent threshold need to be investigated, as these are cause for concern.

> If the received rate or sent rate are exceeding the threshold, add an additional broker node to increase capacity.

You can view these metrics over several time frames by clicking any of the following desired time frames in the upper right corner of the table:

- Last hour
- Last 4 hours
- Last day
- Last week
- Last month

1-Minute Load Average table

CPU load average of the chosen broker node over 1-minute intervals of time. (You must first click **Last 1h** from the time frame options bar in the upper right corner of the table.) Move your cursor over the x_axis (the horizontal line that reflects the time) to find a specific minute in time. When the load average exceeds the threshold, which is set to the number of CPUs (the value represented by the y_axis), your network telemetry flow rate slows down.

Memory Usage table

Memory consumption and total available memory over 3-minute intervals of time. (You must first click **Last 1h** from the time frame options bar in the upper right corner of the table.) Move your cursor over the x_axis (the horizontal line that reflects the time) to find a specific 3-minute interval in time. Rates that exceed the 80 percent threshold need to be investigated, as these are cause for concern.

Disk Storage table

Disk storage used and total available storage over 3-minute intervals of time. (You must first click **Last 1h** from the time frame options bar in the upper right corner of the table.) Move your cursor over the x_axis (the horizontal line that reflects the time) to find a specific 3-minute interval in time. Rates that exceed the 80 percent threshold need to be investigated, as these are cause for concern.

> If you find that the load average, memory usage, or disk storage are exceeding the associated threshold, expand the resource allocation for your VM.

High Availability Clusters

Cisco Telemetry Broker high availability provides highly available IPv4 and IPv6 virtual IP addresses to be targets for your inputs, ensuring reliable delivery of telemetry from inputs to destinations.

To establish Broker Node high availability, you can create high availability clusters and assign multiple broker nodes to each. In each cluster, one broker node is designated *Active*, meaning it passes telemetry and serves metrics to Cisco Telemetry Broker, and the rest are designated *Passive*, meaning they are not passing telemetry or serving metrics currently. If an Active broker node stops passing telemetry or otherwise loses connectivity with Cisco Telemetry Broker, one of the Passive broker nodes is promoted to Active broker node and starts passing telemetry.

Note the following about clusters:

- Each broker node can only belong to one cluster at a time.
- To create a cluster, you need to assign a minimum of one broker node to that cluster.
- Keep in mind that if you create a cluster with only one broker node and this broker node fails, no other broker node is available to be promoted to Active broker node. Similarly, if all broker nodes within a cluster fail, no broker node can be promoted to Active broker node. If a broker node fails, bring it back online as soon as possible.
- You cannot choose which broker node is active in a given cluster.
- If an Active broker node for a virtual IP address fails, one of the Passive broker nodes in the same cluster becomes the Active broker node for the virtual IP address. When the failed broker node comes back up again, it remains a Passive broker node. If you want to make that node active again, you will need to do so manually using the provided commands. (To view these commands, see the "Move a VIP to a Specific Node" section in the Cisco Telemetry Broker Virtual Appliance Deployment and Configuration Guide.)
- You can assign either a virtual IPv4 or virtual IPv6 address, or both, to a cluster. Cisco Telemetry Broker uses this virtual IP address to communicate with the cluster and promote Passive broker nodes to Active broker nodes when an Active broker node loses connectivity with Cisco Telemetry Broker.

For information about how HA clusters are updated during the Cisco Telemetry Broker software update process, see **Software Update**.

Cluster Tasks

View Cluster Details

In the High Availability Clusters section on the Broker Nodes page, you can view the following data:

- All configured clusters
- IPv4 address and IPv6 address for each cluster
- Broker nodes that belong to each cluster

Add a Cluster

1. From the Cisco Telemetry Broker main menu, choose **Broker Nodes**.
2. On the right side of the page, click **+ Add Cluster**.
3. Enter a descriptive cluster name.
4. Choose one or more broker nodes to include in the cluster.
5. Enter a cluster virtual IPv4 Address, IPv6 Address, or both.
6. Click **Add Cluster**.

- It can take up to 3 minutes for the configuration to propagate and for the VIP addresses to become available on your network.
- The **+Add Cluster** button is disabled when no broker nodes are available to be assigned to a cluster.

Modify a Cluster's Configuration

1. From the Cisco Telemetry Broker main menu, choose **Broker Nodes**.
2. In the High Availability Clusters section, click the **(Edit)** icon for the cluster you want to edit.
3. In the Edit dialog that opens, make your edits and click **Save**.

Remove a Cluster

1. From the Cisco Telemetry Broker main menu, choose **Broker Nodes**.
2. In the High Availability Clusters section, click the  **(Remove)** icon for the cluster you want to delete.
3. In the Remove dialog that opens, click **Remove**.

For information about managing clusters, refer to the "Manage High Availability Clusters" section in the Cisco Telemetry Broker Virtual Deployment Guide.

Manager Node

The Cisco Telemetry Broker Manager view shows metrics for your Cisco Telemetry Broker Manager. You can view the following information:

- Hostname and Admin interface (Management Network) IPv4/IPv6 addresses
- Current memory use and total memory available
- Current disk storage use and total disk storage space available

1-Minute Load Average table

CPU load average of the chosen broker node over 1-minute intervals of time. (You must first click **Last 1h** from the time frame options bar in the upper right corner of the table.) Move your cursor over the x_axis (the horizontal line that reflects the time) to find a specific minute in time. When the load average exceeds the threshold, which is set to the number of CPUs (the value represented by the y_axis), your network telemetry flow rate slows down.

Memory Usage table

Memory consumption and total available memory over 1-minute intervals of time. (You must first click **Last 1h** from the time frame options bar in the upper right corner of the table.) Move your cursor over the x_axis (the horizontal line that reflects the time) to find a specific 3-minute interval in time. Any rate that exceeds the 80 percent threshold need to be investigated, as these are cause for concern.

Disk Storage table

Disk storage used and total available storage over 3-minutes intervals of time. (You must first click **Last 1h** from the time frame options bar in the upper right corner of the table.) Move your cursor over the x_axis (the horizontal line that reflects the time) to find a specific 3-minute interval in time. Any rate that exceeds the 80 percent threshold need to be investigated, as these are cause for concern.

> If you find that the load average, memory usage, or disk storage are exceeding the associated threshold, expand the resource allocation for your VM.

You can view these metrics over several time frames by clicking any of the following desired time frames in the upper right corner of the Metrics table:

- Last hour
- Last 4 hours
- Last day

- Last week
- Last month

Integrations

The Cisco Telemetry Broker Integrations shows information about your VPC Flow Logs. You can configure your AWS deployment to export VPC Flow Logs to Cisco Telemetry Broker, then configure Cisco Telemetry Broker to transform the VPC Flow Logs to IPFIX for ingestion by destinations.

View Integration Information

From the Cisco Telemetry Broker main menu, choose **Integrations**.

AWS Configuration

AWS Configuration - Part 1

Enable Flow Logging

To enable flow logging for one or more VPCs, then send the flow logs to an S3 bucket, complete the following steps:

1. From the AWS VPC main menu, choose **Your VPCs**.
2. Right-click a VPC, then choose **Create Flow Log**.
3. From the Filter drop-down,choose **All** to log accepted and rejected telemetry, or **Accept** to log only accepted telemetry.
4. Choose **Send to an S3 bucket destination**.
5. Enter an **S3 bucket ARN** in which you want to store flow log telemetry.
6. Click **Create**.

Create an IAM User

To create an IAM user that has access to the S3 bucket and record the access key ID and Secret access key, complete the following steps:

1. From the AWS IAM main menu, choose **Users > Add user**.
2. Enter a **User Name**.
3. Choose **Programmatic access**.
4. Click **Next: Permissions**.
5. Click **Next: Tags**.
6. Click **Next: Review**.
7. Click **Create User**.
8. For both the access key ID and the secret access key, click **Show**.

9. Record your Access key ID and Secret access key or click **Download** and save the keys in a secure location.

Cisco Telemetry Broker Configuration – Part 1

Upload Your AWS Access

To upload your AWS access and secret access keys to Cisco Telemetry Broker, complete the following steps:

1. From the Cisco Telemetry Broker main menu, choose **Integrations**.

   The AWS tab opens.

2. Click **Add AWS Credentials** (located above the AWS Credentials table in the upper right corner).
3. Enter a descriptive **Credentials Name**.
4. Enter the **AWS Access Key ID** and **AWS Secret Access Key**.
5. Click **Save**.
6. If you have additional S3 credentials, repeat Step 1 through Step 5.

Configure the VPC Flow Log Input

To configure the VPC Flow Log input and upload the bucket policy to AWS, complete the following steps:

1. From the Cisco Telemetry Broker main menu, choose **Inputs > VPC Flow Logs tab**.
2. Click **Add VPC Flow Log** (located above the Inputs table in the upper right corner).

   *The **Add VPC Flow Log** dialog opens.*

3. In the **S3 Bucket Path** field, enter your s3 bucket name and path. For example,

   `[bucket-name]/[path]`

4. In the **Region Code** field, enter the AWS region where you created the S3 bucket.
5. Choose your **Credentials** based on the access key and secret access key that you uploaded.
6. Click the arrow in the next field down to expand the pane. From this pane, copy the S3 bucket policy and use it for S3 Bucket configuration in AWS.
7. Keep this dialog open and continue to the next section, AWS Configuration – Part 2.

AWS Configuration – Part 2

Create the S3 Bucket Policy

1. From the AWS IAM main menu, choose **Policies**.
2. Click **Create policy**.
3. Select the JSON tab.
4. Paste the policy you copied from Cisco Telemetry Broker into the JSON editor.
5. Click **Review policy**.
6. In the **Name** field, enter a unique name to identify the policy (for example, **ctb_ policy**).
7. Enter a description, such as **Policy to allow Cisco Telemetry Broker access to VPC Flow Logs**.
8. Click **Create Policy**.

Create a User Group

To create a user group, assign the policy to an IAM group, and add your IAM user to the IAM group, complete the following steps:

1. From the AWS IAM main menu, choose **Groups > Create New Group**.
2. Enter the **group name**.
3. Click **Next Step**.
4. Select the Cisco Telemetry Broker policy that you created.
5. Click **Next Step**.
6. Click **Create Group**.
7. From the IAM console, choose **Groups > [Group Name]**.
8. Click the **Users** tab.
9. Click **Add Users to Group** and choose your **Cisco Telemetry Broker user**.
10. Click **Add Users**.

Cisco Telemetry Broker Configuration – Part 2

Register AWS Flow Log in Cisco Telemetry Broker.

To configure Cisco Telemetry Broker to process the VPC Flow Log telemetry and transform it into IPFIX, do the following:

1. Return to the dialog that you partially completed in Cisco Telemetry Broker Configuration – Part 1 (refer to **Configure the VPC Flow Log Input**).
2. In the **Input Name** field, enter the input IP address name.
3. In the **Input IP Address** field, enter the input IP address to assign to this Flow Log. Cisco Telemetry Broker uses this IP address as the input address when sending IPFIX generated from the VPC Flow Log. It should be an internal IP address and should not conflict with other IP addresses on your network.

   Cisco Telemetry Broker places the following restrictions on the Input IP value to ensure proper brokering of packets. If any of the following conditions are not met, Cisco Telemetry Broker displays an error message:

   - Input IP must **not** overlap with the subnet of the Assigned Node's Telemetry interface.
   - Input IP must **not** conflict with any existing input IPs in the system.
   - Input IP must **not** conflict with any destination IPs in the system.

4. From the **Assigned Broker Node** drop-down list, choose the assigned broker node. This broker node will process all flow log telemetry from the S3 bucket.
5. Choose one or more destinations to ingest the flow log telemetry. Note that Cisco Telemetry Broker transforms VPC Flow Logs to IPFIX.
6. Click **Add VPC Flow Log**.
7. If you have multiple VPC Flow Logs to configure, complete the following steps, in order, for each VPC Flow Log you configure:
   a. Repeat every step in the **Configure the VPC Flow Log Input** .
   b. Repeat every step in **Create the S3 Bucket Policy**.
   c. Repeat every step in **Create a User Group**.
   d. Repeat Step 1 through Step 5 in this section.
8. Click **Save**.

> To configure VPC flow logs successfully, ensure the AWS S3 bucket has flow logs present (already being written to it). If they are not, the AWS VPC flow log configuration will fail.

Azure Configuration

The following instructions detail how to set up a monitoring application that will collect telemetry from your Azure environment for analysis. We recommend that you follow these

instructions as a user assigned the *Global Administrator AD* and *Owner* roles for all subscriptions that need monitoring.

If this isn't possible, contact your Azure AD administrator to ensure that for each subscription to be monitored, the user has access to the following Azure resources: authorization, network, storage accounts, and monitoring. For this to occur, you must assign the user the *User access administrator* and *Contributor* roles.

Prerequisites

Before configuring NSG Flow Logs, complete the following steps:

1. **Connect to Azure** Access your Azure portal and follow the instructions to sign in. For command line access, launch a bash console using the console icon located next to the search bar.
2. **Set up Network Watcher** Set up the Network Watcher service for the regions in which you have resource groups to monitor:
    a. From the main menu, choose **Network Watcher > Overview**.
    b. Click the ••• (**Ellipsis**) icon and choose **Enable Network Watcher**, either at the subscription level or on target regions.
3. **Create Storage Accounts** To store NSG Flow Logs, you'll need storage accounts in the same locations (e.g. East US) as your target resource groups. If you don't already have storage accounts in the target locations, you'll need to create some with Blob storage capabilities (StorageV2 or BlobStorage).

Enable NSG Flow Logs

For the NSGs you want to monitor, you'll need to enable Flow Logging by completing the following steps:

1. From the main menu, choose **Network Watcher > NSG Flow Logs**. The list of Network Security Groups appears.
2. To display the Flow Logs settings screen, from the main menu choose an NSG.
3. Complete the form, entering the following settings:
    - **Status:** On
    - **Flow Logs version:** Version 2
    - **Storage account:** Select the storage account you created earlier.
    - **Retention:** Microsoft currently has a known issue with Flow Logs Retention. For more information, refer to the note at Step 11 of the "Enable NSG Flow Log

section" in the Microsoft documentation.

- **Traffic Analytics status:** Off (optionally, you may enable this)

4. Click **Save** and repeat the Flow Logs setup for each NSG.

> You need to enable NSG Flow Logs for any new Resource Group you create that you want to monitor.

5. In the Azure portal, from the main menu, choose **Storage Accounts > Select Your Account > Containers**. Verify that you see the *insights-logs-networksecuritygroupflowevent* entry in the Containers list. It may take a few minutes for it to appear.

Obtain Blob Service SAS URL

To generate the Blob Service SAS URL that Cisco Telemetry Broker requires, complete the following steps:

1. In the Azure portal, from the main menu, choose **Storage Accounts > Select Your Account > Shared Access Signature**. The form that opens should contain the following entries:
   - **Allowed Services:** Blob
   - **Allowed Resource Types:** Service, Container, Object
   - **Allowed Permissions:** Read, List
   - **Start and Expiry Times:** Set to an interval that you will allow Cisco Telemetry Broker to access
2. Choose **Generate SAS > the connection string**.
3. Copy the Blob Service SAS URL.

> Provide the Blob Service SAS URL when adding the NSG Flow Log to Cisco Telemetry Broker.

Register Azure Flow Log in Cisco Telemetry Broker

To configure Cisco Telemetry Broker to process the NSG Flow Log telemetry and transform it into IPFIX, complete the following steps:

1. Return to Cisco Telemetry Broker.
2. From the Cisco Telemetry Broker main menu, click the **Inputs > NSG Flow Logs**

tab.

3. Click **Add NSG Flow Log** (located above the Inputs table in the upper right corner).

   *The **Add NSG Flow Log** dialog opens.*

4. In the **Input Name** field, enter the input IP address name.
5. In the **Input IP Address** field, enter the input IP address to assign to this Flow Log. Cisco Telemetry Broker uses this IP address as the input address when sending IPFIX generated from the NSG Flow Log. It should be an internal IP address and should not conflict with other IP addresses on your network.

   Cisco Telemetry Broker places the following restrictions on the Input IP value to ensure proper brokering of packets. If any of the following conditions are not met, Cisco Telemetry Broker displays an error message:

   - Input IP must **not** overlap with the subnet of the Assigned Node's Telemetry interface.
   - Input IP must **not** conflict with any existing input IPs in the system.
   - Input IP must **not** conflict with any destination IPs in the system.

6. From the **Assigned Broker Node** drop-down list, choose the assigned broker node. This broker node will process all flow log telemetry from the S3 bucket.
7. Choose one or more destinations to ingest the flow log telemetry. Note that Cisco Telemetry Broker transforms NSG Flow Logs to IPFIX.
8. Click **Add NSG Flow Log**.
9. If you have multiple NSG Flow Logs to configure, complete the following steps, in order, for each NSG Flow Log you configure:
   a. Repeat every step in each previous section in this topic.
   b. Repeat Step 1 through Step 7 in this section.
10. Click **Save**.

Application Settings

The Application Settings control your Cisco Telemetry Broker deployment. The following settings are available:

General

Software Update

Smart Licensing

TLS Certificate

User Management

General

1. Click the ⚙**(Settings)** icon.

   The Application Settings page opens.

2. Click the **General** tab.

Configure Inactivity Interval

The telemetry inputs configuration allows you to configure the amount of time before Cisco Telemetry Broker marks a telemetry input as inactive.

1. In the Inputs section, choose an **Inactivity Interval** in minutes from the Inactivity interval drop-down list.
2. Click **Save**.

Configure HTTPS Proxy

The HTTPS Proxy configuration allows you to configure HTTPS proxy server settings if Cisco Telemetry Broker connects to the internet using an HTTPS proxy.

> ℹ Cisco Telemetry Broker does not support using HTTP proxy servers.

1. In the HTTPS Proxy section, enable **Use HTTPS proxy**.
2. Enter an **IP Address** and **Port**.
3. Click **Save**.

Software Update

The Software Update page shows the current Cisco Telemetry Broker version of your Manager node and broker nodes, and it allows you to upgrade to the current released

version.

The update upgrades your Manager and all of your managed broker nodes to the newest version. Before performing the update, we recommend that you take a VM snapshot of your Cisco Telemetry Broker VMs. You can use this snapshot to revert to the current state in case you receive an unexpected error.

The system is unresponsive during the update process. First it updates your Manager, and then it updates the broker nodes. While your Manager updates, you may not see the proper state of your Cisco Telemetry Broker deployment. While your broker nodes update, they may not properly pass sent telemetry to destinations.

The Cisco Telemetry Broker HA cluster is designed to ensure there is no down time during an upgrade; therefore, in an HA cluster, the Manager always updates only one node at a time. When updating an HA cluster, the Manager node updates nodes in that cluster by order of creation. When a node starts to update, it first puts itself into standby mode. If this is the active node, the Cisco Telemetry Broker functionality is transferred to the alternate node. This occurs before the previously active node stops processing telemetry. This ensures that there is minimal to no telemetry loss during an upgrade.

Upgrade Your Cisco Telemetry Broker Deployment

Download the Update File

1. Go to Cisco Software Central.
2. In the Download and Upgrade section, choose **Access Download**.
3. Type **Cisco Telemetry Broker** in the search field.
4. Choose the **Manager Node Software**.
5. Download the CTB Update Bundle file.

Upload the Update File

1. In the Cisco Telemetry Broker Manager, click the ☼ **(Settings)** icon.

   The Application Settings page opens.

2. Click the **Software Update** tab.
3. In the upper right corner of the page, click **Upload an Update File**.
4. Choose the file you downloaded.

   You may need to wait several minutes for the upload to finish, based on the time estimates displayed. After the file is uploaded, you will receive a message informing you that a software update is now available.

5. Click **Update Cisco Telemetry Broker**.

You will not be able to navigate within Cisco Telemetry Broker while the Manager node is updated to the latest version. The update process takes about 10 minutes.

6. When the update has completed, you will be prompted to log back in to Cisco Telemetry Broker.

   A loading indicator will appear next to each broker node that is being updated.

Smart Licensing

The Smart Software Licensing page shows the state of your Cisco Telemetry Broker Smart Licensing.

Cisco Telemetry Broker licensing is based on GB ingested by your broker nodes per day.

1. Click the ⚙ **(Settings)** icon.

   The Application Settings page opens.

2. Click the **Smart Licensing** tab.

User Management

1. Click the **Settings** icon.

   The Application Settings page opens.

2. Click the **User Management** tab.

Add a User

1. Click **Add User**.
2. Enter the user's **First Name** and **Last Name**.
3. Enter the **Username**. Neither you or the user can change this username once it is created.
4. Enter a password in the **New Password** field and enter it again in the **Confirm Password** field. Make sure to adhere to the password guidelines.
5. Click **+ Add User**.

Edit a User

1. In the row that contains the user you want to edit, click the ••• (**Actions**) icon > **Edit Profile**.
2. Complete your edits.
3. Click **Save**.

Remove a User

1. In the row that contains the user you want to remove, click the **Actions** icon > **Remove User**.
2. Click **Remove**.

Change a User's Password

1. In the row that contains the user whose password you want to change, click the **Actions** icon > **Change Password**.
2. Enter a new password in the **Password** field, and enter it again in the **Confirm Password** field.
3. Click **Change Password**.

TLS Certificate

On this page you can view the following information:

- Hostname
- Certificate expiration date and time
- Subject name and issuer name (under Certificate details)

> ⚠ The certificate and the private key must be PEM-encoded.

> ⚠ The private key file cannot be password-protected.

Upload TLS Certificate

1. Click the ⚙ **(Settings)** icon.

   The Application Settings page opens.
2. Click the **TLS Certificate** tab.
3. To view certificate details, click the **Certificate details drop-down arrow**. In this section you can view the Subject Name, Issuer Name, and Subject Alternate Name.
4. In the upper right corner of the page, click **Upload TLS Certificate**.
5. In the Upload TLS certificate dialog that opens, click **Choose File** for each certificate and each private key you want to upload.

   Certificate details are displayed beneath the associated files so you can verify that all related information is correct.
6. Click **Upload**.

Re-register Broker Nodes

After you upload the appropriate TLS certificates, you need to enable the connection between the Manager node and the broker nodes by re-registering each broker node.

1. Use SSH or the VM server console to log in to the appliance as **admin**.
2. Enter this command:

   ```
   sudo ctb-manage
   ```

   You are informed that a Manager configuration already exists.
3. Choose **Option C "Re-fetch the manager's certificate but keep everything else"**.

Syslog Notifications

1. Click the ⚙ **(Settings)** icon.

   The Application Settings page opens.
2. Click the **Notifications** tab.

To see a list of supported alerts, click the **Supported Alerts drop-down arrow** at the top of the page. You can direct Cisco Telemetry Broker to send a syslog notification when any alert is generated. For a list of these alerts, refer to **Appendix B: Supported Alerts**.

> ⓘ Currently you cannot configure custom alert types.

Configure the Syslog Server

First, you need to configure the Syslog server settings.

1. In the Syslog Server Address field, click **Configure**.
2. Enter the applicable Syslog server address (this can be an IPv4 address, IPv6 address, or a DNS name) and port number.
3. Click **Save**.

Enable the Syslog Server to Receive Notifications

Next, do the following:

- Enable the **Send Syslog Notifications** toggle ().

After you configure the Syslog server, you must enable this toggle, or the Syslog server will not receive notifications. Once you have enabled this toggle, then when your Cisco

Telemetry Broker triggers an alert, it immediately sends a syslog notification to the Syslog server.

Send a Test Syslog Notification

Whenever you choose to do so, you can manually send a test syslog notification to the syslog server. This test notification checks that the Syslog server is successfully receiving syslog messages.

Every time you send a test syslog notification, a copy of the message appears under the **Sent Test** button. This enables you to compare the sent message with the message that the Syslog server receives.

If you log out of Cisco Telemetry Broker, when you log in again the messages will no longer be displayed.

> You must manually check the syslog server to verify that a test notification was received.

To send a test syslog notification, complete the following steps:

1. Enable the **Send Syslog Notifications** toggle ( ).
2. Click **Send Test**.
3. In the confirmation dialog, click **Send**.

Severity and Facility Values

Telemetry Broker hardcodes the severity value to *warning* and the facility value to *local0*.

Email Notifications

1. Click the **(Settings)** icon.

   The Application Settings page opens.

2. Click the **Notifications** tab.

You can direct Cisco Telemetry Broker to send an email notification when any alert is generated. For a list of these alerts, refer to **Appendix B: Supported Alerts**.

> Currently you cannot configure custom alert types.

Configure the SMTP Server

First, you need to configure the SMTP server settings.

1. In the SMTP Server field, click **Configure**.
2. Enter the applicable SMTP server address (this can be an IPv4 address, IPv6 address, or a DNS name), port number, and the email address from which the alerts will be sent.
3. Designate whether or not you want to require authentication. If you do, enter the SMTP server's username and password into the associated fields.
4. Choose the encryption type.
5. Click **Save**.

Enable a User to Receive Email Notifications

After you configure the SMTP server, you must enable Cisco Telemetry Broker to send email notifications, or the designated users will not receive notifications.

1. Enable the **Send Email Notifications** toggle ( ).
2. In the Recipients field, click **Edit**.
3. In the Edit Recipients dialog that opens, choose every user whom you want to have the ability to receive email notifications.

   The current user's name appears at the top of the list. The user name for any user whose profile is missing an email address is displayed at the bottom of the list in a dimmed state.
4. Click **Save**.

Send a Test Email Notification

Whenever you choose to do so, you can manually send a test email notification for all alerts. This test email notification checks that the SMTP server has been correctly configured and that all appropriate users will successfully receive email notifications for any alerts (to which they are assigned) that occur.

1. Enable the **Send Email Notifications** toggle ( ).
2. Click **Send Test**.
3. If you need to edit the list of users who will receive this test email notification, then in the Send Test dialog that opens, click **Choose** and make your edits.

   The current user's name appears at the top of the list. The user name for any user whose profile is missing an email address is displayed at the bottom of the list in a dimmed state.
4. Click **Send**.

Profile Settings

Edit Your Personal Information

1. Click the (**User**) icon.

   The Profile Settings page opens.

2. In the Personal Information section, click the (**Edit**) icon.
3. Complete your edits.
4. Click **Save**.

Change Your Password

1. Click the **User** icon.

   The Profile Settings page opens.

2. In the Password section, click **Change Password**.
3. Enter a new password in the **Password** field, and enter it again in the **Confirm Password** field.
4. Click **Change Password**.

Expand Cisco Telemetry Broker Manager and Broker Node Disk Size

With Cisco Telemetry Broker, you can expand the disk size of both the Manager and any broker node.

1. Back Up the Partition Table Information

Log in to the appliance and run the following command.

```
admin@ctb-nfik72TO:~$ sudo sgdisk -p /dev/sda > partition_table_
$(date +'%Y_%m_%d_%H_%M_%S').txt
```

This creates a file similar to the partition_table_2021_07_09_15_51_04.txt file, with contents similar to the following:

```
Disk /dev/sda: 81920000 sectors, 39.1 GiB
Model: Virtual disk
Sector size (logical/physical): 512/512 bytes
Disk identifier (GUID): B078BED8-2BD0-4EEA-9149-BA93FC8A299D
Partition table holds up to 128 entries
Main partition table begins at sector 2 and ends at sector 33
First usable sector is 34, last usable sector is 81919966
Partitions will be aligned on 2048-sector boundaries
Total free space is 4029 sectors (2.0 MiB)

Number  Start (sector)    End (sector)  Size       Code  Name
   1            2048            4095   1024.0 KiB  EF02
   2            4096          491519   238.0 MiB   8300
   3          491520         3844095   1.6 GiB     8200
   4         3844096        33767423   14.3 GiB    8300
   5        33767424        63690751   14.3 GiB    8300
   6        63690752        81917951   8.7 GiB     8300
```

The total size of the disk (/dev/ada) is 39.1 GB and the size of the Cisco Telemetry Broker application partition (/dev/sda6) is 8.7 GB.

2. Delete All Existing VM Snapshots for the Appliance

You cannot resize the ESXi VM disk when snapshots exist. In order to increase the disk size we need to delete all existing snapshots.

1. Log in to the ESXi console (vSphere or Web Client).
2. Right-click the VM and choose **Snapshots > Manage Snapshots > Delete All**.

3. Increase the Disk Size of the Appliance

1. Log in to the ESXi console (vSphere or Web Client).
2. From the list of VMs in the left panel, select the appliance.
3. From the toolbar at the top of the page, click the  (**Edit**) icon.
4. In the Hard Disk 1 row, increase to the desired size.
5. Reboot the VM.
6. Log in and verity that the new size has been applied by running this command:

```
$ sudo sgdisk -p /dev/sda
Disk /dev/sda: 125829120 sectors, 60.0 GiB
Model: Virtual disk
Sector size (logical/physical): 512/512 bytes
Disk identifier (GUID): B078BED8-2BD0-4EEA-9149-BA93FC8A299D
Partition table holds up to 128 entries
Main partition table begins at sector 2 and ends at sector 33
First usable sector is 34, last usable sector is 81919966
Partitions will be aligned on 2048-sector boundaries
Total free space is 4029 sectors (2.0 MiB)

Number  Start (sector)    End (sector)  Size       Code  Name
   1            2048            4095   1024.0 KiB  EF02
   2            4096          491519   238.0 MiB   8300
   3          491520         3844095   1.6 GiB     8200
   4         3844096        33767423   14.3 GiB    8300
   5        33767424        63690751   14.3 GiB    8300
   6        63690752        81917951   8.7 GiB     8300
```

4. Run ctb-part-resize.sh Script

1. Take a snapshot of the VM.
2. Run the following command:

```
$ sudo /opt/titan/bin/ctb-part-resize.sh

WARNING

This program will update /dev/sda6 to use the full remaining free space
available on /dev/sda.

It is HIGHLY RECOMMENDED that you take a backup of any important data/configuration
before proceeding.

Do you wish to proceed?y
<134>Mar  8 15:35:30 ctb-disk-resize: Moving the partition table header to the end of the
disk(/dev/sda)
```

```
Warning: The kernel is still using the old partition table.
The new table will be used at the next reboot or after you
run partprobe(8) or kpartx(8)
The operation has completed successfully.
<134>Mar  8 15:35:31 ctb-disk-resize: Deleting CTB application partition (/dev/sda6)
Warning: The kernel is still using the old partition table.
The new table will be used at the next reboot or after you
run partprobe(8) or kpartx(8)
The operation has completed successfully.
<134>Mar  8 15:35:32 ctb-disk-resize: Creating the CTB application partition (/dev/sda6)
Warning: The kernel is still using the old partition table.
The new table will be used at the next reboot or after you
run partprobe(8) or kpartx(8)
The operation has completed successfully.
<134>Mar  8 15:35:33 ctb-disk-resize: Updating kernel partition tables
<134>Mar  8 15:35:34 ctb-disk-resize: Resizing /dev/sda6
resize2fs 1.44.5 (15-Dec-2018)
Filesystem at /dev/sda6 is mounted on /var/lib/titan; on-line resizing required
old_desc_blocks = 2, new_desc_blocks = 2
The filesystem on /dev/sda6 is now 2412283 (4k) blocks long.
```

5. Verify that Space has been Allocated

Run the following command:

```
$ df -h /dev/sda
Filesystem      Size  Used Avail Use% Mounted on
/dev/sda4        14G  5.6G  7.7G  42% /
/dev/sda2       227M   80M  132M  38% /boot
/dev/sda5        14G   41M   14G   1% /mnt/alt_root
/dev/sda6       8.5G  172M  7.9G   3% /var/lib/titan
```

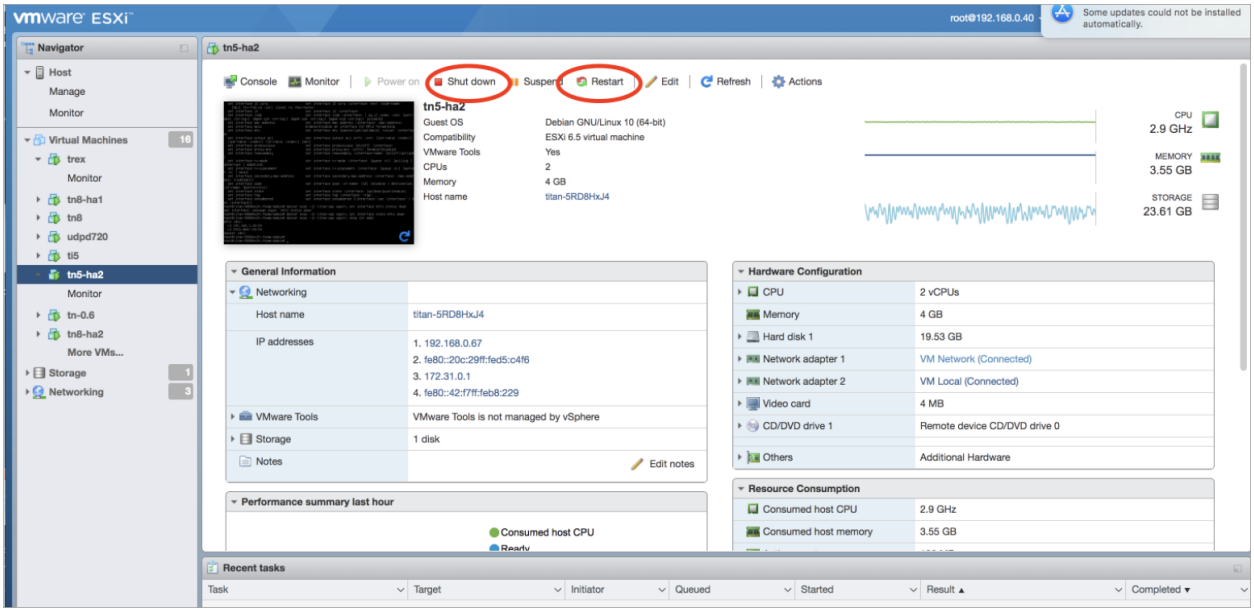
Shut Down or Reboot Cisco Telemetry Broker

If at some point you need to shut down or reboot Cisco Telemetry Broker, complete the following steps:

1. Log in to the CTB Manager or CTB Broker Node via ssh or the console with the user name **admin**.
    - To shut down, enter `sudo shutdown now`
    - To reboot, enter `sudo shutdown -r now`
2. Log in to the VMWare console and verify that the VM has completed the shutdown or has rebooted properly.

Optionally, you can also shut down or reboot using VMWare. To do this, complete the following steps:

1. Log in to the VMWare console and select the applicable VM.
2. Depending on if you want to shut down or reboot, click one of the following options displayed at the top of the page:



Appendix A: Supported IPFIX Fields for Cisco Telemetry Broker

The table in this appendix contains a list of the IPFIX fields that Cisco Telemetry Broker supports.

Cisco Telemetry Broker extracts the numeric IDs (each numeric ID includes an Element ID and a PEN) from Information Elements within NetFlow messages and maps each of them to an associated descriptive name.

> If Cisco Telemetry Broker doesn't recognize the numeric ID for an Information Element, the element information is still sent to Cisco Secure Cloud Analytics, but Cisco Telemetry Broker assigns a name to it using this format: `unknownID_<ElementID>_<PEN>`

If you want to view the description for any element ID, see the Cisco Secure Network Analytics Information Elements Guide.

ElementID	PEN	Name
1	0	octetDeltaCount
2	0	packetDeltaCount
3	0	deltaFlowCount
4	0	protocolIdentifier
5	0	ipClassOfService
6	0	tcpControlBits
7	0	sourceTransportPort
8	0	sourceIPv4Address
9	0	sourceIPv4PrefixLength
10	0	ingressInterface

ElementID	PEN	Name
11	0	destinationTransportPort
12	0	destinationIPv4Address
13	0	destinationIPv4PrefixLength
14	0	egressInterface
15	0	ipNextHopIPv4Address
16	0	bgpSourceAsNumber
17	0	bgpDestinationAsNumber
18	0	bgpNextHopIPv4Address
19	0	postMCastPacketDeltaCount
20	0	postMCastOctetDeltaCount
21	0	flowEndSysUpTime
22	0	flowStartSysUpTime
23	0	postOctetDeltaCount
24	0	postPacketDeltaCount
25	0	minimumIpTotalLength
26	0	maximumIpTotalLength
27	0	sourceIPv6Address
28	0	destinationIPv6Address
29	0	sourceIPv6PrefixLength
30	0	destinationIPv6PrefixLength

ElementID	PEN	Name
31	0	flowLabelIPv6
32	0	icmpTypeCodeIPv4
33	0	igmpType
34	0	samplingInterval
35	0	samplingAlgorithm
36	0	flowActiveTimeout
37	0	flowIdleTimeout
38	0	engineType
39	0	engineId
40	0	exportedOctetTotalCount
41	0	exportedMessageTotalCount
42	0	exportedFlowRecordTotalCount
43	0	ipv4RouterSc
44	0	sourceIPv4Prefix
45	0	destinationIPv4Prefix
46	0	mplsTopLabelType
47	0	mplsTopLabelIPv4Address
48	0	samplerId
49	0	samplerMode
50	0	samplerRandomInterval

ElementID	PEN	Name
51	0	classId
52	0	minimumTTL
53	0	maximumTTL
54	0	fragmentIdentification
55	0	postIpClassOfService
56	0	sourceMacAddress
57	0	postDestinationMacAddress
58	0	vlanId
59	0	postVlanId
60	0	ipVersion
61	0	flowDirection
62	0	ipNextHopIPv6Address
63	0	bgpNextHopIPv6Address
64	0	ipv6ExtensionHeaders
70	0	mplsTopLabelStackSection
71	0	mplsLabelStackSection2
72	0	mplsLabelStackSection3
73	0	mplsLabelStackSection4
74	0	mplsLabelStackSection5
75	0	mplsLabelStackSection6

ElementID	PEN	Name
76	0	mplsLabelStackSection7
77	0	mplsLabelStackSection8
78	0	mplsLabelStackSection9
79	0	mplsLabelStackSection10
80	0	destinationMacAddress
81	0	postSourceMacAddress
82	0	interfaceName
83	0	interfaceDescription
84	0	samplerName
85	0	octetTotalCount
86	0	packetTotalCount
87	0	flagsAndSamplerId
88	0	fragmentOffset
89	0	forwardingStatus
90	0	mplsVpnRouteDistinguisher
91	0	mplsTopLabelPrefixLength
92	0	srcTrafficIndex
93	0	dstTrafficIndex
94	0	applicationDescription
95	0	applicationId

ElementID	PEN	Name
96	0	applicationName
98	0	postIpDiffServCodePoint
99	0	multicastReplicationFactor
100	0	className
101	0	classificationEngineId
102	0	layer2packetSectionOffset
103	0	layer2packetSectionSize
104	0	layer2packetSectionData
128	0	bgpNextAdjacentAsNumber
129	0	bgpPrevAdjacentAsNumber
130	0	exporterIPv4Address
131	0	exporterIPv6Address
132	0	droppedOctetDeltaCount
133	0	droppedPacketDeltaCount
134	0	droppedOctetTotalCount
135	0	droppedPacketTotalCount
136	0	flowEndReason
137	0	commonPropertiesId
138	0	observationPointId
139	0	icmpTypeCodeIPv6

ElementID	PEN	Name
140	0	mplsTopLabelIPv6Address
141	0	lineCardId
142	0	portId
143	0	meteringProcessId
144	0	exportingProcessId
145	0	templateId
146	0	wlanChannelId
147	0	wlanSSID
148	0	flowId
149	0	observationDomainId
150	0	flowStartSeconds
151	0	flowEndSeconds
152	0	flowStartMilliseconds
153	0	flowEndMilliseconds
154	0	flowStartMicroseconds
155	0	flowEndMicroseconds
156	0	flowStartNanoseconds
157	0	flowEndNanoseconds
158	0	flowStartDeltaMicroseconds
159	0	flowEndDeltaMicroseconds

ElementID	PEN	Name
160	0	systemInitTimeMilliseconds
161	0	flowDurationMilliseconds
162	0	flowDurationMicroseconds
163	0	observedFlowTotalCount
164	0	ignoredPacketTotalCount
165	0	ignoredOctetTotalCount
166	0	notSentFlowTotalCount
167	0	notSentPacketTotalCount
168	0	notSentOctetTotalCount
169	0	destinationIPv6Prefix
170	0	sourceIPv6Prefix
171	0	postOctetTotalCount
172	0	postPacketTotalCount
173	0	flowKeyIndicator
174	0	postMCastPacketTotalCount
175	0	postMCastOctetTotalCount
176	0	icmpTypeIPv4
177	0	icmpCodeIPv4
178	0	icmpTypeIPv6
179	0	icmpCodeIPv6

ElementID	PEN	Name
180	0	udpSourcePort
181	0	udpDestinationPort
182	0	tcpSourcePort
183	0	tcpDestinationPort
184	0	tcpSequenceNumber
185	0	tcpAcknowledgementNumber
186	0	tcpWindowSize
187	0	tcpUrgentPointer
188	0	tcpHeaderLength
189	0	ipHeaderLength
190	0	totalLengthIPv4
191	0	payloadLengthIPv6
192	0	ipTTL
193	0	nextHeaderIPv6
194	0	mplsPayloadLength
195	0	ipDiffServCodePoint
196	0	ipPrecedence
197	0	fragmentFlags
198	0	octetDeltaSumOfSquares
199	0	octetTotalSumOfSquares

ElementID	PEN	Name
200	0	mplsTopLabelTTL
201	0	mplsLabelStackLength
202	0	mplsLabelStackDepth
203	0	mplsTopLabelExp
204	0	ipPayloadLength
205	0	udpMessageLength
206	0	isMulticast
207	0	ipv4IHL
208	0	ipv4Options
209	0	tcpOptions
210	0	paddingOctets
211	0	collectorIPv4Address
212	0	collectorIPv6Address
213	0	exportInterface
214	0	exportProtocolVersion
215	0	exportTransportProtocol
216	0	collectorTransportPort
217	0	exporterTransportPort
218	0	tcpSynTotalCount
219	0	tcpFinTotalCount

ElementID	PEN	Name
220	0	tcpRstTotalCount
221	0	tcpPshTotalCount
222	0	tcpAckTotalCount
223	0	tcpUrgTotalCount
224	0	ipTotalLength
225	0	postNATSourceIPv4Address
226	0	postNATDestinationIPv4Address
227	0	postNAPTSourceTransportPort
228	0	postNAPTDestinationTransportPort
229	0	natOriginatingAddressRealm
230	0	natEvent
231	0	initiatorOctets
232	0	responderOctets
233	0	firewallEvent
234	0	ingressVRFID
235	0	egressVRFID
236	0	VRFname
237	0	postMplsTopLabelExp
238	0	tcpWindowScale
239	0	biflowDirection

ElementID	PEN	Name
240	0	ethernetHeaderLength
241	0	ethernetPayloadLength
242	0	ethernetTotalLength
243	0	dot1qVlanId
244	0	dot1qPriority
245	0	dot1qCustomerVlanId
246	0	dot1qCustomerPriority
247	0	metroEvcId
248	0	metroEvcType
249	0	pseudoWireId
250	0	pseudoWireType
251	0	pseudoWireControlWord
252	0	ingressPhysicalInterface
253	0	egressPhysicalInterface
254	0	postDot1qVlanId
255	0	postDot1qCustomerVlanId
256	0	ethernetType
257	0	postIpPrecedence
258	0	collectionTimeMilliseconds
259	0	exportSctpStreamId

ElementID	PEN	Name
260	0	maxExportSeconds
261	0	maxFlowEndSeconds
262	0	messageMD5Checksum
263	0	messageScope
264	0	minExportSeconds
265	0	minFlowStartSeconds
266	0	opaqueOctets
267	0	sessionScope
268	0	maxFlowEndMicroseconds
269	0	maxFlowEndMilliseconds
270	0	maxFlowEndNanoseconds
271	0	minFlowStartMicroseconds
272	0	minFlowStartMilliseconds
273	0	minFlowStartNanoseconds
274	0	collectorCertificate
275	0	exporterCertificate
276	0	dataRecordsReliability
277	0	observationPointType
278	0	newConnectionDeltaCount
279	0	connectionSumDurationSeconds

ElementID	PEN	Name
280	0	connectionTransactionId
281	0	postNATSourceIPv6Address
282	0	postNATDestinationIPv6Address
283	0	natPoolId
284	0	natPoolName
285	0	anonymizationFlags
286	0	anonymizationTechnique
287	0	informationElementIndex
288	0	p2pTechnology
289	0	tunnelTechnology
290	0	encryptedTechnology
291	0	basicList
292	0	subTemplateList
293	0	subTemplateMultiList
294	0	bgpValidityState
295	0	IPSecSPI
296	0	greKey
297	0	natType
298	0	initiatorPackets
299	0	responderPackets

ElementID	PEN	Name
300	0	observationDomainName
301	0	selectionSequenceId
302	0	selectorId
303	0	informationElementId
304	0	selectorAlgorithm
305	0	samplingPacketInterval
306	0	samplingPacketSpace
307	0	samplingTimeInterval
308	0	samplingTimeSpace
309	0	samplingSize
310	0	samplingPopulation
311	0	samplingProbability
312	0	dataLinkFrameSize
313	0	ipHeaderPacketSection
314	0	ipPayloadPacketSection
315	0	dataLinkFrameSection
316	0	mplsLabelStackSection
317	0	mplsPayloadPacketSection
318	0	selectorIdTotalPktsObserved
319	0	selectorIdTotalPktsSelected

ElementID	PEN	Name
320	0	absoluteError
321	0	relativeError
322	0	observationTimeSeconds
323	0	observationTimeMilliseconds
324	0	observationTimeMicroseconds
325	0	observationTimeNanoseconds
326	0	digestHashValue
327	0	hashIPPayloadOffset
328	0	hashIPPayloadSize
329	0	hashOutputRangeMin
330	0	hashOutputRangeMax
331	0	hashSelectedRangeMin
332	0	hashSelectedRangeMax
333	0	hashDigestOutput
334	0	hashInitialiserValue
335	0	selectorName
336	0	upperCILimit
337	0	lowerCILimit
338	0	confidenceLevel
339	0	informationElementDataType

ElementID	PEN	Name
340	0	informationElementDescription
341	0	informationElementName
342	0	informationElementRangeBegin
343	0	informationElementRangeEnd
344	0	informationElementSemantics
345	0	informationElementUnits
346	0	privateEnterpriseNumber
347	0	virtualStationInterfaceId
348	0	virtualStationInterfaceName
349	0	virtualStationUUID
350	0	virtualStationName
351	0	layer2SegmentId
352	0	layer2OctetDeltaCount
353	0	layer2OctetTotalCount
354	0	ingressUnicastPacketTotalCount
355	0	ingressMulticastPacketTotalCount
356	0	ingressBroadcastPacketTotalCount
357	0	egressUnicastPacketTotalCount
358	0	egressBroadcastPacketTotalCount
359	0	monitoringIntervalStartMilliSeconds

ElementID	PEN	Name
360	0	monitoringIntervalEndMilliSeconds
361	0	portRangeStart
362	0	portRangeEnd
363	0	portRangeStepSize
364	0	portRangeNumPorts
365	0	staMacAddress
366	0	staIPv4Address
367	0	wtpMacAddress
368	0	ingressInterfaceType
369	0	egressInterfaceType
370	0	rtpSequenceNumber
371	0	userName
372	0	applicationCategoryName
373	0	applicationSubCategoryName
374	0	applicationGroupName
375	0	originalFlowsPresent
376	0	originalFlowsInitiated
377	0	originalFlowsCompleted
378	0	distinctCountOfSourceIPAddress
379	0	distinctCountOfDestinationIPAddress

ElementID	PEN	Name
380	0	distinctCountOfSourceIPv4Address
381	0	distinctCountOfDestinationIPv4Address
382	0	distinctCountOfSourceIPv6Address
383	0	distinctCountOfDestinationIPv6Address
384	0	valueDistributionMethod
385	0	rfc3550JitterMilliseconds
386	0	rfc3550JitterMicroseconds
387	0	rfc3550JitterNanoseconds
388	0	dot1qDEI
389	0	dot1qCustomerDEI
390	0	flowSelectorAlgorithm
391	0	flowSelectedOctetDeltaCount
392	0	flowSelectedPacketDeltaCount
393	0	flowSelectedFlowDeltaCount
394	0	selectorIDTotalFlowsObserved
395	0	selectorIDTotalFlowsSelected
396	0	samplingFlowInterval
397	0	samplingFlowSpacing
398	0	flowSamplingTimeInterval
399	0	flowSamplingTimeSpacing

ElementID	PEN	Name
400	0	hashFlowDomain
401	0	transportOctetDeltaCount
402	0	transportPacketDeltaCount
403	0	originalExporterIPv4Address
404	0	originalExporterIPv6Address
405	0	originalObservationDomainId
406	0	intermediateProcessId
407	0	ignoredDataRecordTotalCount
408	0	dataLinkFrameType
409	0	sectionOffset
410	0	sectionExportedOctets
411	0	dot1qServiceInstanceTag
412	0	dot1qServiceInstanceId
413	0	dot1qServiceInstancePriority
414	0	dot1qCustomerSourceMacAddress
415	0	dot1qCustomerDestinationMacAddress
417	0	postLayer2OctetDeltaCount
418	0	postMCastLayer2OctetDeltaCount
420	0	postLayer2OctetTotalCount
421	0	postMCastLayer2OctetTotalCount

ElementID	PEN	Name
422	0	minimumLayer2TotalLength
423	0	maximumLayer2TotalLength
424	0	droppedLayer2OctetDeltaCount
425	0	droppedLayer2OctetTotalCount
426	0	ignoredLayer2OctetTotalCount
427	0	notSentLayer2OctetTotalCount
428	0	layer2OctetDeltaSumOfSquares
429	0	layer2OctetTotalSumOfSquares
430	0	layer2FrameDeltaCount
431	0	layer2FrameTotalCount
432	0	pseudoWireDestinationIPv4Address
433	0	ignoredLayer2FrameTotalCount
434	0	mibObjectValueInteger
435	0	mibObjectValueOctetString
436	0	mibObjectValueOID
437	0	mibObjectValueBits
438	0	mibObjectValueIPAddress
439	0	mibObjectValueCounter
440	0	mibObjectValueGauge
441	0	mibObjectValueTimeTicks

ElementID	PEN	Name
442	0	mibObjectValueUnsigned
443	0	mibObjectValueTable
444	0	mibObjectValueRow
445	0	mibObjectIdentifier
446	0	mibSubIdentifier
447	0	mibIndexIndicator
448	0	mibCaptureTimeSemantics
449	0	mibContextEngineID
450	0	mibContextName
451	0	mibObjectName
452	0	mibObjectDescription
453	0	mibObjectSyntax
454	0	mibModuleName
455	0	mobileIMSI
456	0	mobileMSISDN
457	0	httpStatusCode
458	0	sourceTransportPortsLimit
459	0	httpRequestMethod
460	0	httpRequestHost
461	0	httpRequestTarget

ElementID	PEN	Name
462	0	httpMessageVersion
463	0	natInstanceID
464	0	internalAddressRealm
465	0	externalAddressRealm
466	0	natQuotaExceededEvent
467	0	natThresholdEvent
468	0	httpUserAgent
469	0	httpContentType
470	0	httpReasonPhrase
471	0	maxSessionEntries
472	0	maxBIBEntries
473	0	maxEntriesPerUser
474	0	maxSubscribers
475	0	maxFragmentsPendingReassembly
476	0	addressPoolHighThreshold
477	0	addressPoolLowThreshold
478	0	addressPortMappingHighThreshold
479	0	addressPortMappingLowThreshold
480	0	addressPortMappingPerUserHighThreshold
481	0	globalAddressMappingHighThreshold

ElementID	PEN	Name
482	0	vpnIdentifier
483	0	bgpCommunity
484	0	bgpSourceCommunityList
485	0	bgpDestinationCommunityList
486	0	bgpExtendedCommunity
487	0	bgpSourceExtendedCommunityList
488	0	bgpDestinationExtendedCommunityList
489	0	bgpLargeCommunity
490	0	bgpSourceLargeCommunityList
491	0	bgpDestinationLargeCommunityList
33002	0	ASAFirewallExtendedEvent
34000	0	TrustSecSourceIdentifier
34001	0	TrustSecDestinationIdentifier
34002	0	TrustSecSourceName
34003	0	TrustSecDestinationName
1232	9	SGTSourceId_9
1233	9	SGTDestinationId_9
9292	9	AVCRespsCountDelta_9
9303	9	AVCSumRespTime_9
9306	9	AVCSumServerRespTime_9

ElementID	PEN	Name
12172	9	ETAInitialDataPacket_9
12173	9	ETASequenceOfPacketLengthsAndTimes_9
12184	9	ETASequenceOfPacketLengths_9
12185	9	ETASequenceOfPacketTimes_9
12235	9	AVCSubApplicationValueIPFIX_9
12332	9	NVMUdid_9
12333	9	NVMLoggedInUser_9
12334	9	NVMOsName_9
12335	9	NVMOsVersion_9
12336	9	NVMSystemManufacturer_9
12337	9	NVMSystemType_9
12338	9	NVMProcessAccount_9
12339	9	NVMParentProcessAccount_9
12340	9	NVMProcessName_9
12341	9	NVMProcessHash_9
12342	9	NVMParentProcessName_9
12343	9	NVMParentProcessHash_9
12344	9	NVMDnsSuffix_9
12345	9	NVMDestinationHostname_9
12346	9	NVML4ByteCountIn_9

ElementID	PEN	Name
12347	9	NVML4ByteCountOut_9
12351	9	NVMOsEdition_9
12352	9	NVMModuleNameList_9
12353	9	NVMModuleHashList_9
12355	9	NVMInterfaceInfoUid_9
12356	9	NVMInterfaceIndex_9
12357	9	NVMInterfaceType_9
12358	9	NVMInterfaceName_9
12359	9	NVMInterfaceDetailsList_9
12360	9	NVMInterfaceMacAddress_9
12361	9	NVMUserAccountType_9
12362	9	NVMProcessAccountType_9
12363	9	NVMParentProcessAccountType_9
12364	9	NVMAgentVersion_9
12365	9	NVMProcessId_9
12366	9	NVMParentProcessId_9
12367	9	NVMProcessPath_9
12368	9	NVMParentProcessPath_9
12369	9	NVMProcessArgs_9
12370	9	NVMParentProcessArgs_9

ElementID	PEN	Name
12371	9	NVMFlowStartMsec_9
12372	9	NVMFlowEndMsec_9
12172	8712	FlowSensorEtaInitialDataPacket_8712
12173	8712	FlowSensorEtaSequenceOfPacketLengthsAndTimes_8712
29794	8712	FlowSensorInitiator_8712
29795	8712	FlowSensorTcpSynAckTotalCount_8712
29796	8712	FlowSensorTcpSrsTotalCount_8712
29797	8712	FlowSensorRoundTripTime_8712
29798	8712	FlowSensorServerResponseTime_8712
29799	8712	FlowSensorRetransmits_8712
29800	8712	FlowSensorTcpBadTotalCount_8712
29801	8712	FlowSensorTcpFragTotalCount_8712
29802	8712	FlowSensorSourceEmailIn_8712
29803	8712	FlowSensorSourceEmailOut_8712
29804	8712	FlowSensorSourceEmailInMess_8712
29805	8712	FlowSensorSourceEmailOutMess_8712
29806	8712	FlowSensorSourceEmailInTrys_8712
29807	8712	FlowSensorSourceEmailOutTrys_8712
29808	8712	FlowSensorDestinationEmailIn_8712

ElementID	PEN	Name
29809	8712	FlowSensorDestinationEmailOut_8712
29810	8712	FlowSensorDestinationEmailInMess_8712
29811	8712	FlowSensorDestinationEmailOutMess_8712
29812	8712	FlowSensorDestinationEmailInTrys_8712
29813	8712	FlowSensorDestinationEmailOutTrys_8712
29814	8712	FlowSensorTraces_8712
29817	8712	FlowSensorEmbIcmpProtocol_8712
29818	8712	FlowSensorEmbIcmpType_8712
29819	8712	FlowSensorEmbIcmpCode_8712
29820	8712	FlowSensorApplicationIdentifier_8712
29821	8712	FlowSensorBadFlagXmas_8712
29822	8712	FlowSensorBadFlagSynFin_8712
29823	8712	FlowSensorBadFlagBadRst_8712
29824	8712	FlowSensorBadFlagNoAck_8712
29825	8712	FlowSensorBadFlagUrg_8712
29826	8712	FlowSensorBadFlagNoflag_8712
29828	8712	FlowSensorShortFragAttack_8712
29829	8712	FlowSensorFragPktTooShort_8712
29830	8712	FlowSensorFragPktTooLong_8712
29831	8712	FlowSensorFragDifferentSizes_8712

ElementID	PEN	Name
29832	8712	FlowSensorApplicationDetails_8712
29833	8712	FlowSensorSrcSgt_8712
56701	25461	PaloAltoApplicationIdentifier_25461
56702	25461	PaloAltoUserIdentifier_25461

Appendix B: Supported Alerts

The following table contains the list of Cisco Telemetry Broker alerts.

Alert	Description
Appliance Disk Space Critically Low	The appliance's disk has less than 1G of free space. System operation is degraded.
Appliance Low Disk Space	This appliance's disk usage has reached 80% of its capacity.
Broker Node Dropping Packets	This node is dropping packets. Please make sure the broker node is not overloaded or misconfigured.
Broker Node Not Seen	This node has not communicated with the Manager for [x] minutes.
Destination Unreachable	This destination has sent a "destination unreachable" ICMP message.
Insufficient CPU Allocated	The recommended number of CPUs has not been allocated for this appliance.
Insufficient Memory Allocated	The recommended amount of memory has not been allocated for this appliance.
TLS Certificate Close to Expiration	The Manager's TLS certificate is about to expire. Please install a new certificate.
TLS Certificate Expired	The Manager's TLS certificate has expired. Please install a new certificate.

Contact Support

If you need technical support, please do one of the following:

- Contact your local Cisco Telemetry Broker Partner
- Contact Cisco Telemetry Broker Support
- To open a case by web: http://www.cisco.com/c/en/us/support/index.html
- To open a case by email: tac@cisco.com
- For phone support: 1-800-553-2447 (U.S.)
- For worldwide support numbers: https://www.cisco.com/c/en/us/support/web/tsd-cisco-worldwide-contacts.html

Change History

Document Version	Published Date	Description
1_0	April 2023	Initial Version.
1_1	June 2023	Made some edits in "Azure Configuration" section.
1_2	September 2023	Added the "Import UDP Director Configuration" section.

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