



Managing Devices

A *device* is a Cisco IOS device that supports Cisco IOx. You can install Cisco IOx apps on these devices only.

The Cisco Fog Director Device pages provide information about devices, and provide access to features for monitoring and troubleshooting devices, and for administering apps on devices.

To access the Devices pages, log in to Cisco Fog Director as described in the “[Accessing Cisco Fog Director](#)” section on page 3-1, and then click the **DEVICES** tab. The Devices View page displays.

This chapter includes these sections:

- [Viewing General Information about Devices, page 5-1](#)
- [Viewing Detailed Information about a Device, page 5-5](#)
- [Adding Devices, page 5-10](#)
- [Importing Devices, page 5-11](#)
- [Editing Attributes for a Device, page 5-13](#)
- [Rediscovering Devices, page 5-14](#)
- [Deleting Devices, page 5-15](#)
- [Managing Tags for Devices, page 5-16](#)
- [Starting or Stopping an App on a Device, page 5-17](#)
- [Removing an App from a Device, page 5-19](#)
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- [Obtaining Device Logs, page 5-20](#)
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Viewing General Information about Devices

The Devices View page, which displays when you choose the **DEVICES** tab in Cisco Fog Manager, provides general information about devices that have been added or uploaded to Cisco Fog Manager.

This page includes the items that [Table 5-1](#) describes.

Table 5-1 *Devices View Page Items*


Item	Description
Last Heard chart	Number of devices with which Cisco Fog Director successfully interacted over the past month. The chart can include sections for day, week, month, and never. Hover your mouse pointer over a section of the cart to see the percentage of devices that correspond to that section.
Reachability chart	Number of devices with which Cisco Fog Director can communicate. Hover your mouse pointer over a section of the cart to see the percentage of devices that correspond to that section.
Top 5 Consumers	<p>Includes the following charts, which provide information about resources that IOx apps consumed on devices during the past 24 hours. Hover your mouse pointer over any circle in a chart to see the hostname of the device for which that circle provides information. Double-click any circle in a chart to display detailed information about the device for which that circle provides information, as described in the “Viewing Detailed Information about a Device” section on page 5-5.</p> <ul style="list-style-type: none"> • CPU—Shows the percentage of CPU resources consumed by apps for the five devices on which the apps consumed the most resources • Memory—Shows the memory, in KB, consumed by apps for the five devices on which the apps consumed the most memory • Disk—Shows the disk space, in MB, consumed by apps for the five devices on which the apps consumed the most disk space • Network—Shows the network bandwidth, in KB, consumed by the five devices that consumed the most bandwidth when running apps
ADD button	Displays the Adds New Device window, which you use to add a device to Cisco Fog Director. See the “Adding Devices” section on page 5-10.
IMPORT button	Lets you add devices to Cisco Fog Director by importing a CSV file in which information for the devices is defined. See the “Importing Devices” section on page 5-11.
Additional Actions button 	<p>Displays the following options:</p> <ul style="list-style-type: none"> • RE-DISCOVER— Choose this option to cause Cisco Fog Director discover device information, capabilities, and app states for a selected set of devices. See the “Rediscovering Devices” section on page 5-14. • TAG— Choose this options to add a tag to or remove a tag from multiple devices. See the “Managing Tags for Devices” section on page 5-16. • DELETE—Choose this option to delete multiple devices from Cisco Fog Director inventory. See the “Deleting Devices” section on page 5-15.

Table 5-1 Devices View Page Items (continued)


Item	Description
Device Filters field	<p>Click this field and then choose from the following options to display in the Device table only devices that meet designated criteria. When you choose an option, it appears in the Device Filters field and the Device table updates automatically. You can add as many device filter options as needed. To remove a device filter option from this field, click the X icon  next to the option.</p> <ul style="list-style-type: none"> • REACHABLE option: <ul style="list-style-type: none"> – Online—Choose this option to display only devices that are on line – Offline—Choose this option to display only devices that are not on line • LAST HEARD options: <ul style="list-style-type: none"> – Day—Choose this option to display only devices with which Cisco Fog Director successfully interacted over the past 24 hours – Week—Choose this option to display only devices with which Cisco Fog Director successfully interacted beginning from the current time 7 days ago – Month—Choose this option to display only devices with which Cisco Fog Director successfully interacted beginning with the current time 28 days ago – Never—Choose this option to display only devices with which Cisco Fog Director has not successfully interacted • DISCOVERY STATUS option: <ul style="list-style-type: none"> – Not Discovered—Choose this option to display only devices that Cisco Fog Director has not yet discovered – Discovering—Choose this option to display only devices that Cisco Fog Director is in the process of discovering – Discovered—Choose this option to display only devices that Cisco Fog Director has discovered – Discovery Failed—Choose this option to display only devices that Cisco Fog Director tried to discover was unable to discover (for example, because the device is unreachable)

Table 5-1 Devices View Page Items (continued)







Item	Description
Device table	<p>Provides information about each device that has been added to Cisco Fog Director. This table includes the following:</p> <ul style="list-style-type: none"> • Search Hostname, IP Address field—Type all or part of a hostname or IP address of a device to display information for devices with matching information. The table display updates as you type. • Show field—Enter the name of a tag and then press the Enter key to display information for devices with a matching tag. You can display a drop-down of tags that you can choose typing the first few letters of the tag. • Host Name—Hostname of the device. Click a hostname to display detailed information about the device. See the “Viewing Detailed Information about a Device” section on page 5-5. • IP Address—IP address of the device. Click a hostname to display device detailed information about the device. See the “Viewing Detailed Information about a Device” section on page 5-5. • Tags—Tags for the device. See the “Managing Tags for Devices” section on page 5-16. • Health—Icons that represent information about CPU use or memory use on the device. Hover your mouse pointer over an icon to see more detailed information. • Last Heard—How long ago Cisco Fog Director last communicated with the device, or a brief explanation of why the last attempt to communicate with the device was unsuccessful. • Pagination controls—Click a control to go to the first, next, last, previous, or specific page in the table. <p>To see additional information about a device or access various functions for a device, click the Expand icon  to the left of the device hostname in the Device table. The following row in this table describes the items that appear.</p>

Table 5-1 Devices View Page Items (continued)

Item	Description
Expanded device information and functions	<p>The following items appear when you click the Expand icon  to the left of the device hostname in the Device table:</p> <ul style="list-style-type: none"> • Edit Device—Click to edit various attributes for the device. See the “Editing Attributes for a Device” section on page 5-13. • Delete Device—Click to remove the device from Cisco Fog Director. See the “Deleting Devices” section on page 5-15. • Refresh button —Click to cause Cisco Fog Director to rediscover the device and update information that displays. • App information and controls—Provides the following for each app that is installed on the device <ul style="list-style-type: none"> – App—Name of the app. – Downtime - today—Amount of time during the past 24 hours that the app was in Stopped state. – CPU - mean %age today—Average (mean) percentage of CPU resources that the app used on the device during the past 24 hours. – Memory - mean Kb today—Average (mean) memory (RAM) in KB, that the app consumed on the device during the past 24 hours. – Status—State of the app. – Action—Stop App button , Start App button , Remove App button , depending on the state of the app. See the “Starting or Stopping an App on a Device” section on page 5-17 or the “Removing an App from a Device” section on page 5-19.

Viewing Detailed Information about a Device

To view detailed information about a device, take any of these actions:

- On the Devices View page, double-click a circle in a Top 5 Consumers chart. Detailed information displays for the device for which that circle provides information.
- On the Apps View page or the Devices View page, click the hostname of the IP address of a device anywhere that either of these items appears as a link.

The Device Details page displays. This page includes information and features that apply to the app, as the following sections describe:

- [Device Details Area, page 5-6](#)
- [Apps Area, page 5-8](#)

Device Details Area

The Device Details area on the Device Details page provides detailed information about a device, and includes the items that [Table 5-1](#) describes.

Table 5-2 *Host Information Area Items*

Item	Description
Up Time	Amount of time that the device has been operating since it last started.
Last Heard	How long ago Cisco Fog Director last communicated with the device, or a brief explanation of why the last attempt to communicate with the device was unsuccessful.
Version	Version of the app that is installed on the device.
Contact Person	Name of the person who is responsible for the device or the app.
Installed Cartridges	Cartridges that have been installed on the device for apps.
DEVICE DETAILS tab	<p>Displays the following information:</p> <ul style="list-style-type: none"> • Serial number—Serial number of the device. • IP Address—IP address of the device. • Port—Port on which Cisco IOx runs on the device. • Description—Description of the device that was entered when the device was added to Cisco Fog Director. • Resources charts—Shows the amount of CPU (in units), memory (in KB), and disk (in MB) resources that are in use and available for apps on the device. Hover your mouse pointer over a chart to see more detailed information.
CARTRIDGES tab	<p>Includes the following (see Chapter 7, “Managing Cartridges,” for more information about cartridges):</p> <ul style="list-style-type: none"> • Unused Cartridges—Number of cartridges that are installed on the device but that are not used by any app. • NAME—Name of each unused cartridge. Hover your mouse pointer over a cartridge name to see detailed information about the cartridge. • SIZE—Size, in MB, of each unused cartridge. • DELETE UNUSED CARTRIDGES button—Removes all unused cartridges from the device. See the “Deleting Unused Cartridges” section on page 5-19.

Table 5-2 Host Information Area Items (continued)

Item	Description
OUTSTANDING ACTIONS tab	<p>Displays the following information. For related information, see the “Managing Outstanding and Expired Actions for Apps” section on page 4-48.</p> <ul style="list-style-type: none"> • Outstanding Actions—Number of actions that are in Outstanding state on this device. • Outstanding Actions table—Includes these items: <ul style="list-style-type: none"> – Check box—Check the check box for each app for which you want to cancel additional retries of the corresponding action on the device. You can click the check box in the title row of the table to quickly check all boxes in the table. – App—Name of the app to which the outstanding action relates. – Action—Type of the outstanding action (Install, Edit, Upgrade, or Uninstall). – Next Attempt at—Date and time that Cisco Fog Director will next attempt to perform the action on the device, according to the action plan that is in effect for this action. – Pending Attempts—Maximum number of additional times that Cisco Fog Director will attempt to perform the action on the device, according to the action plan that is in effect for this action. • CANCEL OUTSTANDING button—Click to stop Cisco Fog Director from retrying the action on the devices that are listed in the Selected Devices table. Choosing this option cancels the action plan that is in effect for the action on this device and moves the action on this device to Expired state.
Launch Local Manager link	<p>Opens the Cisco IOx Local Manager application in a new browser tab or window. This application is installed on a device as part of the installation of the Cisco IOx framework on that device. It provides a web-based user interface that you can use to manage, administer, monitor, and troubleshoot apps on the host system, and to perform a variety of related activities. For detailed information about this application, see <i>Cisco IOx Local Manager Reference Guide</i>.</p>
Collect Debug Logs	<p>Turns Cisco IOx debug log collection on or off for the device. See the “Obtaining Device Logs” section on page 5-20.</p>
VIEW DEVICE LOGS button	<p>Click to display log information that is generated by the device. If the Collect Debug Logs option is set to Yes on this Device Details page, the device log also includes debug information. See the “Obtaining Device Logs” section on page 5-20.</p>
DOWNLOAD TECH SUPPORT LOGS button	<p>Click to obtain a log file that contains log information that was generated by the device. If the Collect Debug Logs option is set to Yes on this Device Details page, the log file also includes debug information. See the “Obtaining Device Logs” section on page 5-20.</p>

Apps Area

The Apps area on the Device Details page includes the items that [Table 5-3](#) describes for each Cisco IOx app that is installed on the device. Some items might not appear depending on your deployment.

Table 5-3 *Apps Area Items*




Item	Description
App Info	<p>Includes the following information:</p> <ul style="list-style-type: none"> • App Status—Status of the app (for example, RUNNING). • App Type—Type of the app. • Installed on—Date and time that the app was installed on the device. • Last Upgrade—Date and time that the app was upgraded on the device. • Version—Version number of the app. • App Links—Available if you configured links for an app. Click a link to go to the configured resource. See the “Configuring App Links” section on page 4-39. • Start App button —Start the app, which initiates its operation on the device and puts the app in Running state. • Stop App button —Stops the app, which shuts down its operation on the device and puts the app in Stopped state. • Remove App button —Removes the app from the device. See the “Removing an App from a Device” section on page 5-19.

Table 5-3 Apps Area Items (continued)


Item	Description
App Details	<p>Includes the following information:</p> <ul style="list-style-type: none"> • Refresh button —Click to cause Cisco Fog Director to rediscover the device and update information that displays in the Apps area. • Resource Profile—Resource profile that is configured for the app. Hover your mouse pointer over the resource profile name to see system CPU and memory (RAM) resources that the app requires on the device. • App IP—IP address that is assigned to the app on the device. • Ports—Hover your mouse pointer over Ports to see port asked and port mapping information for TCP ports and UDP ports. Port Asked is the port that the app requests in its package_config.ini file. Mapped Port is the port that is used for external communication with the app. Port mapping is handled by Cisco IOx. • App mac—MAC address that is assigned to the app on the device • Network Mode—Network mode in that is assigned to the app • Serial Port—Serial port that is assigned to the app • Cartridges Used—Cisco cartridges that the app requires to run, if any
App Downtime	<p>Shows the states that the app was in on the device over the past month. Hover your mouse pointer over any section of a chart to see the name of the state, the date and time that the app entered the state, and the amount of time the app was in the state.</p>
App Consumption	<p>Displays the following charts, which provide information about device resources that the app consumes:</p> <ul style="list-style-type: none"> • CPU Consumption—Percentage of CPU resources that the app used on the device during the designated time period. • Memory Consumption—RAM resources, in KB, that the app used on the device during the designated time period. • Disk Consumption—Hard disk space, in MB, that the app used on the device during the designated time period. • Network Consumption—Network bandwidth, in bytes, that the device used for the app during the designated time period. <p>You can click Day, Week, or Month above these charts to designate the time period for the information that the charts display.</p> <p>Hover your mouse pointer over any part of a chart to see detailed information about a data point.</p>
App Log tab	<p>Displays log information that was generated by the app on the device. Click Refresh to update the display with current information.</p>

Table 5-3 Apps Area Items (continued)

Item	Description
Edit Configuration tab	Lets you update configuration for the app. The items that display are defined in the package_config.ini file for the app.
Edit App Settings tab	<p>Lets you change the following settings for an app:</p> <ul style="list-style-type: none"> • Resource Profiles—Resource profile for the app • Network Configuration—Network information that relates to how the app obtains its IP address or addresses on each device • Serial Configuration—Device serial port that the app uses • VNC Password—VNC password that is required to access an app on the device via a VNC session • VCPU Configuration—Number of virtual CPUs that the app requires on a device <p>If you make changes in this tab, click the RECONFIGURE SETTINGS button to send the updated information to the device.</p> <p>For detailed information about these settings, see the “Install App Procedure” section on page 4-15.</p>
View all App Logs	Displays all logs that the app generates on the device. Click Refresh to update the display with current information.
App Console Support area	Displays the command that you can use to access the app via a console. See the “Accessing an App via a Console” section on page 5-20.

Adding Devices

Adding a device makes it manageable by Cisco Fog Director and available for the installation and running of IOx apps.

All devices that you add to Cisco Fog Director should be configured to synchronize their time from same NTP server. In this way, Cisco Fog Director can accurately aggregate data from the servers.

To add a device, follow these steps:

Procedure

-
- Step 1** In Cisco Fog Director, click the **DEVICES** tab.
- Step 2** On the Devices View page, click the **ADD** button.
- The Add New Device window displays.

Step 3 In the Add New Device window, enter information for the device to add, as described in the following table:

Field	Description
IP Address	Required. IP address of the device to be added.
Port	Required. HPPTS port on which Cisco IOx runs on the device. Valid values are 0 through 65535. The default port is 844.
Username	Required. Cisco IOS user name that is configured on the device.
Password	Required. Cisco IOS password that is configured on the device.
Tags	Optional. One or more tags for the device. (See the “Managing Tags for Devices” section on page 5-16 for an explanation of tags.) To enter more than one tag, separate each tag by pressing the Tab key.
Contact Details	Optional. Contact information of the person who is responsible for the device.
Network Element ID	Identifier of the network element for the device. This ID typically uses a hierarchical naming convention, for example, us-west.cal.ne1. Space, hyphen (-), and underscore (_) characters are not allowed.
Description	Optional. Brief description of the device.

Step 4 In the Add New Device window, take one of these actions:

- To save the information you entered, add the device, and exit the window, click the **SAVE & CLOSE** button.
- To save the information you entered, add the device, and clear the fields in the window, click the **SAVE & AND ADD MORE** button. Now you can enter information for another device to add.
- To clear the fields in the window and exit the window without adding the device, click the **CANCEL** button.

Importing Devices

Importing devices provides you with a convenient way to add several devices to Cisco Fog Director at once. The import process involves creating a comma-separated value (CSV) file that includes information about each device to be added, and then importing that file to Cisco Fog Director.

The following sections provide detailed information:

- [Creating an Import File, page 5-12](#)
- [Importing an Import File, page 5-13](#)

Creating an Import File

To import devices to Cisco Fog Director, you begin by creating a CSV import file. This file includes one record for each device that is to be added Cisco Fog Director.

Cisco Fog Director provides a sample CSV file that you can use to create your own file.

Cisco recommends that you use Microsoft Excel to edit the sample CSV file, then use the Save As command in Excel to save the file as a **CSV (Comma delimited)** type.

An import file must adhere to these guidelines:

- The file must be comma delimited.
- Lines preceded with a pound sign (#) are comment lines and are ignored by the import process.
- Each record must include each field that the following procedure describes. The fields must be in the order shown. A field that is indicated as “Optional” can be blank.

To use the sample CSV file to create an import file, follow these steps:

Procedure

-
- Step 1** In Cisco Fog Director, click the **DEVICES** tab.
- Step 2** On the Devices View page, click the **IMPORT** button.
The Import window displays.
- Step 3** Click **Download Sample CSV** and follow the on-screen prompts to open a sample CSV file or save it in to the location of your choice.
- Step 4** If you saved the sample CSV file, open it with Microsoft Excel or another editor that can open a CSV file.
- Step 5** For each device to be added, create a record for it that includes the following information:

Field	Description
ipv4_address	Required. IP address of the device.
https_port	Required. HTTPS port on which Cisco IOx runs on the device. Valid values are 0 through 65535. The default port is 844.
https_username	Required. Cisco IOS user name that is configured on the device.
https_password	Required. Cisco IOS password that is configured on the device.
tags	Optional. One or more tags for the device. (See the “Managing Tags for Devices” section on page 5-16 for an explanation of tags.) If you include more than one tag, separate each tag with a comma. Enclose the tag or tag string of tags with double quotation marks (“”).
contact_details	Optional. Contact information of the person who is responsible for the device.
description	Optional. Brief description of the device.

- Step 6** Save the import file as a **CSV (Comma delimited)** type in the location of your choice. You can give this file any valid Windows file name.
-

Importing an Import File

After you create an import file as described in the [“Creating an Import File” section on page 5-12](#), you can import the file to Cisco Fog Director. Doing so adds the devices that the file defines to Cisco Fog Director.

If the import file includes a record for a device that already exists in Cisco Fog Director, the information for that device is updated with the information in the record.

To use the sample CSV file to create an import file, follow these steps:

Procedure


- Step 1** In Cisco Fog Director, click the **DEVICES** tab.
- Step 2** On the Devices View page, click the **IMPORT** button.
The Import window displays.
- Step 3** Click the **Select devices csv** button and follow the on-screen prompts to locate and select the CSV file that you want to import.
Cisco Fog Director discovers the devices that the import file includes and the devices appear in the Devices table.
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Editing Attributes for a Device

Editing attributes for a device lets you update various information for the device.

To edit device information, follow these steps:

Procedure

- Step 1** In Cisco Fog Director, click the **DEVICES** tab.
- Step 2** In the Device table, click the **Expand** icon  to the left of the device hostname of the device for which you want to edit attributes.
- Step 3** Click **Edit Device**.
The Edit Device dialog box displays. This dialog box shows the IP address of the device and provides fields in which you can enter or update information.
- Step 4** In the Edit Device dialog box, enter information in the following fields as needed:
- **Port**—HTTPS port on which Cisco IOx runs on the device.
Valid values are 0 through 65535. The default port is 844.
 - **Username**—Cisco IOS user name that is configured on the device.

- **Password**—Cisco IOS password that is configured on the device.
- **Contact Details**—Contact information of the person who is responsible for the device.
- **Description**—Brief description of the device.

Step 5 In the Edit Device dialog box, take either of these actions:

- Click the **SAVE & CLOSE** button to save your changes and exit the dialog box
- Click the **CLOSE** button to exit the dialog box without saving your changes

Rediscovering Devices

Rediscovering devices causes Cisco Fog Director to discover device information (including host name and serial ID), capabilities (including CPU, memory, disk and network resources), and states of apps for the devices that you select.

To rediscover devices, follow these steps:


Procedure

Step 1 In Cisco Fog Director, click the **DEVICES** tab.

Step 2 On the Devices View page, click the **Additional Actions** button  and then click **RE-DISCOVER**.

The Re-Discover Devices page appears. The top part of this page displays the Devices table, which lists the devices that you can be rediscovered.


Step 3 If you want to limit the devices that display in the Devices table to one or more specific devices, take the appropriate action:

- To limit the device display to a specific device based on its hostname or IP address, enter all or part of the hostname or IP address in the **Search Hostname, IP Address** field.
- To limit the device display to specific devices based on a tag, choose a tag from the **Show** drop-down list
- To limit the device display to specific devices based on reachability, last heard, or discovery status, click the Device Filters and then choose the desired filter option. When you choose an option, it appears in the Device Filters field and the Device table updates automatically. You can add as many device filter options as needed. To remove a device filter option from this field, click the X icon  next to the option. For descriptions of the device filter options, see the [Device Filters field](#) row in [Table 5-1 on page 5-2](#).

Step 4 In the Installed Devices table, check the check box for each device that you want to be rediscovered.

Step 5 Click the **ADD SELECTED DEVICES** button.

The devices with checked check boxes are added to the Selected Devices table. The devices that this table lists will be rediscovered.

To remove a device from this table, click the x icon  in the Action column that corresponds to the device to remove.

Step 6 Click the **DONE, LET'S GO** button.

Cisco Fog Director rediscovered the devices that you selected.

Deleting Devices

Deleting a device removes it from Cisco Fog Director.


You delete as described in the following sections:

- [Deleting One Device, page 5-15](#)
- [Deleting Multiple Devices, page 5-15](#)

Deleting One Device

To delete single device from Cisco Fog Director, perform the following steps:



Procedure

- Step 1** In Cisco Fog Director, click the **DEVICES** tab.
- Step 2** In the Device table, click the **Expand** icon  to the left of the device hostname of the device that you want to delete.
- Step 3** Click **Delete Device**.
The Delete dialog box displays.
- Step 4** Click **OK** in the delete dialog box.
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Deleting Multiple Devices

To delete several devices from Cisco Fog Director at the same time, follow these steps:

Procedure

- Step 1** In Cisco Fog Director, click the **DEVICES** tab.
- Step 2** On the Devices View page, click the **Additional Actions** button  and then click **DELETE**.
The Delete Devices page appears. The top part of this page displays the Devices table, which lists the devices that you can delete.
- Step 3** If you want to limit the devices that display in the Devices table to one or more specific devices, take the appropriate action:
- To limit the device display to a specific device based on its hostname or IP address, enter all or part of the hostname or IP address in the **Search Hostname, IP Address** field.
 - To limit the device display to specific devices based on a tag, choose a tag from the **Show** drop-down list
 - To limit the device display to specific devices based on reachability, last heard, or discovery status, click the Device Filters and then choose the desired filter option. When you choose an option, it appears in the Device Filters field and the Device table updates automatically. You can add as many device filter options as needed. To remove a device filter option from this field, click the X icon  next to the option. For descriptions of the device filter options, see the [Device Filters field](#) row in [Table 5-1 on page 5-2](#).

Step 4 In the Installed Devices table, check the check box for each device that you want to delete.

Step 5 Click the **ADD SELECTED DEVICES** button.

The devices with checked check boxes are added to the Selected Devices table. The devices that this table lists will be deleted.

To remove a device from this table, click the x icon **✖** in the Action column that corresponds to the device to remove.

Step 6 Click the **DONE, LET'S GO** button.

The devices that you selected are removed from Cisco Fog Director.

Managing Tags for Devices

A tag is a brief descriptive label that you assign to a device. For example, a tag could be the name of an administrator, the name of an app, or the purpose of an app. Tags are useful for categorizing devices. In some areas on the Apps pages, you can display devices with matching tags.

The following guidelines apply to tags:

- There is no limit to the number of tags that can be assigned to a device
- A tag can include alphanumeric characters, special characters, and spaces
- Tags are case sensitive

You manage tags for devices in the Device table on the Devices View page as described in the following sections:

- [Managing Tags for One Device, page 5-16](#)
- [Managing Tags for Multiple Devices, page 5-16](#)

Managing Tags for One Device

To assign a tag to a single device, click the **Enter new tag** field in the Tags column that corresponds to the device, enter the tag that you want, and then press the **Enter** key or the **Tab** key. If the tag does not already exist, the system creates a new one with the name that you enter.

To remove a tag from a device, click the **X** next to the tag.




Managing Tags for Multiple Devices

You can assign tags to or remove tags from several devices at the same time. Tags that you assign must already have been created in Cisco Fog Director as described in as described in the [“Managing Tags for One Device” section on page 5-16](#),

To assign tags to or remove tags from multiple devices, follow these steps

Procedure

Step 1 In Cisco Fog Director, click the **DEVICES** tab.

- Step 2** On the Devices View page, click the **Additional Actions** button  and then click **TAG**.
The Tag page appears. The top part of this page displays the Devices table, which lists the devices on which you can assign or remove a tag.
- Step 3** If you want to limit the devices that display in the Devices table to one or more specific devices, take the appropriate action:
- To limit the device display to a specific device based on its hostname or IP address, enter all or part of the hostname or IP address in the **Search Hostname, IP Address** field.
 - To limit the device display to specific devices based on a tag, choose a tag from the **Show** drop-down list
 - To limit the device display to specific devices based on reachability, last heard, or discovery status, click the Device Filters and then choose the desired filter option. When you choose an option, it appears in the Device Filters field and the Device table updates automatically. You can add as many device filter options as needed. To remove a device filter option from this field, click the X icon  next to the option. For descriptions of the device filter options, see the [Device Filters](#) row in [Table 5-1 on page 5-2](#).
- Step 4** In the Installed Devices table, check the check box for each device on which you want assign or remove a tag.
- Step 5** Click the **ADD SELECTED DEVICES** button.
The devices with checked check boxes are added to the Selected Devices table. Tags will be assigned to or removed from the devices that this table lists.
To remove a device from this table, click the x icon  in the Action column that corresponds to the device to remove.
- Step 6** In the Tag Configuration area, take either of these actions:
- To assign a tag to all selected devices:
 - a. Click **Tag** next to Action.
 - b. In the Tag field, enter the tag that you want to assign. The system displays a list of tags with initial characters that match the characters you type. To display a list of all tags, press the Spacebar in this field.
 - To remove a tag from all selected devices:
 - a. Click **Tag** next to Action.
 - b. In the Tag field, enter the tag that you want to remove. The system displays a list of tags with initial characters that match the characters you type. To display a list of all tags, press the Spacebar in this field.

After you choose a tag, a the system displays the number of devices on which the tag is assigned.
- Step 7** Click the **DONE, LET'S GO** button.
The designated tag is assigned to or removed from all devices that you selected.
-

Starting or Stopping an App on a Device

Starting an app initiates its operation on a host device and puts the app in Running state. CPU and memory (RAM) resources that were reserved for the app become in use.

Stopping an app shuts down its operation on a host device and puts the app in Stopped state. CPU and memory (RAM) resources that were used by the app remain reserved for it but stop being used.

The following sections describe how to start and stop an app from the DEVICES tab. (You also can start and stop an app from the App Monitoring Page by using the as described in the **START** and **STOP** buttons under the Status Charts as described in the “[Viewing General Monitoring Information](#)” section on page 4-54).

- [Starting an App, page 5-18](#)
- [Stopping an App, page 5-18](#)




You also can start or stop an app from the App Monitoring page by clicking the **START** or **STOP** button under a status chart. See the “[Viewing General Monitoring Information](#)” section on page 4-54 for more information.

Starting an App

Starting an app initiates its operation on a host device and puts the app in Running state.

To start an app on a device, follow these steps:

Procedure

-
- Step 1** In Cisco Fog Director, click the **DEVICES** tab.
- Step 2** Take either of these actions:
- In the Device table on the Devices View page, click the IP address or the hostname of the device on which you want to start the app.
 - In the Device table, click the **Expand** icon  to the left of the device hostname of the device of the device on which you want to start the app.
- Step 3** If the app is running, take either of these actions:
- If you clicked the IP address or the hostname of the device in [Step 2](#), click the **Start App** button  that appears under the icon of the app that you want to start.
 - If you clicked the **Expand** icon in [Step 2](#), click the **Start App** button  that corresponds to the app that you want to start.
-


Stopping an App

Stopping an app shuts down its operation on a host device and puts the app in Stopped state.



To stop an app on a device, follow these steps:

Procedure

-
- Step 1** In Cisco Fog Director, click the **DEVICES** tab.
- Step 2** Take either of these actions:
- In the Device table on the Devices View page, click the IP address or the hostname of the device on which you want to stop the app.

- In the Device table, click the **Expand** icon  to the left of the device hostname of the device of the device on which you want to stop the app.

Step 3 If the app is running, take either of these actions:

- If you clicked the IP address or the hostname of the device in [Step 2](#), click the **Stop App** button  that appears under the icon of the app that you want to stop.
- If you clicked the **Expand** icon in [Step 2](#), click the **Stop App** button  that corresponds to the app that you want to stop

Removing an App from a Device


Removing an app from a device removes it from the host device and releases CPU and memory (RAM) resources that were reserved for the app.

To remove an app from a device, follow these steps:



Procedure

Step 1 In Cisco Fog Director, click the **DEVICES** tab.



Step 2 Take either of these actions:

- In the Device table on the Devices View page, click the IP address or the hostname of the device from which you want to remove the app.
- In the Device table, click the **Expand** icon  to the left of the device hostname of the device from which you want to remove the app.

Step 3 If the app is running, take either of these actions:

- If you clicked the IP address or the hostname of the device in [Step 2](#), click the **Stop App** button  that appears under the icon of the app that you want to remove from the device.
- If you clicked the **Expand** icon in [Step 2](#), click the **Stop App** button  that corresponds to the app that you want to remove from the device,

Step 4 Take either of these actions:

- If you clicked the IP address or the hostname of the device in [Step 2](#), click the **Remove App** button  that appears under the icon of the app that you want to remove from the device, then click the **YES** button in the confirmation dialog box that displays.
- If you clicked the **Expand** icon in [Step 2](#), click the **Remove App** button  that corresponds to the app that you want to remove from the device,

Deleting Unused Cartridges

For system maintenance and to free disk space on a device, you can delete cartridges that have been installed on the device but that are not used by any apps. Deleting cartridges removes them and their metadata from a device.

To delete unused cartridges from a device, follow these steps:

Procedure

-
- Step 1** In Cisco Fog Director, click the **DEVICES** tab.
 - Step 2** In the Device table on the Devices View page, click the IP address or the hostname of the device for which you want to delete unused cartridges.
 - Step 3** In the Unused Cartridges area on the page that displays, click the **DELETE UNUSED CARTRIDGES** button.
-

Obtaining Device Logs

To troubleshoot a device, you can view and download a device log file that you can review or provide to Cisco for assistance. The file contains log information that was generated by the device. If the Collect Debug Logs option on the Device Details page is set to **Yes**, the log file also includes debug information.

To create a log file for a device, follow these steps:

Procedure

-
- Step 1** In Cisco Fog Director, click the **DEVICES** tab.
 - Step 2** In the Device table on the Devices View page, click the IP address or the hostname of the device for which you want to create a log file.
 - Step 3** Click the **Yes** button next to Collect Debug Logs near the top right of the screen.
 - Step 4** Try to reproduce the issue that you are troubleshooting.
 - Step 5** Take either of these actions:
 - To review log information, click the **VIEW DEVICE LOGS** button. Then use the tabs in the window that appears to review the information that you want.
 - To save a log file, click the **DOWNLOAD TECH SUPPORT LOGS** button and then follow the on-screen prompts to save the log file in the location of your choice.
 - Step 6** (Optional) To stop collecting log information, click the **No** button next to Collect Debug Logs.
-

Accessing an App via a Console

You can access an installed on a device via a console. After you access an app, you can use Linux console commands to obtain information about it.

Cisco Fog Director provides the command and related information that you can use to access an app via a console.

To access an app via a console, perform the following steps.

Before You Begin

Use Cisco IOS configuration options to forward an SSH port on the router that you want to use for console access to port 22.

Procedure

-
- Step 1** Take any of these actions to display the Device Details page for the device on which you want to access the app via a console:
- On the Devices View page, double-click a circle in a Top 5 Consumers chart.
 - On the Apps View page or the Devices View page, click the hostname of the IP address of a device anywhere that either of these items appears as a link.
- Step 2** On the Device Details page, take these actions to obtain the private key that you need for console access:
- a. In the App Console Support area at the bottom of the page, click the ***app_id.pem*** link that appears in the sample command, where *app_id* is the identifier of the app.
 - b. In the dialog box that appears, follow the prompts to download the *app_id.pem* file.
 - c. Use a text editor to open the *app_id.pem* file, highlight and copy all text that displays.
Make sure to include the “-----BEGIN RSA PRIVATE KEY-----” and “-----END RSA PRIVATE KEY-----” text.
- Step 3** On the system from which you logged in to Cisco Fog Director, take these actions:
- a. Use a text editor to create a text file called *app_id.pem*, where *app_id* is the identifier of the app whose container or VM you want to access.
 - b. Paste the private key that you copied into this file, and save it locally.
 - c. Make sure that this file has the Linux permission 600.
- Step 4** Take these actions to connect to the host system from a console:
- a. From the console system, start an SSH client.
 - b. Enter the following command to obtain the SSH port required for console access:
prompt% **show running-config | i 22**
 - c. Enter the command that appears in the App Console Support area on the Device Details page.
When you enter the command:
 - Replace **SSH_PORT** with the port number for console access.
 - Replace ***app_id.pem*** with the path to the file that you created in [Step 3](#), if the file is not in the current directory.
 - d. Use the commands in your SSH client to complete the connection process.
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