

System Administrator Guide

Kinetic - Edge & Fog Processing Module (EFM) 1.7.0

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Overview

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Overview

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

The *Kinetic - Edge and Fog Processing Module System Administrator* (EFM System Administrator) is a graphical user interface for viewing and managing an EFM system.

Structure of the Kinetic - Edge & Fog Processing Module (EFM)

The EFM, and therefore the EFM 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 EFM 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 EFM 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.

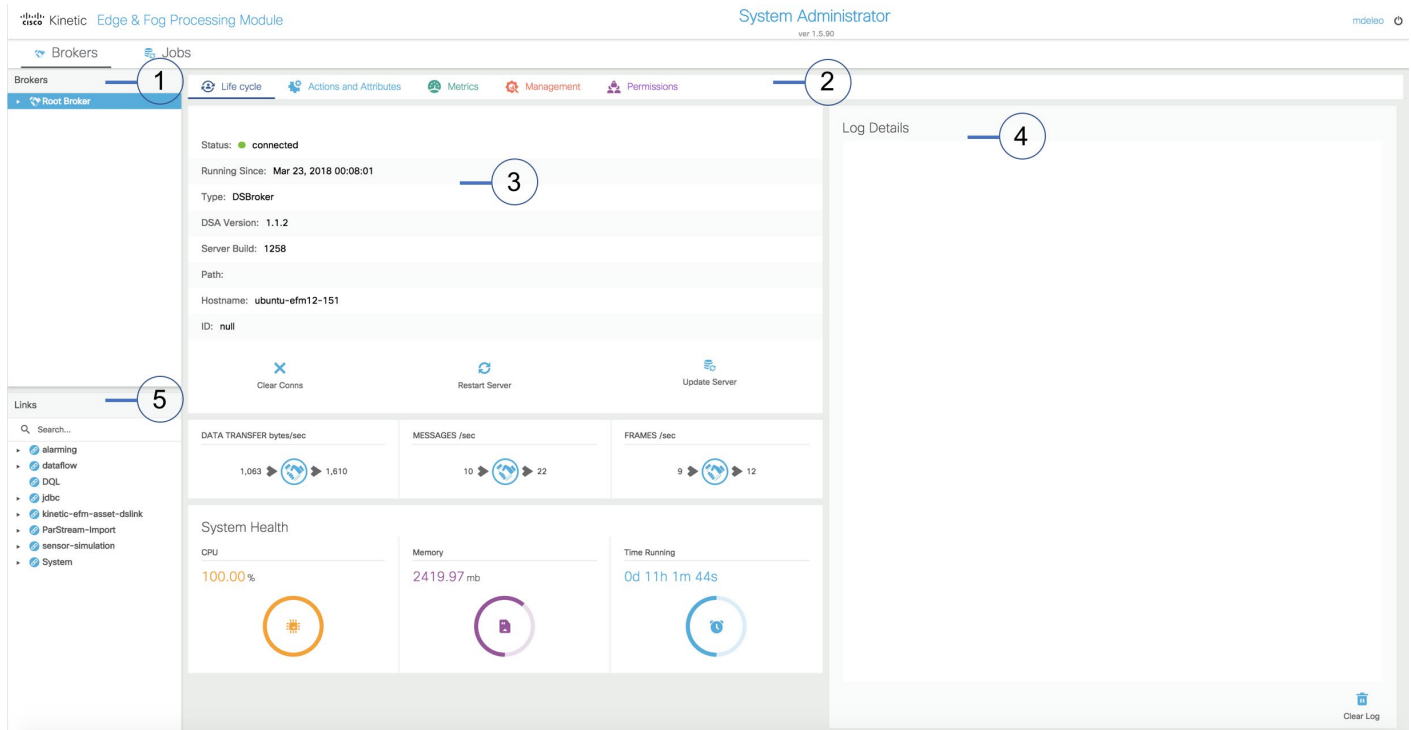
User interface overview

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

1. In the leftmost portion of the UI window, the *Brokers pane* is used to select an individual broker.
2. The top of the window is used to select attributes.
3. 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* allows you to select a link or another node.

Figure 1 describes the layout of the IoT Data Connect - EFM System Administrator.

Figure 1. EFM 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

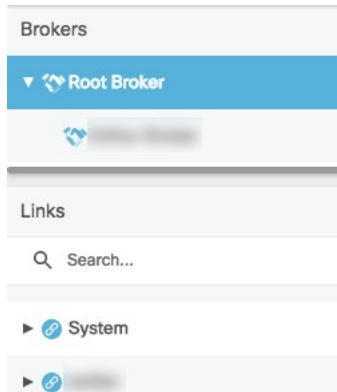
You use the Brokers pane and Links pane to select a node.

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 depicts a selected broker.

Overview

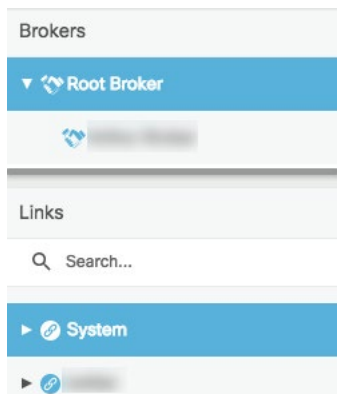
Figure 2. Broker selection



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.

Managing the Broker life cycle and the server

Clearing connections

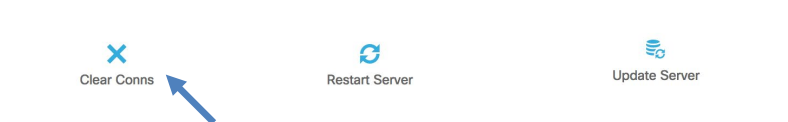
This task removes connections between the selected broker and any links that are not currently running. This removal deallocates any ports on the broker's host server that are allocated to non-running links. This removal does not uninstall links.

To clear connections:

1. Choose 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. Clearing connections



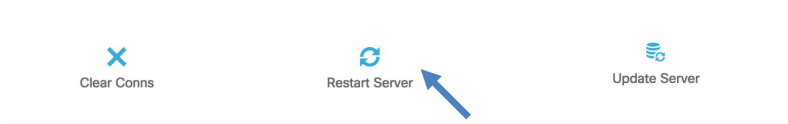
Restarting the server

This task reboots a broker.

To restart the broker:

1. Choose 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. Restarting the server



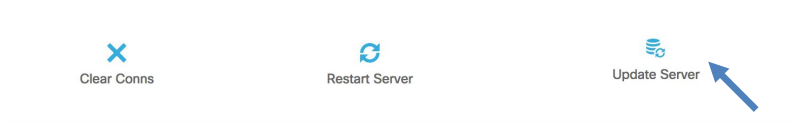
Updating the server

This task updates the version of the server.

To update the server:

1. Choose 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. Updating the server



Adding an upstream connection

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

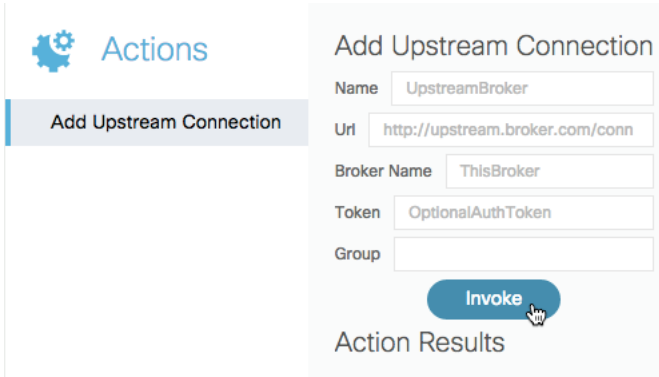
Note: To add a downstream connection, log in as the downstream broker and create the connection in the upstream direction. Then log in again as the upstream broker.

To add an upstream broker to an existing broker:

1. Choose the existing **broker node** in the **Brokers** pane.
2. Choose the **Management** tab in the main pane.
3. Choose the **upstream** node.
4. Choose 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. Adding an upstream connection



The screenshot shows the 'Actions' menu on the left with 'Add Upstream Connection' selected. The main panel displays a form titled 'Add Upstream Connection' with the following fields: Name (UpstreamBroker), Uri (http://upstream.broker.com/conn), Broker Name (ThisBroker), Token (OptionalAuthToken), and Group (empty). A blue 'Invoke' button is highlighted with a mouse cursor, and the 'Action Results' section is visible below.

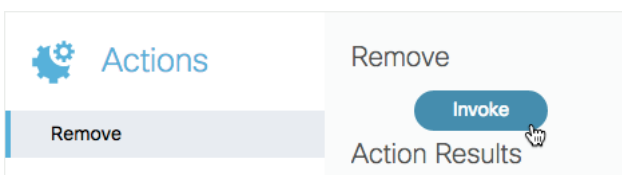
Removing an upstream connection

This task removes an upstream broker from the system.

To remove an upstream broker:

1. Choose 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
6. Click **Invoke**, as shown in Figure 8.

Figure 8. Removing an upstream connection



The screenshot shows the 'Actions' menu on the left with 'Remove' selected. The main panel displays a form titled 'Remove' with a blue 'Invoke' button highlighted by a mouse cursor. The 'Action Results' section is visible below.

Managing the Life Link cycle

This section covers the following tasks:

- Installing a link—Adds a new link to the system.

- Starting a link—Causes a link to run.
- Starting all links—Causes all installed links connected to a broker to start running.
- Stopping a link—Causes a link to stop running.
- Restarting a link—Causes a link to stop running and then start again.
- Uninstalling a link—Removes a link from the system.
- Updating a link—Updates the link to a new version.

Installing a link

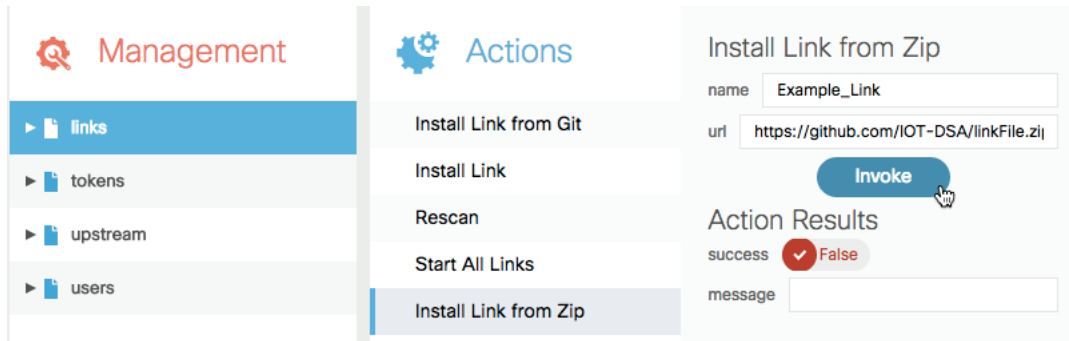
This task adds a new link to the system.

To install a link:

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

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

Figure 9. Installing a link



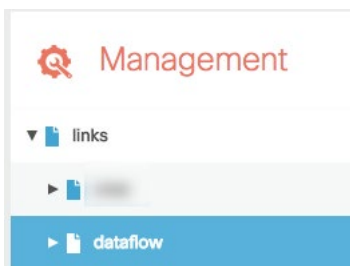
Starting a link

This task causes a link to start running.

To start a link:

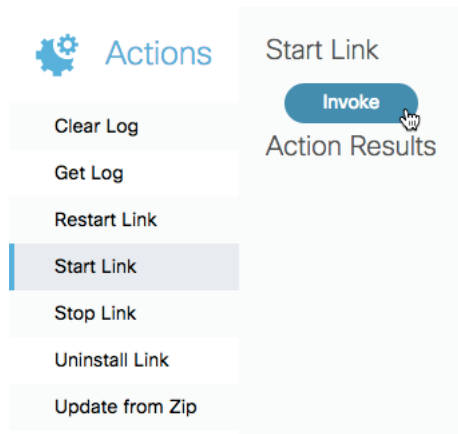
1. Choose the link's broker node in the **Brokers** pane.
2. Choose the **Management** tab in the main pane.
3. Expand the **links** node in the management tree.
4. Choose the link that you want to start, as shown in Figure 10.

Figure 10. Managing a link



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

Figure 11. Starting a link



Starting all links

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

To start all links:

- Follow the steps in Installing a link, except select the **Start All Links** action in Step 4.

Stopping a link

This task causes a link to stop running.

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

Stopping 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. Stopping 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. Stopping a link via the Life Cycle tab



Stopping a link via the Management tab

To stop a link via the **Management** tab:

Follow the steps in

- Starting a link, except select the **Stop Link** action instead of the **Start Link** action in Step 5.

Restarting 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.

Restarting 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. Restarting a link via the Life Cycle tab



Restarting a link via the Management tab

To restart a link via the **Management** tab, follow the steps in

Starting a link, except select the **Restart Link** action instead of the **Start Link** action in Step 5.

Uninstalling a link

This task removes a link from the system.

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

Uninstalling 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. Uninstalling a link via the Life Cycle tab



Uninstalling a link via the Management tab

To uninstall a link via the Management tab, follow the steps in

Starting a link, except select the **Uninstall Link** action instead of the **Start Link** action in Step 5.

Updating a link

This task updates the link to a new version.

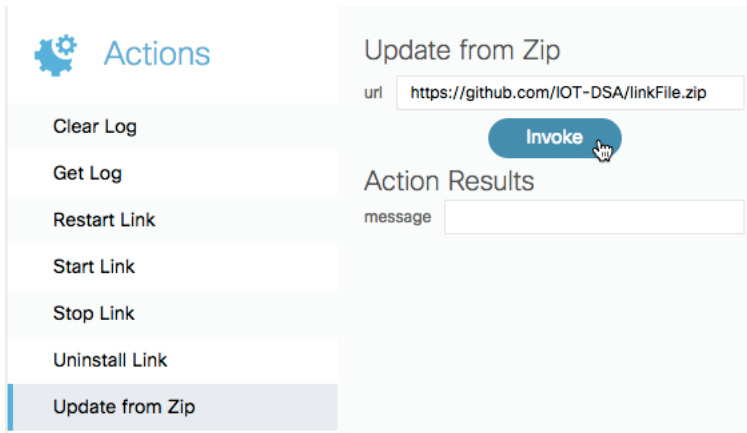
You can update a link from a ZIP file or from the repository from which the link was first installed.

Updating a link from a ZIP file

To update a link from a ZIP file:

1. Choose 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 and then choose 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. Updating a link from a ZIP file



Updating 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.

Updating 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. Updating a link from the repository via the Life Cycle tab

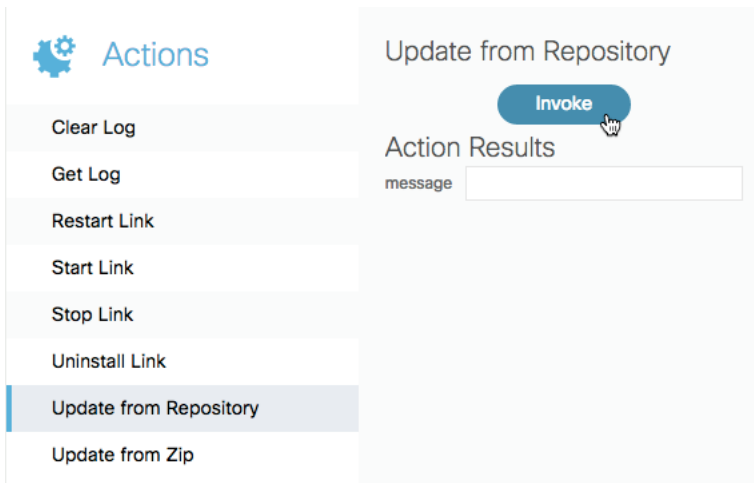


Updating a Link from the Repository via the Management Tab

To update a link from the repository via the Management tab, follow the steps in

Updating a link from a ZIP file, except choose the **Update from Repository** action in Step 4, as shown in Figure 18:

Figure 18. Updating a link from the repository via the Management tab



Managing 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.

Authorizing or deauthorizing a broker or link

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

Authorizing 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. Choose the broker in the **Brokers** pane.
2. Choose the **Management** tab.
3. In the **Management** tree, choose the **quarantine** node.

Managing users

4. Choose the **Authorize** action.
5. In the **Dslid** drop-down menu, 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**.

Deauthorizing 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. Choose the broker in the **Brokers** pane.
2. Choose the **Management** tab.
3. In the **Management** tree, choose the **quarantine** node.
4. Choose the **Deauthorize** action.
5. In the **Name** drop-down menu, 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**.

Authorizing or deauthorizing a quarantined node via the Quarantine pop-up 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 pop-up 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 Authorizing a broker or link via the Management tab or Deauthorizing a broker or link via the Management tab.

Managing users

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

Managing users

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

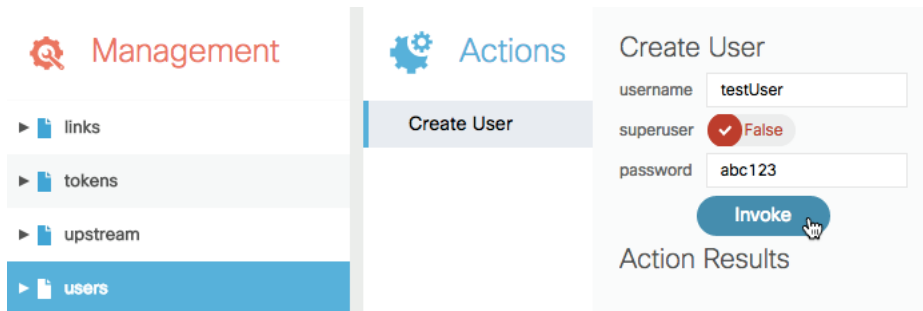
A *permission group* is a defined permission level.

Creating a user

To create a new user:

1. Choose the broker in the **Brokers** pane.
2. Choose the **Management** tab.
3. Choose the **users** node in the **Management** tree.
4. Choose 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. Creating a user



Editing a user

You can edit a username, password, or user permissions.

Editing a username

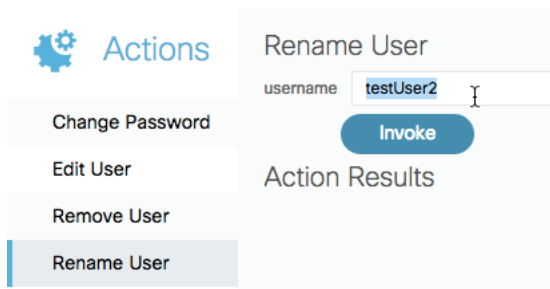
To rename a user:

1. Choose the broker in the **Brokers** pane.

Managing users

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

Figure 20. Editing a username

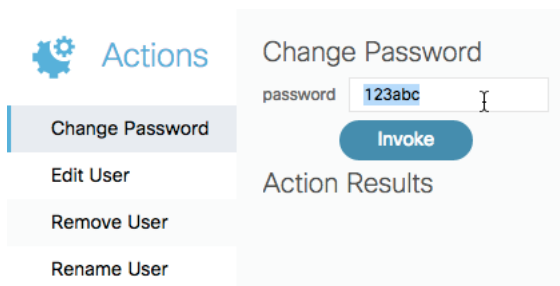


Editing a password

To change a user's password:

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

Figure 21. Changing a password



Editing user permissions

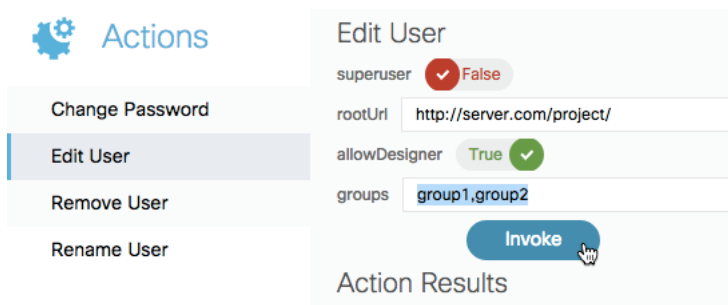
You can edit the following aspects of a user's permissions:

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

Figure 22. Editing user permissions



Removing a user

This task removes a user from the system.

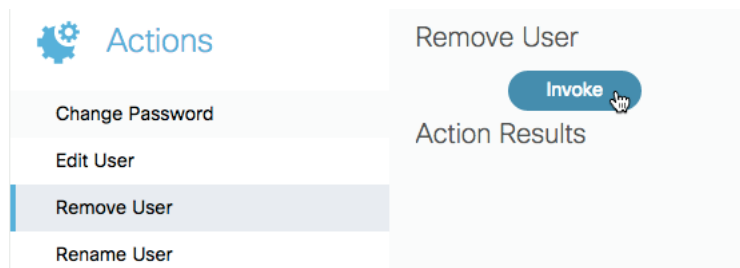
To remove a user:

1. Choose the broker in the **Brokers** pane.
2. Choose the **Management** tab.
3. Expand the **users** node in the **Management** tree.

Viewing information about the Broker or Link Life Cycle

4. Choose the user.
5. Choose the **Remove User** action.
6. Click **Invoke**, as shown in Figure 23:

Figure 23. Removing a user



Viewing 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 Updating 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 EFM 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.

Viewing information about the Broker or Link Life Cycle

Figure 24. Broker Information Graphics



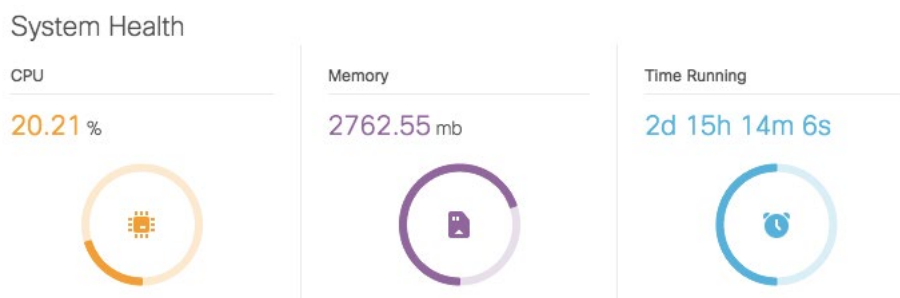
The following broker data graphics are included:

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 depicted 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.
------------	---

Managing metrics

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.

Managing 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: Viewing and invoking actions on a metric, Viewing attributes of a metric.

Viewing 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 Viewing information about the Broker or Link Life Cycle.

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

1. Choose 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.

Adding 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:

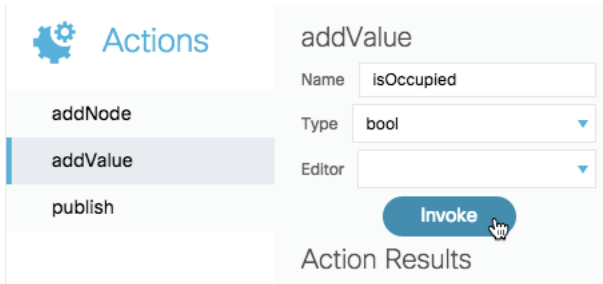
1. Choose the **broker** in the **Brokers** pane.
2. Choose the **Actions and Attributes** tab.
3. Choose either the **addNode** or the **addValue** action.

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.

Managing metrics

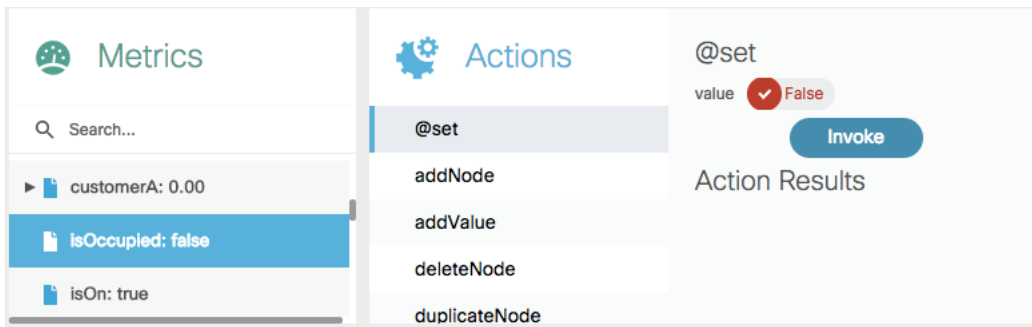
4. Enter the required information, and then click **Invoke**, as shown in Figure 26:

Figure 26. Adding 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.

Deleting a metric

To delete a data node and its children:

1. Choose the broker in the **Brokers** pane.
2. Choose the **Metrics** tab.
3. Choose the **data** node, as shown in Figure 27.
4. Choose 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**.

Duplicating a metric

To duplicate a data node:

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

Renaming a metric

To rename a data node:

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

Viewing and invoking 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.

Viewing and invoking 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 Managing the Broker life cycle, [Error! Reference source not found.](#)

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

1. Choose the broker in the **Brokers** pane.
2. If applicable, choose the link or other node in the **Links** pane.

Viewing and invoking actions

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. Choose 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. Invoking an action on a broker

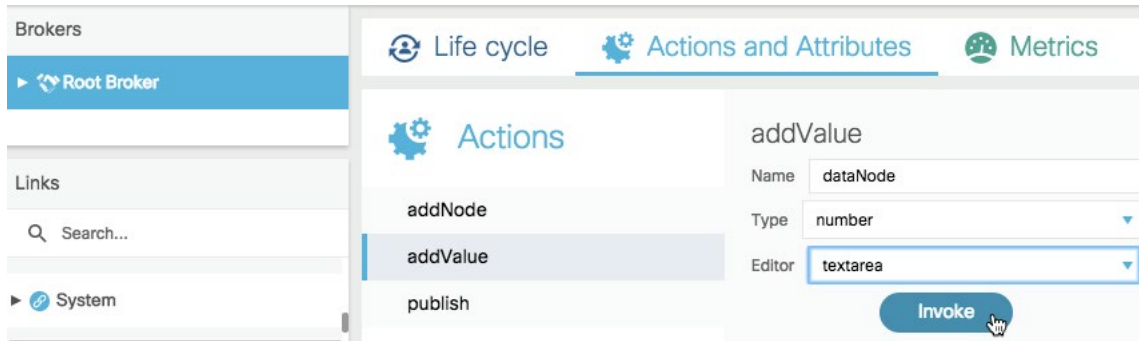
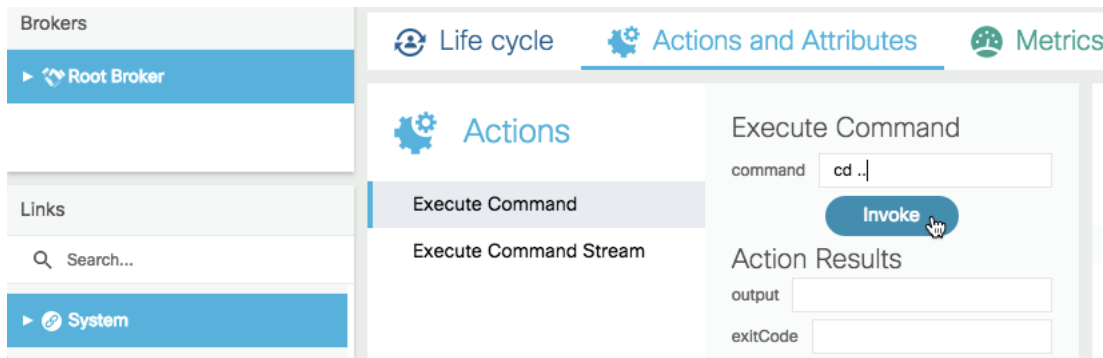


Figure 29 demonstrates an example in which an **Execute Command** action is invoked on a System link. An **Execute Command** action sends a command to the System link and returns the command results in the **output** field.

Figure 29. Invoking an action on a link or other node



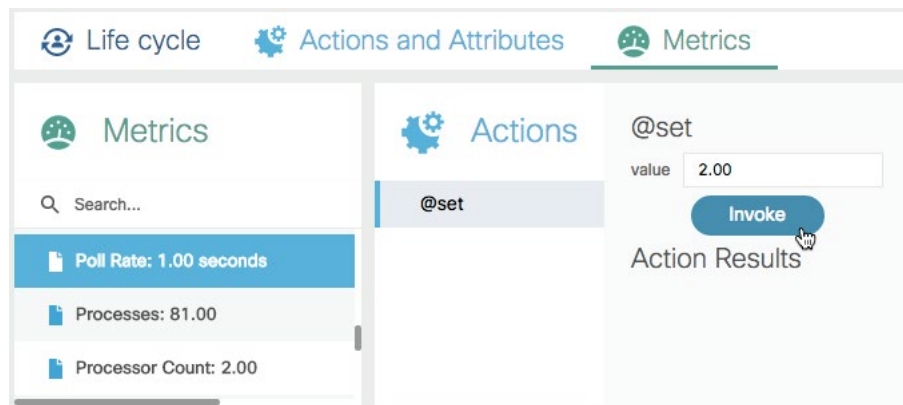
Viewing and invoking actions on a metric

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

1. Choose the broker in the **Brokers** pane.
2. If applicable, choose 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 **Metrics** tab.
4. Choose the Metric. The available actions are displayed.
5. Choose 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. Invoking an action on a metric



Managing 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 EFM, but the EFM System Administrator can manage an attribute only if it is on a broker, a link, another node, or a metric.

Viewing attributes of a Broker, Link or other Node

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

1. Choose the broker in the **Brokers** pane.
2. If applicable, choose the link or other node in the Links pane.

Note: To clear the selection in the Links pane, you can re-choose the broker.

3. Choose 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. Expanding the Attributes pane

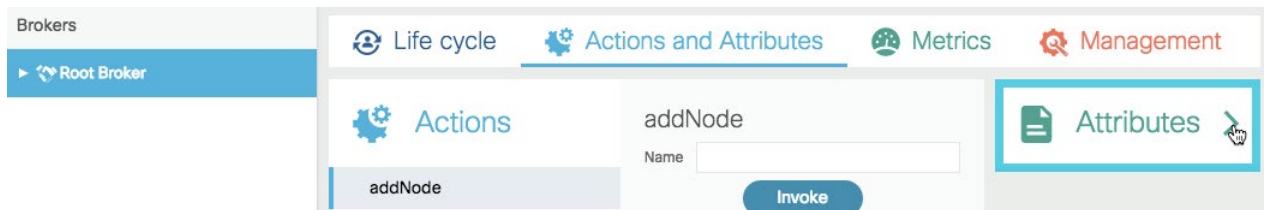
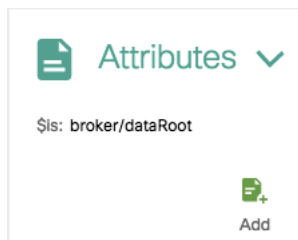


Figure 32 demonstrates the expanded **Attributes** pane:

Figure 32. Attributes pane



Viewing attributes of a metric

To view the attributes of a metric:

1. Choose the broker in the **Brokers** pane.
2. If applicable, choose the link or other node in the **Links** pane.

Note: To clear the selection in the **Links** pane, you can re-choose the broker.

3. Choose the **Metrics** tab.
4. Choose the Metric.

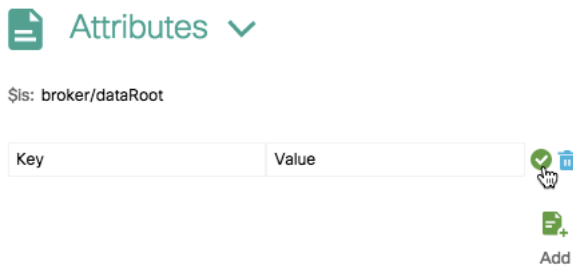
5. Make sure the **Attributes** pane is expanded, as shown in Figure 32.

Creating a new attribute

To create a new attribute:

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

Figure 33. Creating an attribute



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

Editing an attribute

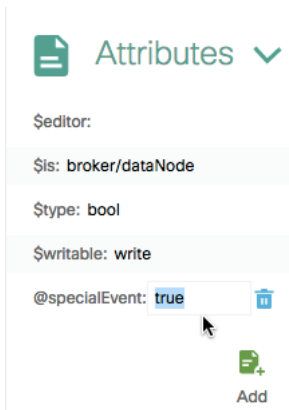
If an attribute is user-created, you can edit the key or value of the attribute. User-created attributes begin with an “at” symbol (@).

To edit an attribute:

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

Getting and clearing logs

Figure 34. Editing an attribute



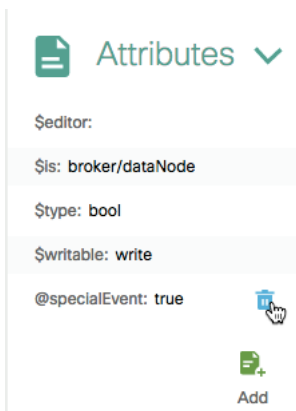
Deleting an attribute

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 Managing attributes.
2. Hover over the attribute, as shown in Figure 35. A **blue delete** icon appears.

Figure 35. Deleting an attribute



3. Click the **blue delete** icon.

Getting and clearing 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.

Getting a log

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

Viewing a log via the Life Cycle tab

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

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

Note: If a non-link node is chosen in the Links pane, the log for that node's ancestor link will be displayed.

3. Choose the **Life Cycle** tab. The log is displayed in the **Log** pane.

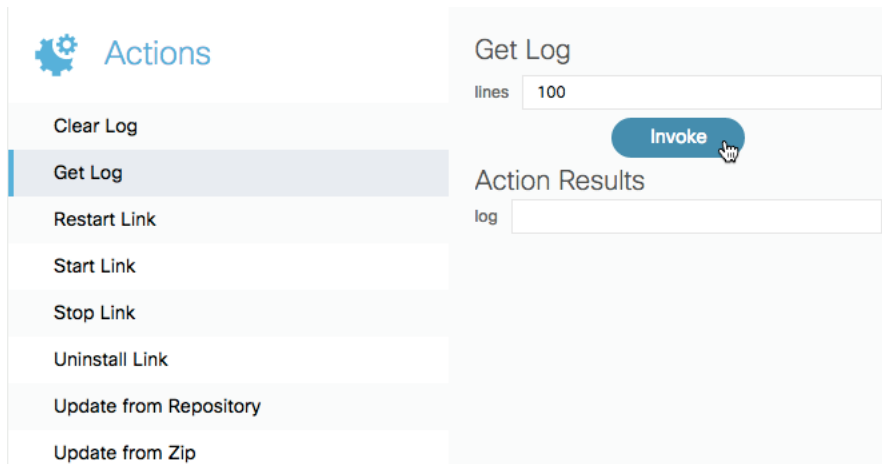
Getting a link's log via the Management tab

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

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

1. Choose the broker in the **Brokers** pane.
2. Choose the **Management** tab.
3. Expand **links**.
4. Choose the link.
5. Choose 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. Getting 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.

Clearing a log

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

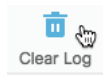
Clearing a log via the Life Cycle tab

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. Clearing a log



Clearing 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.

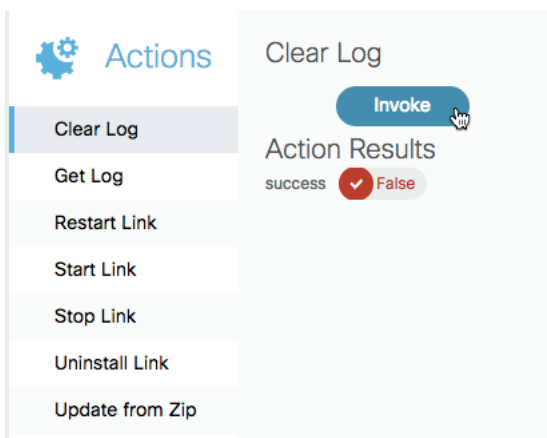
To clear a link's log via the **Management** tab:

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

Getting and clearing logs

4. Choose the link.
5. Choose the **Clear Log** action, and then click **Invoke**, as shown in Figure 38:

Figure 38. Clearing 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>

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