System Administrator Guide

Cisco IoT Data Connect - Edge and Fog Fabric (EFF) 1.0.1

Revised: August 25, 2017

Conventions

This document uses the following conventions.

Convention	Indication
bold font	Menu options, menu and submenu names, window titles, tab names, button names, and icon names appear in **bold** font.
italic font	New or emphasized terms are in *italic* font.

Note: Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the manual.

User Interface Icons

This document refers to the following user interface icons.

Icon	Name
	**check mark** icon
	**delete** icon
	**quarantine** icon

Overview

The *IoT Data Connect - Edge and Fog Fabric* (EFF) product brings together diverse entities—such as devices, services, and applications—into one IoT data system. By representing these entities as one system, EFF makes possible and simplifies various tasks, such as analytics, inter-device communication, distributed computing, and application development.

The *IoT Data Connect - Edge and Fog Fabric System Administrator* (EFF System Administrator) is a graphical user interface for viewing and managing a EFF system.

Structure of the IoT Data Connect - Edge Analytics Fabric (EFF)

The EFF, and therefore the EFF System Administrator, represents each of the entities in the system as one of the following types:

- **Broker**—A broker does a wide variety of management tasks. For example, a broker manages security, links, subscriptions, and node permissions. Other entities in the system can operate only as permitted by a broker. A broker also saves configuration data to disk. A broker also routes data—that is, it moves data from a source to a destination.
- **Link**—A link connects to a broker. A link creates, publishes, and interacts with data. A link can also subscribe to data in the EFF system—that is, it can receive data whenever the data changes.
- **Node**—In this document, the word *node* refers only to brokers, links, and other organizational nodes in the Brokers pane, Links pane, or Management tree. *Node* is not used in this document to refer to metrics, actions, or attributes. The exception is a *data node*, which is a type of metric.
- **Metric**—A metric can exist on any broker, link, or other organizational node. A metric is a key/value pair, in which the value can be any of the data types listed in Supported Data Types, including an arbitrary value map. Some metrics are referred to as *data nodes*. Data nodes allow data to be stored on the broker's host server.
- **Action**—An action can exist on any broker, link, other organizational node, or metric. An action is an invocable command that can affect an entity. For example, an action might create a node or set a metric value.
- **Attribute**—An attribute can exist on any broker, link, other organizational node, or metric. An attribute is metadata for the selected entity, represented as a key/value pair.

Upstream and Downstream Connections

Upstream and *downstream* connections are important concepts for permissions configuration when you work with multiple servers or with multiple brokers on one server. A downstream entity requests permission, and an upstream entity either grants or refuses that permission. A broker is always upstream from its links. A broker can be either upstream or downstream from another broker.

In the Brokers pane, upstream and downstream connections are not differentiated. You can view a broker's upstream connections in the Management tab. Each broker appears only once in the Brokers pane.

Supported Data Types

The EFF supports these data types:

- **String**—A sequence of characters or an empty string.
- **Number**—A number or a null value.
- **Bool**—A true or false value.
- **Array**—An array object or a null value. The values in the array are of the dynamic data type. An example array of number values is `[2,3,5,7,11]`. An example array of map values is `[{"hello":"world","number":1},{"hello":"world"}]`.
- **Map**—A map object containing key/value pairs, or a null value. The key is always a string, and the value is the dynamic data type. An example value is `{"hello":"world","primes":[2,3,5,7,11]}`.
- **Binary**—A byte array expressed as a string, or a null value. The string begins with `\u001Bytes:` and ends with a byte array encoded in base 64.
- **Dynamic**—A value that can be any of the above types.

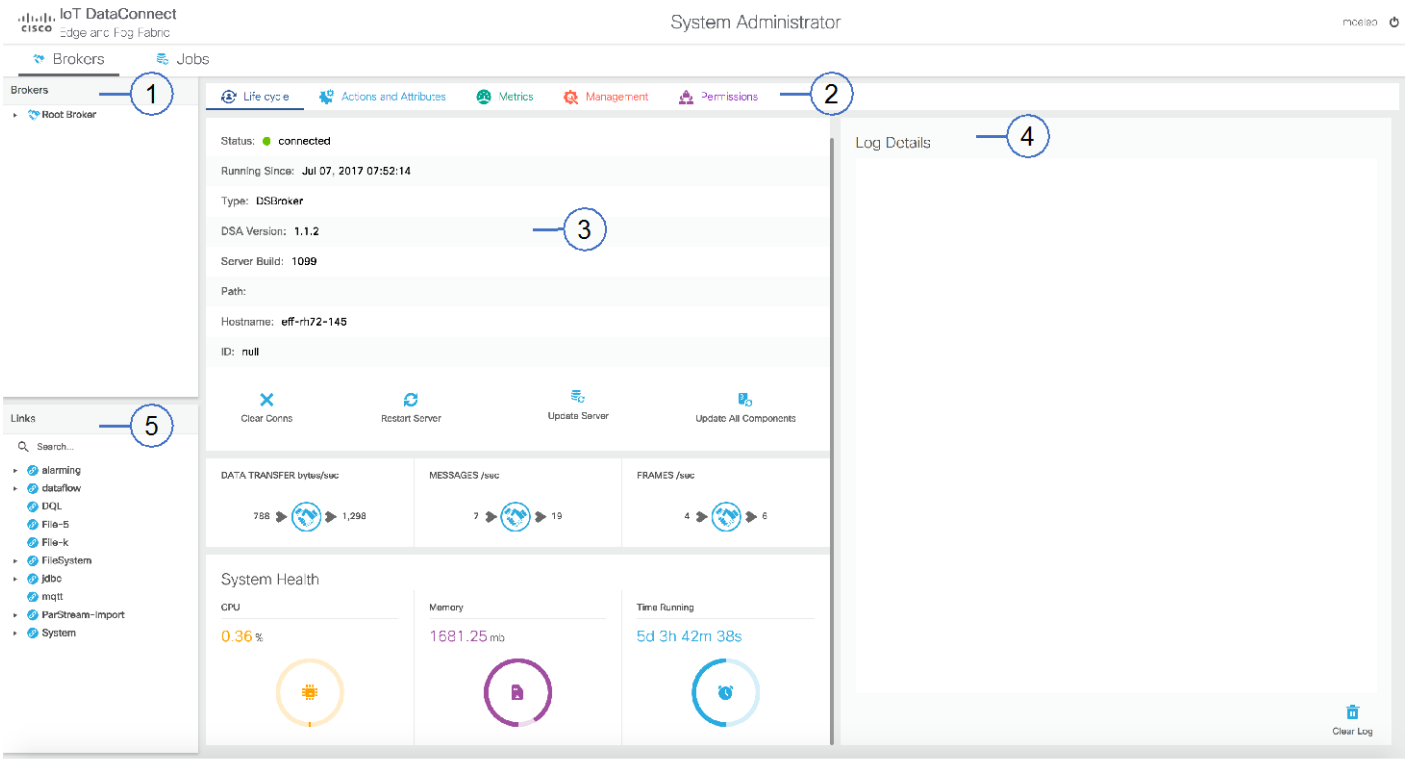
User Interface Overview

The user interface of the IoT Data Connect - EFF System Administrator contains five panes:

1. In the leftmost portion of the UI, the *Brokers pane* is used to select an individual broker.
2. The top of the page is used to select attributes.
3. In the main portion of the UI, the *main pane* allows administration of the selected node.
4. Within the main pane, the *Log pane* displays the log for the currently selected link or broker.
5. The *Links pane* allow you to select a link, or other node.

Figure 1 demonstrates the layout of the IoT Data Connect - EFF System Administrator.

Figure 1. EFF System Administrator Layout



1	Brokers pane	**2**	Main pane tabs
3	Main pane content	**4**	Log pane
5	Links pane		

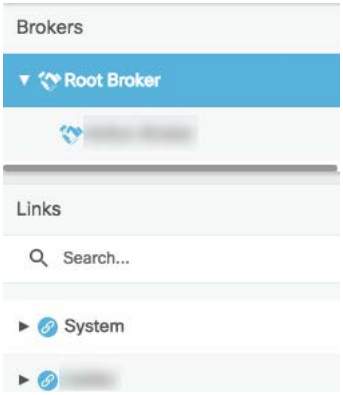
Brokers and Links Panes: Node Selection

You use the Brokers pane and Links pane to select a node.

The Brokers pane displays a tree that represents the brokers in the system. The root of this tree is the broker that was selected during login. The tree displays both upstream brokers and downstream brokers, without differentiating them. Only one instance of each broker is displayed in the tree.

You can click nodes in this tree to change which broker is selected. Figure 2 demonstrates a selected broker.

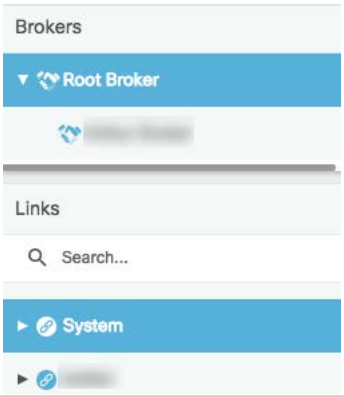
Figure 2. Broker Selection



The Links pane displays a tree that represents links connected to the selected broker. Only running links are shown. This tree also includes any descendant organizational nodes of the displayed links.

You can optionally click nodes in this tree to select a link or other node. To clear the selection in the Links pane, you can re-select the broker. Figure 3 demonstrates a selected link.

Figure 3. Link Selection



Note: You can use the Links pane's **Search** function to find links quickly.

Main Pane: Node Administration

You use the main pane for administration of the selected broker, link, or other node. The main pane can contain the following four tabs:

- **Life Cycle tab**—Displays a dashboard where you can invoke common commands on the selected broker or link. This tab also displays the system health, broker data, and broker or link log. If a non-link node is selected in the Links pane, this tab displays content for that node's ancestor link.
- **Actions and Attributes tab**—Displays actions and attributes associated with the selected node. From this tab, you can execute actions on this node and manage this node's attributes.

- **Metrics tab**—Displays metrics associated with the selected node. This tab also displays actions and attributes associated with each of these metric. From this tab, you can execute actions on these metrics and manage these metrics' attributes.
- **Management tab**—Displays a system management tree for the currently selected broker. Appears only when nothing is selected in the Links pane. From this tab, you can execute actions on management tree nodes and manage attributes of management tree nodes.

How to Manage the Broker Life Cycle and the Server

This section covers the following tasks:

How to Clear Connections

This task removes connections between the selected broker and any links that are not currently running. This removal deallocates any ports on the broker's host server that are allocated to non-running links. This removal does not uninstall links.

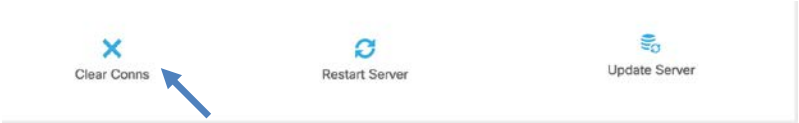
To clear connections:

1. Select the broker node in the Brokers pane.
2. Choose the Life Cycle tab in the main pane.

   Click **Clear Conns**, as shown in Figure 4.

   Connections with disabled links are removed.

Figure 4. How to Clear Connections



How to Restart the Server

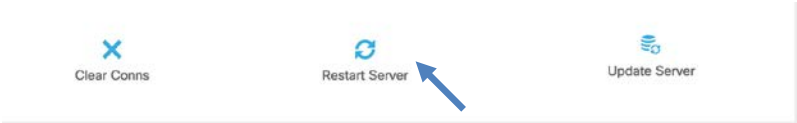
This task reboots a broker.

To restart the broker:

1. Select the broker node in the Brokers pane.
2. Choose the Life Cycle tab in the main pane.
3. Click **Restart Server**, as shown in Figure 5.

   The server is rebooted.

Figure 5. How to Restart the Server



How to Update the Server

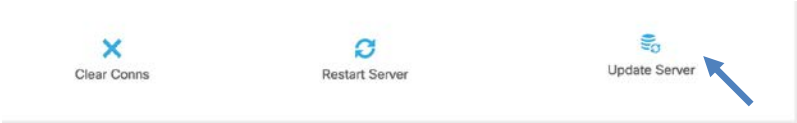
This task updates the version of the server.

To update the server:

1. Select the broker node in the Brokers pane.
2. Choose the Life Cycle tab in the main pane.
3. Click **Update Server**, as shown in Figure 6.

   The data is pushed to the server.

Figure 6. How to Update the Server



How to Add an Upstream Connection

This task adds a broker to the system, upstream of an existing broker.

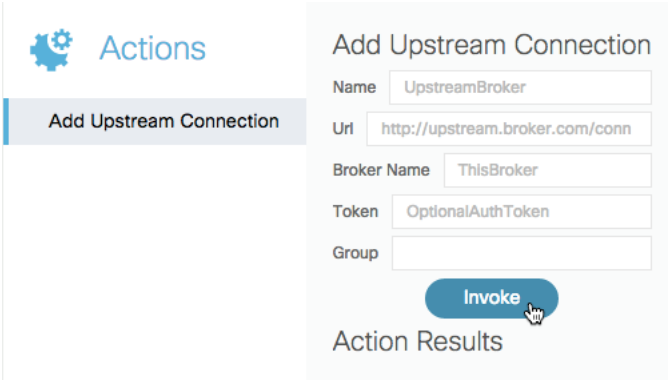
Note: To add a downstream connection, log in as the downstream broker and create the connection in the upstream direction. Then, log in again as the upstream broker.

To add an upstream broker to an existing broker:

1. Select the existing broker node in the Brokers pane.
2. Choose the Management tab in the main pane.
3. Choose the **upstream** node.
4. Select the **Add Upstream Connection** action.

5. Enter the upstream broker information.
   - For **Name**, enter what you want to appear in the currently logged in broker to refer to the new upstream broker.
   - For **Broker Name**, enter the label to appear in the upstream broker to refer to the currently logged in broker.
   - For **URL**, enter the IP address or URL of the broker that you are connecting to, followed by /conn. For example, this might be `localhost:8080/conn`, `http://< URL>/<port>/conn`, or `10.0.1.xxx/8080/conn`.
   - **Token** is optional. Entering an authorized token allows the logged in broker to connect to the upstream broker without quarantine.
   - **Group** is optional. Entering a permission group defines the permission that the upstream broker has on this downstream broker.
6. Click **Invoke**, as shown in Figure 7.

Figure 7. How to Add an Upstream Connection



How to Remove an Upstream Connection

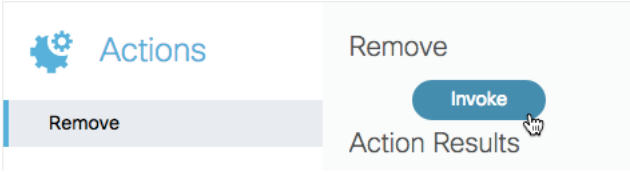
This task removes an upstream broker from the system.

To remove an upstream broker:

1. Select the downstream broker node in the Brokers pane.
2. Choose the Management tab in the main pane.
3. Choose the **upstream** node.
4. Choose the upstream broker.
5. Choose the **Remove** action.

   Click **Invoke**, as shown in Figure 8.

Figure 8. How to Remove an Upstream Connection



How to Manage the Link Life Cycle

This section covers the following tasks:

- How to Install a Link—Adds a new link to the system.
- How to Start a Link—Causes a link to run.
- How to Start all Links—Causes all installed links connected to a broker to start running.
- How to Stop a Link—Causes a link to stop running.
- How to Restart a Link—Causes a link to stop running and then start again.
- How to Uninstall a Link—Removes a link from the system.
- How to Update a Link—Updates the link to a new version.

How to Install a Link

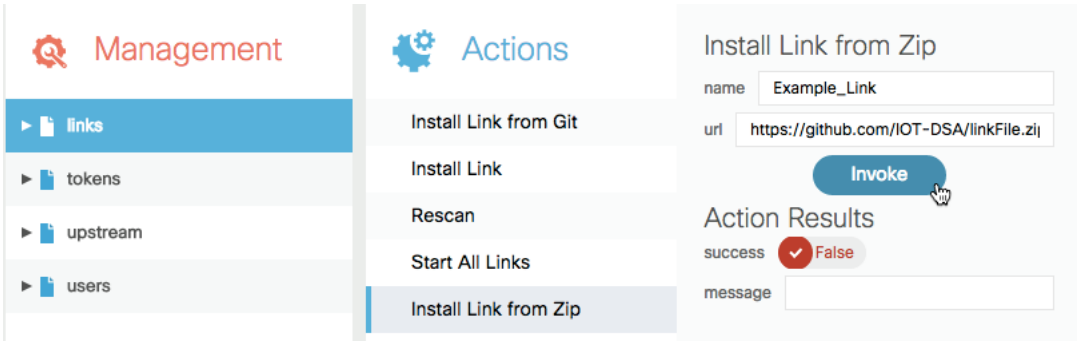
This task adds a new link to the system.

To install a link:

1. Select the broker node in the Brokers pane.
2. Choose the Management tab.
3. Select **links**.
4. Choose one of the following, and enter the required information when prompted.
5. **Install Link from Git**—enter a name and URL for the link.
6. **Install Link**—choose the link from the drop-down menu.
7. **Install Link from ZIP**—enter a name and URL for the link.
8. Click **Invoke**.

Figure 9 demonstrates how to install a link from a ZIP file.

Figure 9. How to Install a Link



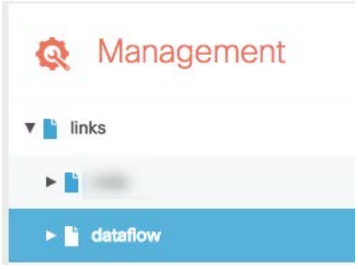
How to Start a Link

This task causes a link to start running.

To start a link:

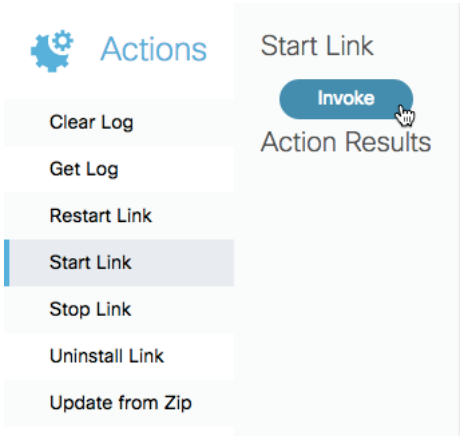
1. Select the link's broker node in the Brokers pane.
2. Choose the Management tab in the main pane.
3. Expand the **links** node in the management tree.
4. Choose the link that you want to start, as shown in Figure 10.

Figure 10. How to Manage a Link



5. Choose the **Start Link** action, and click **Invoke**, as shown in Figure 11.

Figure 11. How to Start a Link



How to Start all Links

This task cases all installed links connected to a broker to start running.

To start all links:

- Follow the steps in How to Install a Link, except select the **Start All Links** action in Step 4.

How to Stop a Link

This task causes a link to stop running.

Links can be stopped via the Life Cycle tab or via the Management tab.

How to Stop a Link via the Life Cycle Tab

The following interactions stop a link via the Life Cycle tab:

- With the link and the Life Cycle tab selected, click **Stop Link**, as shown in Figure 12.

Figure 12. How to Stop a Link via the Life Cycle Tab

- With the link and the Life Cycle tab selected, change **Enabled** to FALSE, as shown in Figure 13.

Figure 13. How to Stop a Link via the Life Cycle Tab

How to Stop a Link via the Management Tab

To stop a link via the Management tab:

- Follow the steps in How to Start a Link, except select the **Stop Link** action instead of the **Start Link** action in Step 5.

How to Restart a Link

This task causes a link to stop running and then start again.

Links can be restarted via the Life Cycle tab or via the Management tab.

How to Restart a Link via the Life Cycle Tab

To restart a link via the Life Cycle tab:

- With the link and the Life Cycle tab selected, click **Restart Link**, as shown in Figure 14.

Figure 14. How to Restart a Link via the Life Cycle Tab

How to Restart a Link via the Management Tab

To restart a link via the Management tab:

- Follow the steps in How to Start a Link, except select the **Restart Link** action instead of the **Start Link** action in Step 5.

How to Uninstall a Link

This task removes a link from the system.

Links can be uninstalled via the Life Cycle tab or via the Management tab.

How to Uninstall a Link via the Life Cycle Tab

To restart a link via the Life Cycle tab:

- With the link and the Life Cycle tab selected, click **Uninstall Link**, as shown in Figure 15.

Figure 15. How to Uninstall a Link via the Life Cycle Tab

How to Uninstall a Link via the Management Tab

To uninstall a link via the Management tab:

- Follow the steps in How to Start a Link, except select the **Uninstall Link** action instead of the **Start Link** action in Step 5.

How to Update a Link

This task updates the link to a new version.

You can update a link from a ZIP file or from the repository from which the link was first installed.

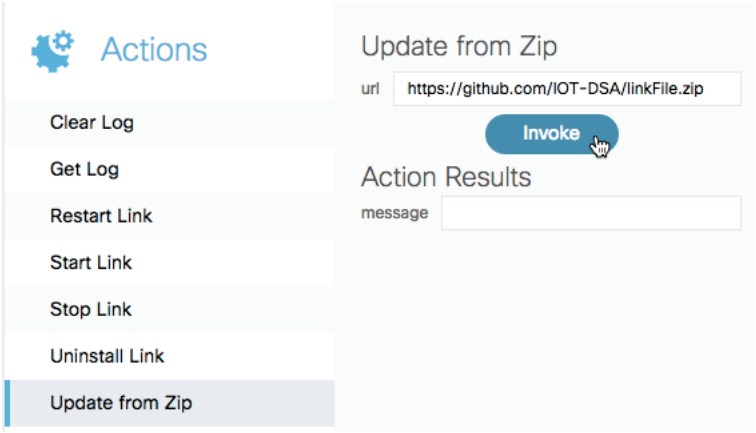
How to Update a Link from a ZIP File

To update a link from a ZIP file:

1. Select the link's broker node in the Brokers pane.
2. Choose the Management tab in the main pane.
3. Expand the **links** node in the management tree.

   Select the link that you want to update, as shown in Figure 10.
4. Select the **Update from ZIP** action, and specify the URL of the ZIP file.
5. Click **Invoke**, as shown in Figure 16.

Figure 16. How to Update a Link from a ZIP File



How to Update a Link from the Repository

If an installation points to a repository, you can update the link from the repository via the Life Cycle tab or the Management tab.

How to Update a Link from the Repository via the Life Cycle Tab

To update a link from a repository via the Life Cycle tab:

- With the link and the Life Cycle tab selected, click **Update from Repo**, as shown in Figure 17.

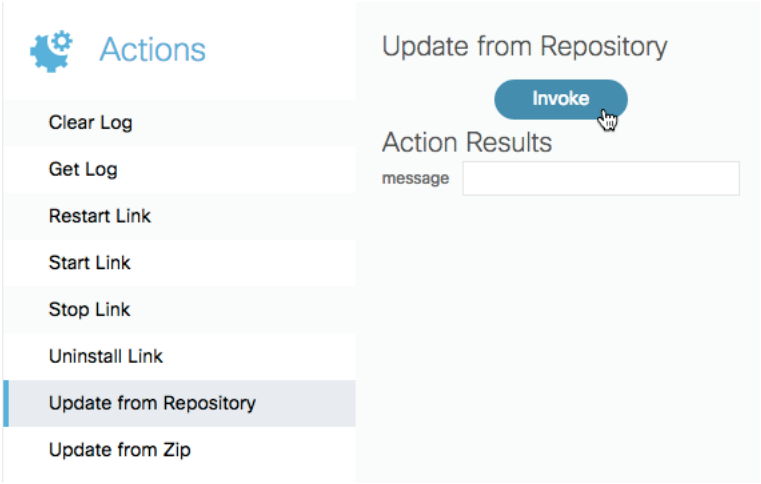
Figure 17. How to Update a Link from the Repository via the Life Cycle Tab

How to Update a Link from the Repository via the Management Tab

To update a link from the repository via the Management tab:

- Follow the steps in How to Update a Link from a ZIP File, except choose the Update from Repository action in Step 4, as shown in Figure 18.

Figure 18. How to Update a Link from the Repository via the Management Tab



How to Manage Quarantined Brokers and Links

Quarantine is enabled on all brokers by default. When quarantine is enabled on a broker, any downstream broker or link without an authorized token is held in quarantine. The system can read, subscribe to, and command nodes that are in quarantine, but a node that is in quarantine cannot access other nodes in the system.

To remove a node from quarantine, you can *authorize* or *deauthorize* the node. An authorized node is granted access as the permission group that you specify. A deauthorized node is refused access and removed from the system. You can also deauthorize any downstream broker or node that has previously been authorized.

When quarantine is disabled on a broker, any link can connect to the broker without approval.

How to Authorize or Deauthorize a Broker or Link

You can authorize or deauthorize a broker or link via the Management tab. You can also use the Quarantine popup window to authorize or deauthorize a node that is in quarantine.

How to Authorize a Broker or Link via the Management Tab

Before you can do this task, you must log in as an upstream broker.

To authorize a node:

1. Select the broker in the Brokers pane.
2. Select the Management tab.
3. In the Management tree, select the **quarantine** node.
4. Choose the **Authorize** action.
5. In the **DsId** drop-down, choose the node that you want to authorize.

   Brokers and links that are quarantined by this broker are listed.
6. For **Group**, choose the permission group to which you want to assign the node.
7. For **Name**, enter the label that you want to appear for this downstream node within this system.
8. Click **Invoke**.

How to Deauthorize a Broker or Link via the Management Tab

Before you can do this task, you must log in as an upstream broker.

To deauthorize a node:

1. Select the broker in the Brokers pane.
2. Select the Management tab.
3. In the Management tree, select the **quarantine** node.
4. Choose the **Deauthorize** action.
5. In the **Name** drop-down, select the name of the node that you want to deauthorize.

   All downstream nodes that are connected to this broker are listed, regardless of whether they are in quarantine and whether they are running.
6. Click **Invoke**.

How to Authorize or Deauthorize a Quarantined Node via the Quarantine Popup Window

Before you can do this task, you must log in as an upstream broker.

To authorize or deauthorize a quarantined node:

1. Click the Quarantine icon in the top right corner.

   A popup window appears.

2. In the popup window, choose the node that you want to authorize or deauthorize.

   The parent broker of the quarantined node is selected. The Management tab is selected.

3. Choose the **quarantine** node, and follow the steps in How to Authorize a Broker or Link via the Management Tab or How to Deauthorize a Broker or Link via the Management Tab.

How to Manage Users

This section covers how to create, edit, and remove users.

Any user with *superuser* enabled has the maximum permission level. A superuser does not need a permission group defined.

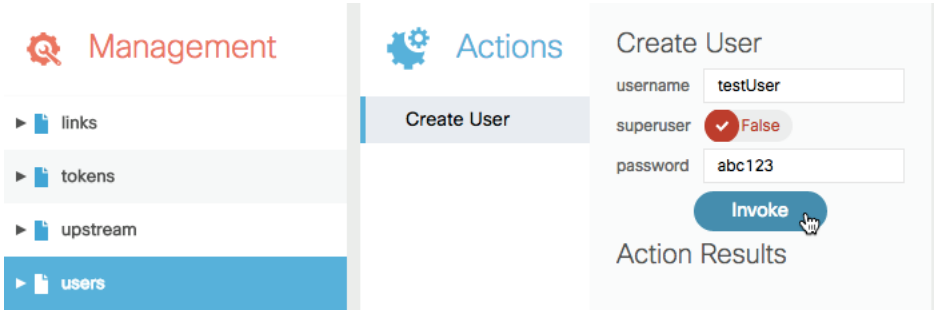
A *permission group* is a defined permission level.

How to Create a User

To create a new user:

1. Select the broker in the Brokers pane.
2. Select the Management tab.
3. Select the **users** node in the Management tree.
4. Select the **Create User** action.
5. Enter the required parameters:
   - Username
   - Password
   - Whether the user has superuser access.
6. Click **Invoke**, as shown in Figure 19.

Figure 19. How to Create a User



How to Edit a User

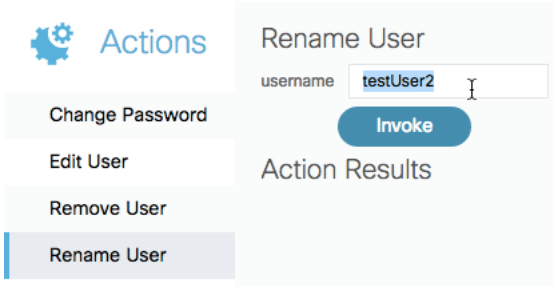
You can edit a username, password, or user permissions

How to Edit a Username

To rename a user:

1. Select the broker in the Brokers pane.
2. Select the Management tab.
3. Expand the **users** node in the Management tree.
4. Select the user.
5. Select the **Rename User** action.
6. Enter the new username.
7. Click **Invoke**, as shown in Figure 20.

Figure 20. How to Edit a Username



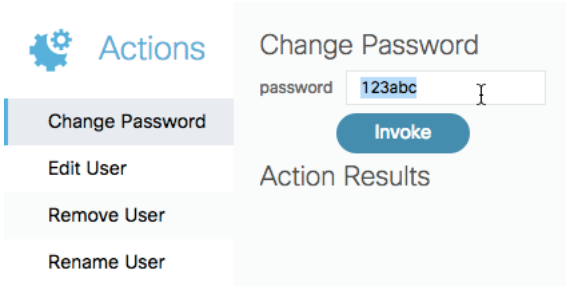
How to Edit a Password

To change a user's password:

1. Select the broker in the Brokers pane.

2. Select the Management tab.
3. Expand the **users** node in the Management tree.
4. Select the user.
5. Select the **Change Password** action.
6. Enter the new password.
7. Click **Invoke**, as shown in Figure 21.

Figure 21. How to Change a Password



How to Edit User Permissions

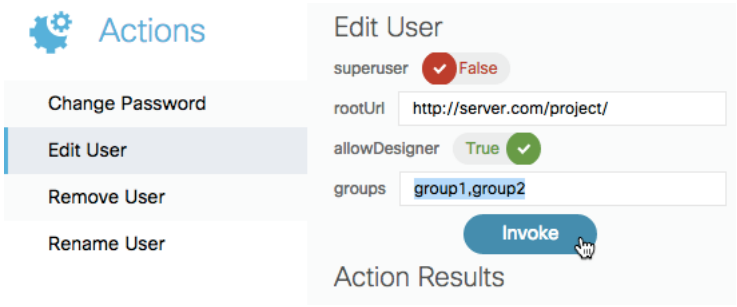
You can edit the following aspects of a user's permissions:

- Whether the user has superuser access.
- The root URL that the user sees when they log in.
- Groups that the user belongs to, as a comma-separated list.

To edit these user permissions:

1. Select the broker in the Brokers pane.
2. Select the Management tab.
3. Expand the **users** node in the Management tree.
4. Select the user.
5. Select the **Edit User** action.
6. Edit the user's parameters.
7. Click **Invoke**, as shown in Figure 22.

Figure 22. How to Edit User Permissions



How to Remove a User

This task removes a user from the system.

To remove a user:

1. Select the broker in the Brokers pane.
2. Select the Management tab.
3. Expand the **users** node in the Management tree.
4. Select the user.
5. Select the **Remove User** action.
6. Click **Invoke**, as shown in Figure 23.

Figure 23. How to Remove a User

How to View Information about the Broker or Link Life Cycle

By using the Life Cycle tab, you can view information about the life cycle of the selected broker or link.

General Information

The following general information is displayed as a table in the Life Cycle tab. If a non-link node is selected in the Links pane, this table displays information for that node's ancestor link.

Status	A colored graphic and a string. These elements indicate the current status of this broker or link, such as "connected."
Running Since (Brokers only)	The date and time when this broker was most recently started.
DSA Version (Brokers only)	The version of DSA that is used by this broker.
Server Build (Brokers only)	The build of DSA that is used by this broker.
Description (Links only)	A description of this link.
Version (Links only)	The version number of this link. See How to Update a Link.
Enabled (Links only)	Whether this link is currently running.
Type	Whether the currently displayed information is for a broker or a link.
Path	The path to this broker or link in the EFF system.
Hostname (Brokers only)	The name of the server that hosts this broker.
ID	The ID of this broker or link. Typically, this ID is automatically generated.

Broker Information

The broker data graphics that are demonstrated in Figure 24 are displayed in the Life Cycle tab. If any node is selected in the Links pane, these graphics are not displayed.

Figure 24. Broker Information Graphics

The following broker data graphics are included:

Data Transfer / sec (Brokers only)	A graphic that indicates the volume of data that is currently moving into and out of this broker, in bytes per second. The leftmost value indicates incoming data, and the rightmost value indicates outgoing data.
Messages / sec (Brokers only)	A graphic that indicates the number of discrete messages being moved into and out of this broker, in number of messages per second. The leftmost value indicates incoming messages, and the rightmost value indicates outgoing messages.
Frames / sec (Brokers only)	A graphic that indicates the number of execution cycles, or frames, that are currently running on the broker. The leftmost value indicates frames that are being used for incoming processes, and the rightmost value indicates frames that are being used for outgoing processes.

System Health Information

The system health data graphics that are demonstrated in Figure 25 are displayed in the Life Cycle tab. If any node is selected in the Links pane, these graphics display information for that node's broker. These graphics require that a System link be installed on the broker.

Figure 25. System Health Information Graphics

The following system health data graphics are included:

CPU	A graphic that displays the current CPU usage of the broker's host server, as a percentage.
Memory	A graphic that indicates the current memory usage of the broker's host server, in megabytes. The maximum value for the graphic is the available memory on the machine.
Time Running	The duration since the last time this broker was started. In this graphic, only the text string is substantive; the circular graphic is always 50% full.

How to Manage Metrics

This section covers how to view, add, delete, duplicate, and rename metrics.

Metrics can exist on brokers, links, or other nodes. A metric is a key/value pair in which the value can be any of the data types listed in Supported Data Types, including an arbitrary value map. A metric can be a data node, in which case the metric stores data on the broker's host server.

See also: How to View and Invoke Actions on a Metric, How to View Attributes of a Metric.

How to View Metrics

These steps display most metrics on a broker, link, or other node. Some metrics, such as the **Messages / sec** metric, can be viewed only via the Life Cycle tab or the Management tab. See How to View Information about the Broker or Link Life Cycle.

To view most metrics on a broker, link, or other node:

1. Select the broker node in the Brokers pane.
2. If applicable, select the link or other node in the Links pane.
3. Choose the Metrics tab.

   The metrics are displayed.

How to Add a Metric to a Broker

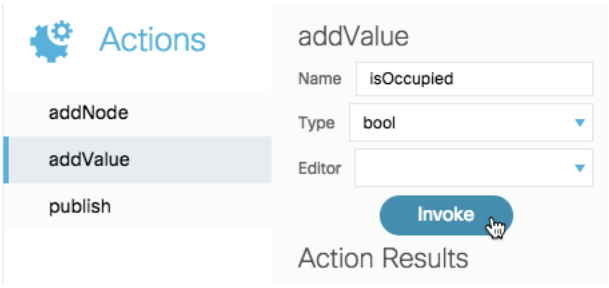
You can add data nodes to a broker. A data node is a metric that allows you to store data on the broker's host server.

To add a data node:

1. Select the broker in the Brokers pane.
2. Choose the Actions and Attributes tab.
3. Choose either the **addNode** or the **addValue** action.

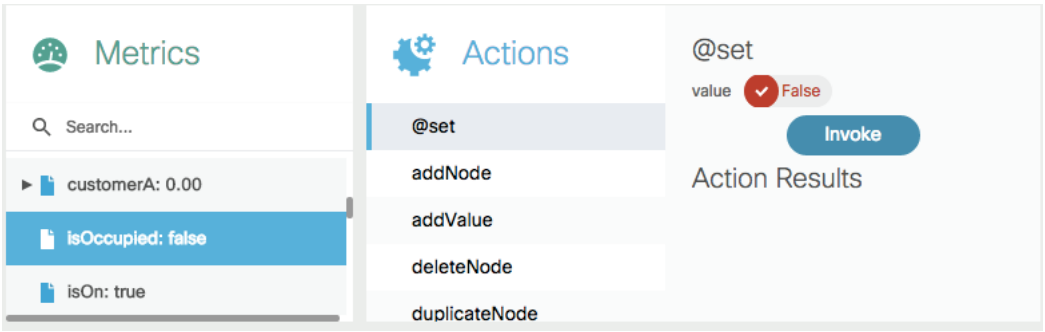
   Each of these actions creates a metric. The difference between these actions is that you specify a data type when you use the **addValue** action, and the **addNode** action creates a node with the dynamic data type. See Supported Data Types.
4. Enter the required information, and click **Invoke**, as shown in Figure 26.

Figure 26. How to Add a Data Node



The data node appears as a metric of the broker, as shown in Figure 27. You can see the data node by keeping the broker selected and clicking the Metrics tab.

Figure 27. Custom Metrics



Note: To create children of this node, use the Metrics tab to select the data node, as shown in Figure 27, and then repeat Steps 3 and 4.

How to Delete a Metric

To delete a data node and its children:

1. Select the broker in the Brokers pane.
2. Select the Metrics tab.
3. Select the data node, as shown in Figure 27.
4. Select the **deleteNode** action.
5. If this node has children, then to recursively delete all children of the node, you must set **Recursive** to TRUE.
6. Click **Invoke**.

How to Duplicate a Metric

To duplicate a data node:

1. Select the broker in the Brokers pane.
2. Select the Metrics tab.
3. Select the data node, as shown in Figure 27.
4. Select the **duplicateNode** action.
5. Enter a name for the new node.
6. Invoke the **duplicateNode** action.

How to Rename a Metric

To rename a data node:

1. Select the broker in the Brokers pane.
2. Select the Metrics tab.
3. Select the data node.
4. Select the **renameNode** action.
5. Enter the new node name.
6. Invoke the **renameNode** action.

How to View and Invoke Actions

This section describes where to view available actions and how to invoke actions.

Actions can exist on brokers, links, other nodes, or metrics. An action is an invokable command that can affect its parent entity in various ways. For example, an action might create a new node or set a data value.

How to View and Invoke Actions on a Broker, Link, or Other Node

These steps display and invoke available actions on a broker, link, or other node, with some exceptions. Some actions, such as the **Restart Server** action, can be viewed only via the Life Cycle tab or the Management tab. See How to Manage the Broker Life Cycle, How to Manage the Link Life Cycle.

To view the available actions on a broker, link, or other node and invoke an action:

1. Select the broker in the Brokers pane.
2. If applicable, select the link or other node in the Links pane.

   Note: To clear the selection in the Links pane, you can re-select the broker.
3. Choose the Actions and Attributes tab.

   The available actions are displayed.
4. Select the action that you want to invoke.
5. If applicable, provide parameters values for the selected action.

   For example, if you are setting a value, enter the value.
6. Click **Invoke**.

Figure 28 demonstrates an example in which an **addValue** action is invoked on a broker. An **addValue** action creates a data metric as a child of the broker.

Figure 28. How to Invoke an Action on a Broker

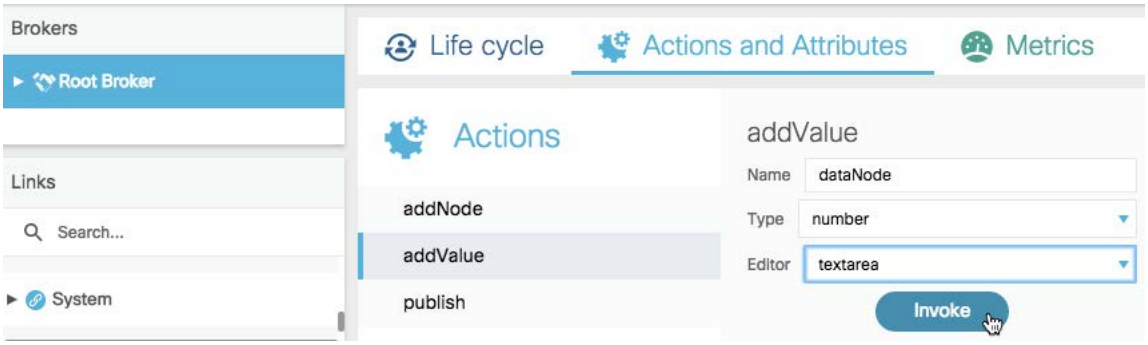
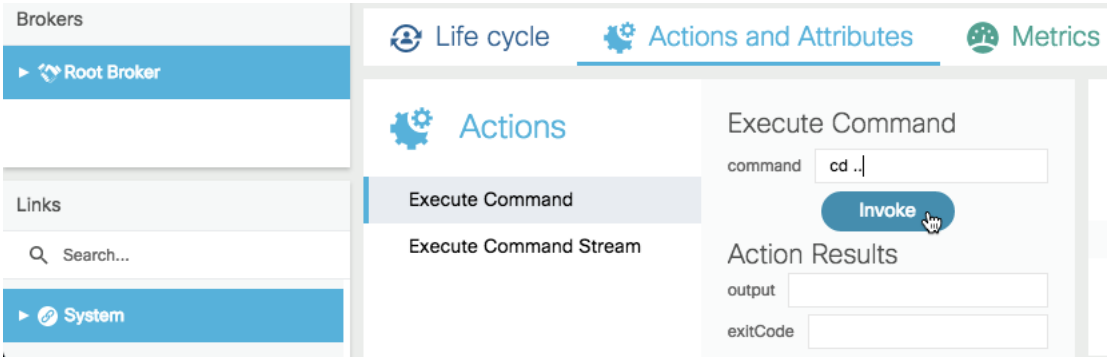


Figure 29 demonstrates an example in which an **Execute Command** action is invoked on a System link. An **Execute Command** action sends a command to the System link and returns the command results in the **output** field.

Figure 29. How to Invoke an Action on a Link or Other Node



How to View and Invoke Actions on a Metric

To view the available actions on a metric and invoke an action:

1. Select the broker in the Brokers pane.
2. If applicable, select the link or other node in the Links pane.

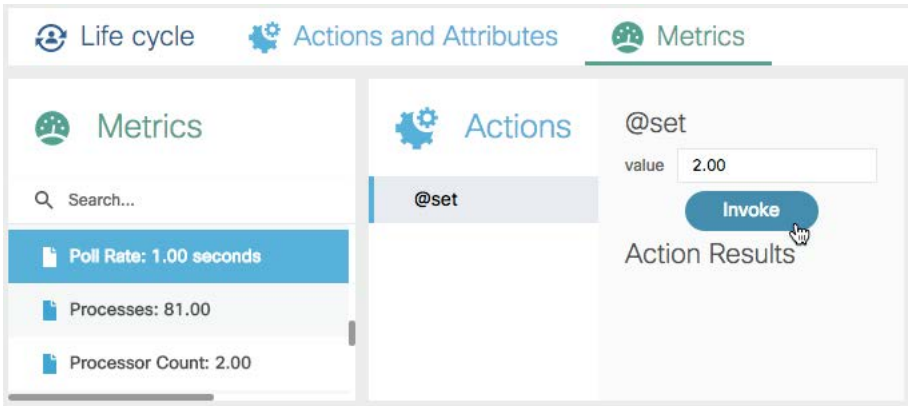
   Note: To clear the selection in the Links pane, you can re-select the broker.
3. Select the Metrics tab.
4. Select the Metric.

   The available actions are displayed.
5. Select the action that you want to invoke.
6. If applicable, provide parameter values for the selected action.

   For example, if you are setting a value, enter the value.
7. Click **Invoke**.

Figure 30 demonstrates an example in which a **@set** action is invoked on the **Poll Rate** metric of the System link. A **@set** action sets the value of a metric.

Figure 30. How to Invoke an Action on a Metric



How to Manage Attributes

This section describes how to view, add, edit, and delete attributes.

Attributes are metadata of entities, presented as key/value pairs. Attributes can exist on brokers, links, other nodes, or metrics. There are two types of attributes: user-created attributes and system-created attributes. The key of a user-created attribute begins with an "at" symbol (@), and the key or value of this attribute can be edited. The key of a system-created attribute begins with a dollar sign ($), and this attribute cannot be edited.

An attribute can exist on any entity in EFF, but the EFF System Administrator can manage an attribute only if it is on a broker, a link, another node, or a metric.

How to View Attributes of a Broker, Link or Other Node

To view the attributes of a broker, link, or other node:

1. Select the broker in the Brokers pane.
2. If applicable, select the link or other node in the Links pane.

   Note: To clear the selection in the Links pane, you can re-select the broker.
3. Select the Actions and Attributes tab.
4. Make sure the Attributes pane is expanded. If it is not expanded, click the arrow to expand it, as shown in Figure 31.

Figure 31. How to Expand the Attributes Pane

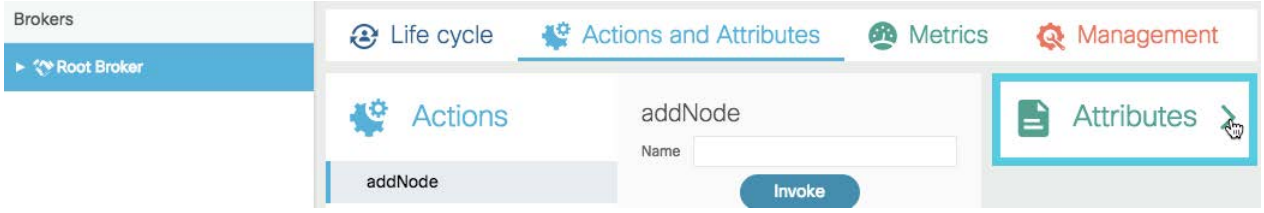
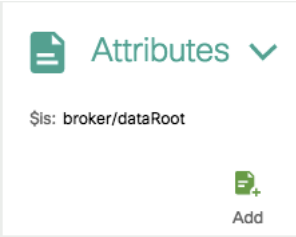


Figure 32 demonstrates the expanded Attributes pane.

Figure 32. Attributes pane



How to View Attributes of a Metric

To view the attributes of a metric:

1. Select the broker in the Brokers pane
2. If applicable, select the link or other node in the Links pane.

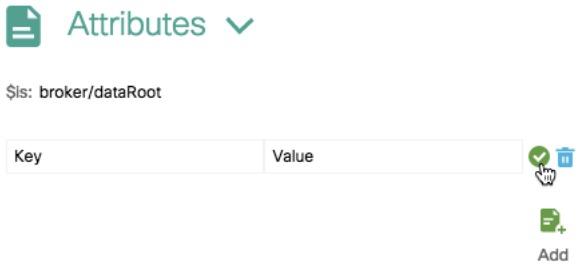
   Note: To clear the selection in the Links pane, you can re-select the broker.
3. Select the Metrics tab.
4. Select the Metric.
5. Make sure the Attributes pane is expanded, as shown in Figure 32.

How to Create a New Attribute

To create a new attribute:

1. View the attributes of the broker, link, other node, or metric. See How to Manage Attributes
2. Click the **Add** icon in the Attributes pane.
3. Enter a name and value, and click the green **check mark** icon, as shown in Figure 33.

Figure 33. How to Create an Attribute



Note: To cancel, click the blue **delete** icon.

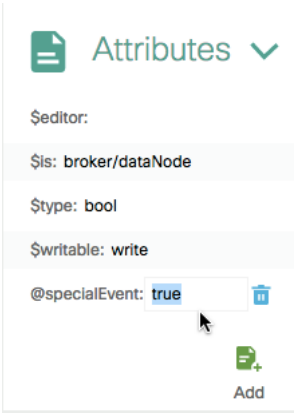
Hoe to Edit an Attribute

If an attribute is user-created, you can edit the key or value of the attribute. User-created attributes begin with an "at" symbol (@).

To edit an attribute:

1. View the attributes of the broker, link, other node, or metric. See How to Manage Attributes.
2. Double-click the key or value of the attribute.
3. Type the new key or value, as shown in Figure 34, and press Enter or Return.

Figure 34. How to Edit an Attribute



How to Delete an Attribute

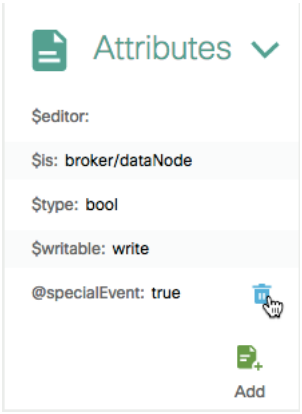
You can delete user-created attributes. User-created attributes begin with an "at" symbol (@).

To delete an attribute:

1. View the attributes of the broker, link, other node, or metric. See How to Manage Attributes.
2. Hover over the attribute, as shown in Figure 35.

   A blue **delete** icon appears.

Figure 35. How to Delete an Attribute



3. Click the blue **delete** icon

How to Get and Clear Logs

This section covers how to retrieve and erase log entries for a broker or link. A log displays activity on a broker or link.

How to Get a Log

You can retrieve log contents via the Life Cycle tab or the Management tab.

How to View a Log via the Life Cycle Tab

To view the log entries for a broker or link via the Life Cycle tab:

1. Select the broker in the Brokers pane.
2. If applicable, select a link in the Links pane.

   Note: If a non-link node is selected in the Links pane, the log for that node's ancestor link will be displayed.
3. Select the Life Cycle tab.

   The log is displayed in the Log pane.

How to Get a Link's Log via the Management Tab

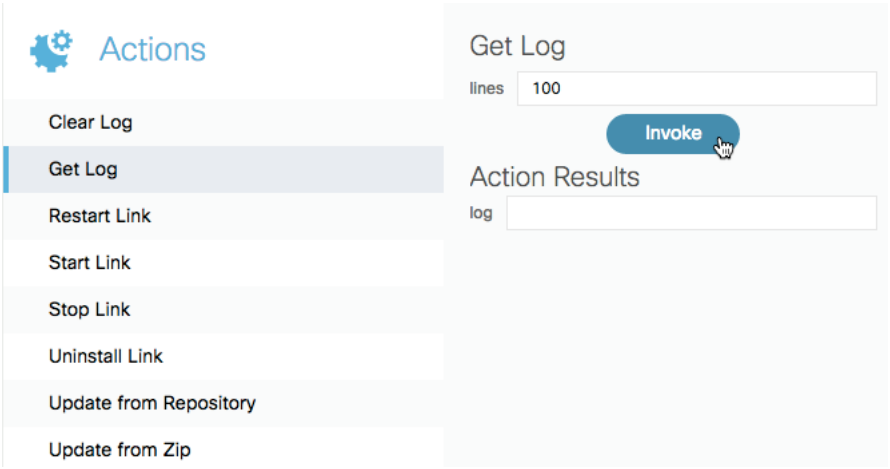
For links only, you can get a log via the Management tab.

To get the log for a link via the Management tab:

1. Select the broker in the Brokers pane.
2. Select the Management tab.
3. Expand **links**.

4. Select the link.
5. Select the **Get Log** action.
6. Optionally, enter a number of lines to retrieve. The default is 100.
7. Click **Invoke**, as shown in Figure 36.

Figure 36. How to Get a Log via the Management Tab



The log contents appear under **Action Results**, in the **log** field.

8. To review the log, copy and paste the contents of the **log** field into a text editor.

How to Clear a Log

You can clear a log via the Life Cycle tab or the Management tab.

How to Clear a Log via the Life Cycle Tab

This task deletes the contents of the log. Deleted entries cannot be retrieved using a **Get Log** action.

To delete the log contents for a broker or link via the Life Cycle tab:

- In the Log pane, click the **Clear Log** button, as shown in Figure 37.

Figure 37. How to Clear a Log

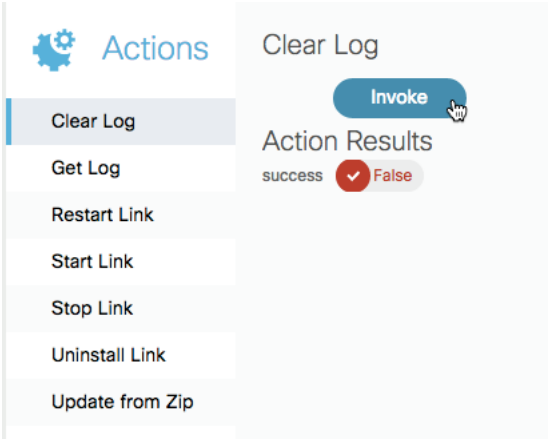
How to Clear a Link's Log via the Management Tab

For links only, you can delete log contents via the Management tab. Deleted entries cannot be retrieved using a **Get Log** action.

To clear a link's log via the Management tab:

1. Select the broker in the Brokers pane.
2. Select the Management tab.
3. Expand **links** in the Management tree.
4. Select the link.
5. Choose the **Clear Log** action, and click **Invoke**, as shown in Figure 38.

Figure 38. How to Clear a Log via the Management Tab



Obtaining documentation and submitting a service request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS Version 2.0.
