Access SAS Event Stream Manager

Here are the requirements for accessing and using SAS Event Stream Manager:

- You have a user ID and password for logging on to SAS Event Stream Manager, unless your system has been configured so that you do not need to log on.

- A supported web browser has been installed.
  
  **Note:** For detailed information about supported browsers, in SAS Event Stream Manager click the user icon in the top-right corner and then click **About**. The About window appears. Click **Supported browsers and platforms** to view supported browsers. SAS Event Stream Manager requires the use of cookies to maintain the session state.

- Your screen has a minimum screen resolution of 1,280 x 1,024.

- JavaScript has been enabled in your browser.

To access SAS Event Stream Manager:

1. Open the following URL:
   
   https://host/SASEventStreamManager

   The *host* is the system on which SAS Event Stream Manager is installed.

   The Sign In to SAS window appears.

2. Enter your user ID and password, and click **Sign In.**
Understanding the User Interface

Pages

A page is the highest level container in the user interface. All other user interface elements are contained within the confines of a page.

When you access SAS Event Stream Manager, the Deployments page appears.

Figure 1  Deployments Page with Three Deployments

SAS Event Stream Manager contains the following main pages:

- The Deployments page enables you to create deployments and then monitor and manage them.
- The Projects page enables you to view projects that have been published using SAS Event Stream Processing Studio.
- The **Unassigned Servers** page enables you to view available ESP servers that SAS Event Stream Manager is aware of, and to connect directly to other ESP servers. ESP servers that already belong to a deployment are not displayed.

- The **Job Templates** page enables you to create and upload job templates, which you can then deploy to create running jobs.

- The **Filters** page enables you to manage filters that are available in SAS Event Stream Manager.

- The **Metering** page enables you to monitor the metering servers that track usage data.

- The **Log** page displays details of currently running jobs and historical jobs.

For more information about the main tasks that you perform using SAS Event Stream Manager, see “Overview of Using SAS Event Stream Manager to Deploy Projects” in *SAS Event Stream Manager: Overview*.

### Panes

SAS Event Stream Manager pages contain **panes**. The following figure shows the **Filters** page, which contains a bottom pane with a **tile** called **Details**.

*Figure 2  Example of a Page with a Pane*

To resize a pane, drag a border that is marked with .... upward or downward.

To hide a pane, click . To display it again, click the same button again.
Tiles

A tile is a self-contained block of information that resides within a pane or sometimes directly on a page. The same tile can appear on several pages. For example, the Details tile appears in the bottom pane on more than one page.

Windows

A window is a floating user interface element that often appears as a result of a user action. Windows generally provide a means by which to perform an action. Closing a window returns you to the page from which the window was launched. The following figure shows a window that can create a new deployment in SAS Event Stream Manager.

Figure 3  Example of a Window

![Deployment Properties](image)

Name:  
Stock Trade

Description:  
A deployment for filtering stock trades

Tags:  
stock

Production deployment

Toolbars

There are three main toolbars in SAS Event Stream Manager, as shown in the following figure. For information about each toolbar, see the subsequent table.
### Figure 4  SAS Event Stream Manager Toolbars

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1           | Application bar| Displays your user icon, which shows the first character of your name or user ID. Click the user icon to access the following functionality:  
  - View Help and product information  
  - Sign out from SAS Event Stream Manager (unless your system has been configured so that you do not need to sign in) |
| 2           | Menu bar       | Provides access to the main SAS Event Stream Manager pages: Deployments, Projects, Unassigned Servers, Job Templates, Filters, Metering, and Log.  
  - Provides access to each deployment, ESP server, project, job template, or job that is currently open. The navigation overflow menu button displays the total number of these pages that are currently open. An example is 2. |
| 3           | Toolbar or tabs| Includes buttons or tabs specific to the open page. For example, the preceding figure shows toolbar buttons on the Job Templates page. The following figure shows tabs on a page for an open project. |

### Figure 5  Example of an Open Project with Tabs Instead of a Toolbar
Arrange Information in Tables

Sometimes a large amount of information is displayed in tables. To make it easier to work with a large amount of information, you can arrange this information in different ways.

You can sort the contents of many columns by ascending or descending order. To do this, click the heading of the column that you want to sort.

You can create filter criteria by which to display only a subset of information for a column. To create filter criteria, click for the column that you want to apply filter criteria to, select Filter, and enter your filter criteria. The use of filter criteria is not available for some columns.

You can configure the columns that you want to display. To do this, click in any column, select Columns, and deselect the columns that you do not want to appear.

You can re-order columns. To do this, click and hold the column heading and drag it to a different location.

In some tables, you can group information by column. To do this, click and select Group columns. If this option is not available, it means that you cannot group information by columns in this table. A horizontal bar appears at the top of the table, with the text Drag a column heading here to group by that column. To group information by column, drag a column heading to the bar. If required, you can drag additional columns to the bar. In the following example, information about the Job Templates page has been grouped by the Production column:

Figure 6  Example of Grouping Information by Column
Working with Deployments

Create a Deployment

1. On the Deployments page, click .

   The Deployment Properties window appears.

2. In the Name field, enter a unique name for the deployment.

3. In the Description field, enter a description for the deployment. For example, you can enter the purpose of the deployment to allow users to differentiate between deployments with similar names. This description is displayed as a tooltip when you place the cursor over the deployment name in the Name column on the Deployments page.

4. In the Tags field, you can attribute one or more tags to the deployment.

   To add a tag, enter text and press Enter. Tags can be used to group and filter deployments. Tags are single-term descriptors for the deployment. Tags cannot contain spaces. Duplicate tags are not permitted on a single deployment.

5. If you want to create a production deployment, select the Production deployment check box. For more information, see “Production Assets” in SAS Event Stream Manager: Overview.

6. Click OK.

   Your deployment appears on a new page.

   You can now add ESP servers to your deployment. For more information, see “Add ESP Servers” on page 9.

Edit a Deployment

1. On the Deployments page, select the deployment that you want to edit and click .

   The Deployment Properties window appears.

2. Edit the Description and Tags fields as required. You can also select or deselect the Production deployment check box to move a deployment from test to production or from production to test. For more information about these fields, see “Create a Deployment” on page 7.

   Note: You cannot edit the Name field.

3. If required, you can add or remove ESP servers or you can filter ESP servers that are associated with the deployment:

   - For more information about adding ESP servers, see “Add ESP Servers” on page 9.
   - For more information about removing ESP servers, see “Remove ESP Servers” on page 12.
Change the Production Status of a Deployment

Certain assets can be marked as production assets. For more information, see “Production Assets” in *SAS Event Stream Manager: Overview*.

To change the production status of a deployment, on the **Deployments** page, right-click the deployment and select **Set as production** or **Remove as production**.

The Production column on the **Deployments** page changes to reflect your choice.

Delete a Deployment

You can delete a deployment if no ESP servers are associated with it. For more information, see “Remove ESP Servers” on page 12.

To delete a deployment:

1. On the **Deployments** page, select the deployment that you want to delete.
2. Click ![Delete](image).
   
   The Delete Deployment window appears.
3. Click **Delete**.

Working with ESP Servers

ESP Server in a Cluster

*SAS Event Stream Manager* enables you to deploy a project to a Kubernetes cluster. When a project is deployed to a cluster, an ESP server is created on demand in the cluster. When the project is stopped, the ESP server is deleted from the cluster. Otherwise, an ESP server in a cluster behaves in the same way as an ESP server that is not in a cluster.

When a project is deployed to a cluster, the ESP server that is created is automatically added to the selected deployment.

You can deploy a project to a cluster only if SAS Event Stream Manager itself is running in a Kubernetes cluster. In this case, all deployments created in SAS Event Stream Manager are automatically associated with the cluster. On the page for each specific deployment in SAS Event Stream Manager, a user interface control is available so that you can start a project on an ESP server in the cluster. Deployments that are associated with a cluster can contain ESP servers that are in the cluster and ESP servers that are not in the cluster.
Add ESP Servers

This topic applies to ESP servers that are not in a cluster. For information about how an ESP server that is in a cluster is added to a deployment, “ESP Server in a Cluster” on page 8.

SAS Event Stream Processing can inform SAS Event Stream Manager about ESP servers that exist in the SAS Event Stream Processing environment. You can configure the esm.xml file in SAS Event Stream Processing to enable SAS Event Stream Processing to pass this information to SAS Event Stream Manager. For more information about the esm.xml file in a Linux environment, see “Configure the ESP Server for SAS Event Stream Manager” in SAS Event Stream Processing on Linux: Deployment Guide. For more information about the esm.xml file in a Windows environment, see “Configure the ESP Server for SAS Event Stream Manager” in SAS Event Stream Processing on Windows: Deployment Guide.

If SAS Event Stream Manager is not aware of a particular ESP server, you can connect directly to that ESP server. A direct connection to a specific ESP server might be necessary if the esm.xml file has not been configured or the ESP server is running with SAS Event Stream Processing version 5.2 or earlier. In this case, SAS Event Stream Manager becomes aware of the ESP server only after you have made the direct connection. For more information, see “Connecting Directly to an ESP Server” on page 10.

Each ESP server can belong to only one deployment. If you want to add an ESP server that already belongs to another deployment, you must first remove that ESP server from its original deployment. For more information, see “Remove ESP Servers” on page 12.

Each deployment can contain several ESP servers.

To add ESP servers to a deployment:

1. Open the deployment if it is not already open: on the Deployments page, select the deployment that you want to open and click . A separate page that displays the deployment opens.

2. Click and select Add an unassigned server.

Note: The New server menu option, which is adjacent to the Add an unassigned server menu option, relates to making a direct connection to an ESP server that SAS Event Stream Manager has not yet detected. For more information, see “Connecting Directly to an ESP Server” on page 10.

The Add and Remove ESP Servers window appears.
3 Move the required ESP servers from the Available servers table to the Selected servers table, using the buttons between the two tables:

- To move a single ESP server, select the ESP server in the Available servers table and click 
- To move all ESP servers that are displayed in the Available servers table, click 

4 Click OK.

The ESP servers appear in the table on the deployment page. To view more information about a particular ESP server, select it in the main table and view the information that appears in the tabs in the bottom pane.

Connecting Directly to an ESP Server

This topic applies to ESP servers that are not in a cluster. For information about how an ESP server that is in a cluster is added to a deployment, “ESP Server in a Cluster” on page 8.

SAS Event Stream Processing can inform SAS Event Stream Manager about ESP servers that exist in the SAS Event Stream Processing environment. You can configure the esm.xml file in SAS Event Stream Processing to enable SAS Event Stream Processing to pass this information to SAS Event Stream Manager. For more information about the esm.xml file in a Linux environment, see “Configure the ESP Server for SAS Event Stream Manager” in SAS Event Stream Processing on Linux: Deployment Guide. For more information about the esm.xml file in a Windows environment, see “Configure the ESP Server for SAS Event Stream Manager” in SAS Event Stream Processing on Windows: Deployment Guide.

If SAS Event Stream Manager is not aware of a particular ESP server, you can connect directly to that ESP server. A direct connection to a specific ESP server might be necessary if the esm.xml file has not been configured or the ESP server runs with SAS Event Stream Processing version 5.2 or earlier.

To connect directly to an ESP server:

1 On the Unassigned Servers page, click 

   The ESP Server Properties window appears.

2 In the Name field, enter a name for the ESP server.

3 In the Host field, enter the host name of the server that the ESP server runs on.

4 In the HTTP port field, replace the default value with the port number used for HTTP administration requests and for the HTTP publish/subscribe server.

   Note: This port is specified in the \-http argument to the dfesp_xml_server command in SAS Event Stream Processing.

5 In the Description field, enter a description for the ESP server. For example, you can specify the purpose of this ESP server to enable users to differentiate between ESP servers with similar names. This description is displayed as a tooltip when you place the cursor over the ESP server’s name in the Name column on the Unassigned Servers page or on the page for a specific deployment that includes this ESP server.

6 In the Tags field, you can attribute one or more tags to the ESP server.
To add a tag, enter text and press Enter. Tags can be used to group and filter ESP servers. Tags are single-term descriptors for the ESP server. Tags cannot contain spaces. Duplicate tags are not permitted on a single ESP server.

7 If required, change the setting for the Authentication field:

- **None**: This is the default option.
- **Kerberos**: This option is relevant only if the ESP server is configured to require authentication using Kerberos.
- **OAuth token**: This option is relevant only if the ESP server is configured to require authentication using an OAuth token. If you select this option, an additional field appears where you must enter the OAuth token.
- **Username and password**: This option is relevant only if the ESP server is configured to require authentication using a user name and password (SASLogon Services). If you select this option, additional fields appear where you must enter the user name and password.

8 If required, select the Connect using SSL check box. Selecting this check box is relevant only if the ESP server is configured to require SSL encryption.

9 Click OK.

The ESP server is displayed on the Unassigned Servers page, along with your other ESP servers. The Unassigned Servers page does not indicate which ESP servers were detected automatically and which ones you connected to directly.

You can now associate the ESP server with a deployment. For more information, see “Add ESP Servers” on page 9.

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### Edit an ESP Server

This topic applies to ESP servers that are not in a cluster. You cannot edit the properties of an ESP server that is in a cluster. For more information, see “ESP Server in a Cluster” on page 8.

1 Open the ESP server if it is not already open: on the page for a specific deployment or on the Unassigned Servers page, select the ESP server that you want to open, and click .

The Edit ESP Server Properties window appears.

2 Edit the fields as required:

- **Name**: Edit the name of the ESP server.
- **Tags**: You can attribute one or more tags to the ESP server. To add a tag, enter text and press Enter. Tags can be used to group and filter ESP servers. Tags are single-term descriptors for the ESP server. Tags cannot contain spaces. Duplicate tags are not permitted on a single ESP server.
- **Description**: Edit the description for the ESP server. For example, you can specify the purpose of this ESP server, to allow users to differentiate between ESP servers with similar names. This description is displayed as a tooltip when you place the cursor over the ESP server’s name in the Name column on the Unassigned Servers page or on the page for a specific deployment that includes this ESP server.

3 If required, change the setting for the Authentication field:

- **None**: This is the default option.


Kerberos: This option is relevant only if the ESP server is configured to require authentication using Kerberos.

OAuth token: This option is relevant only if the ESP server is configured to require authentication using an OAuth token. If you select this option, an additional field appears where you must enter the OAuth token.

Username and password: This option is relevant only if the ESP server is configured to require authentication using a user name and password (SASLogon Services). If you select this option, additional fields appear where you must enter the user name and password.

4 If required, select the Connect using SSL check box. Selecting this check box is relevant only if the ESP server is configured to require SSL encryption.

5 Click OK.

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Remove ESP Servers

Remove an ESP Server That Is Not in a Cluster from a Deployment

Removing an ESP server from a deployment enables you to add that ESP server to another deployment.

Before you can remove an ESP server from a deployment, you must stop and unload any projects that were previously running on the ESP server. For more information, see “Stop and Unload a Project That Is Running on an ESP Server That Is Not in a Cluster” on page 16.

To remove ESP servers from a deployment:

1 Open the deployment if it is not already open: on the Deployments page, select the deployment that you want to open and click .

A separate page that displays the deployment opens.

2 Select the ESP servers that you want to remove. You can select multiple ESP servers by holding down the Ctrl key and using your mouse to select the ESP servers. You can also select all ESP servers by clicking .

3 Click .

If this button is not enabled, check that you have selected only ESP servers that are not in a cluster. Selecting any ESP servers that are in a cluster causes the button to be disabled.

4 To remove the ESP servers from the deployment, select Return the ESP servers to the list of unassigned servers. To remove the ESP servers from SAS Event Stream Manager, select Remove the ESP servers permanently.

---

Remove an ESP Server That Is Not in a Cluster from SAS Event Stream Manager

Removing an ESP server from SAS Event Stream Manager means that SAS Event Stream Manager is not aware of that ESP server. The ESP server itself continues to exist.
To remove an ESP server from SAS Event Stream Manager, you must first remove it from any deployment that it belongs to. For more information, see “Remove an ESP Server That Is Not in a Cluster from a Deployment” on page 12.

If you made a direct connection to an ESP server, you can remove the ESP server from SAS Event Stream Manager by following the steps in this topic. However, if SAS Event Stream Manager is aware of certain ESP servers because the esm.xml configuration file is used in SAS Event Stream Processing, you cannot remove those ESP servers using the SAS Event Stream Manager user interface. For more information about the esm.xml file in a Linux environment, see “Configure the ESP Server for SAS Event Stream Manager” in SAS Event Stream Processing on Linux: Deployment Guide. For more information about the esm.xml file in a Windows environment, see “Configure the ESP Server for SAS Event Stream Manager” in SAS Event Stream Processing on Windows: Deployment Guide.

To remove ESP servers that are not assigned to any deployment from SAS Event Stream Manager:

1. On the Unassigned Servers page, select the ESP servers that you want to remove.
2. Click .
   The Remove ESP Server window appears.
3. Click Yes.

SAS Event Stream Manager is no longer aware of the ESP servers. However, the ESP servers themselves continue to exist.

Delete an ESP Server That Is in a Cluster from a Deployment and from SAS Event Stream Manager

To delete an ESP server that is in a Kubernetes cluster, stop the project that is running on the ESP server. Stopping the project deletes the ESP server from the cluster permanently. For more information, see “Stop a Project That Is Running on an ESP Server in a Cluster” on page 18.

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### Working with Projects

#### View a Project

**Overview**

You can create a project in SAS Event Stream Processing Studio or upload a project to SAS Event Stream Processing Studio. If you publish the project using SAS Event Stream Processing Studio, it becomes visible in SAS Event Stream Manager. If you delete a published project in SAS Event Stream Processing Studio, it remains visible in SAS Event Stream Manager.

**Note:** If SAS Event Stream Processing Studio is running as a stand-alone application (deployed without SAS Viya services), you cannot use it to publish projects. For a project to be visible in SAS Event Stream Manager, you must download it from SAS Event Stream Processing Studio and then upload it to SAS Event Stream Manager. You can upload a project to SAS Event Stream Manager
only if SAS Event Stream Processing Studio is running as a stand-alone application. For more information, see “Upload a Project” on page 14.

To view detailed information about a project, select the project on the Projects page and click . A page with five tabs appears.

Diagram Tab
The Diagram tab displays a graphical representation of the project’s windows and edges. Each window can display icons that represent its state. For more information, see “Window Icons” in SAS Event Stream Processing: Using SAS Event Stream Processing Studio.

You can use the buttons on the toolbar to zoom in and out of the view, or to zoom to fit the view.

XML Tab
The XML tab displays a read-only view of the XML used to construct the model. You can collapse XML elements to restrict your view to the elements that you are interested in.

Details Tab
The Details tab displays general information about the project. This information was entered when the current version of the project was uploaded. For example, the Details tab displays the project description and version notes.

Versions Tab
The Versions tab lists the current version and any previous versions of the project. To open a previous version, right-click it and select Open project version. A separate page appears where you can review the metadata and XML content relating to that version.

The major version is updated when you publish a new version of the project in SAS Event Stream Processing Studio. For example, the version is updated from 1.0 to 2.0.

The minor version is updated when you accept an update to a project that refers to a model that is stored in the SAS Model Manager common model repository. For example, SAS Event Stream Manager updates the project from version 1.0 to 1.1. For more information, see “Update SAS Micro Analytic Service Modules” on page 34.

Files Tab
The Files tab lists analytics model files that are loaded from the SAS Model Manager common model repository and are executed through SAS Micro Analytic Service modules and the Calculate window.

Upload a Project
If SAS Event Stream Processing Studio is running as a stand-alone application (deployed without SAS Viya services), you cannot use it to publish projects. For a project to be visible in SAS Event Stream Manager, you must download it from SAS Event Stream Processing Studio and then upload it to SAS Event Stream Manager. You can upload a project to SAS Event Stream Manager only if SAS Event Stream Processing Studio is running as a stand-alone application. For more information about
downloading a project from SAS Event Stream Processing Studio, see “Download a Project” in SAS Event Stream Processing: Using SAS Event Stream Processing Studio.

Before SAS Event Stream Manager accepts an uploaded project, it validates the project’s content against an active ESP server. Therefore, an ESP server must be available to SAS Event Stream Manager before you attempt to upload a project.

To upload a project to SAS Event Stream Manager:

1. On the Projects page, click and select Upload projects.

   The Upload Projects window appears.

2. Click.

3. Navigate to the file that contains the project that you want to upload and click Open.

   Note: If you want to upload multiple projects that are located in the same folder, you can select the relevant projects and upload them simultaneously. To select multiple projects, hold down the Ctrl key and select each project that you want to upload, and click Open. If your projects are located in different folders, click again, select one or more relevant projects, and click Open.

4. Click Upload.

   An icon is displayed to indicate whether the project was successfully uploaded. Successfully uploaded projects are indicated by the icon . Projects that failed to upload are indicated by the icon .

5. Click OK.

   The projects that you uploaded appear on the Projects page.

   If the project fails validation, an error message appears. You can use the information in the message to correct the issue and then upload the project again.

When you upload a new version of a project that was updated in SAS Event Stream Processing Studio, the project’s major version number is updated in SAS Event Stream Manager. For example, in SAS Event Stream Processing Studio, the version number in the project XML file is incremented from 1.0 to 2.0, and the updated version is displayed in SAS Event Stream Manager. However, if you update the project XML file manually (that is, outside SAS Event Stream Processing Studio), then the version number is always set to 1.0. The version number is set to 1.0 even if the major and minor version numbers are set manually in the project XML file. To ensure that the version number is incremented as expected, update the project in SAS Event Stream Processing Studio.

### Change the Production Status of a Project

Certain assets can be marked as production assets. For more information, see “Production Assets” in SAS Event Stream Manager: Overview.

To change the production status of a project, on the Projects page, right-click the project and select Set as production or Remove as production.

The Production column on the Projects page changes to reflect your choice.
Load and Start a Project on an ESP Server That Is Not in a Cluster

This topic applies to loading and starting a project on an ESP server that is not in a cluster. For information about loading and starting a project on an ESP server that is in a cluster "Load and Start a Project on an ESP Server That Is in a Cluster" on page 17.

You can load and start projects by including the load-project and start-project instructions in a job template. For more information, see “instructions” in SAS Event Stream Manager: XML Language Reference for SAS Event Stream Manager Job Templates. You can also load and start projects by using the user interface controls on the page for a specific deployment. Loading and starting projects using these user interface controls is appropriate in many situations. However, for complex situations, using instructions in a job template might be more useful. For example, in the Stock Trade example, where you collect user input about selected stock codes, using instructions in a job template is appropriate. For more information, see “Overview of the Stock Trade Example” in SAS Event Stream Manager: Examples.

To load or start a project with user interface controls:

1. Open the deployment if it is not already open: on the Deployments page, select the deployment that you want to open and click.

2. In the main table, select the ESP servers on which you want to load or start a project. To select multiple ESP servers, hold down the Ctrl key and click the ESP servers. You can also select all ESP servers by clicking.

3. Click and select Load project, Start project, or Load and start project, as required.

The Load Project window, the Start Loaded or Stopped Project window, or the Load and Start Project window appears.

4. Select the project, and if prompted for select the version, and click OK.

A new page appears, displaying details about the job. For more information, see “View Job Details” on page 37.

Stop and Unload a Project That Is Running on an ESP Server That Is Not in a Cluster

This topic applies to stopping and unloading a project on an ESP server that is not in a cluster. For information about stopping and unloading a project on an ESP server that is in a cluster “Stop a Project That Is Running on an ESP Server in a Cluster" on page 18.

You can stop and unload projects by including the stop-project and unload-project instructions in a job template. For an example of a job template like this, see “A Job Template for Stopping a Project” in SAS Event Stream Manager: Examples. For more information, see “instructions” in SAS Event Stream Manager: XML Language Reference for SAS Event Stream Manager Job Templates.

You can also stop and unload projects by using the user interface controls on the page for a specific deployment.
To stop or unload a project with user interface controls:

1. Open the deployment if it is not already open: on the **Deployments** page, select the deployment that you want to open and click .

2. In the main table, select the ESP servers on which you want to load or start a project. To select multiple ESP servers, hold down the Ctrl key and click the ESP servers. You can also select all ESP servers by clicking .

3. Click and select **Stop project, Unload project**, or **Stop and unload project**, as required.

   The Stop Running Project window, the Unload Project window, or the Stop and Unload Running Project window appears.

4. Select the project and click **OK**.

   A new page appears, displaying details about the job. For more information, see “View Job Details” on page 37.

When a project has stopped, the **Projects** tab in the bottom pane of the **Deployments** page displays the project’s status as stopped. When a project has been unloaded, it no longer appears in the **Projects** tab.

If a project is reported as missing, the Status column in the **Projects** tab displays the value **Missing** and the status icon is red ( ). In this case, you might not be able to unload the project using an instruction. A project is reported as missing if the ESP server that it is running on is restarted. A project might be reported as missing if it was started, but never stopped, by SAS Event Stream Manager, and now is no longer available to the ESP server. To clean up a missing project, right-click the ESP server that contains the affected project and select **Clean up missing projects**. The affected project no longer appears in the **Projects** tab.

---

### Load and Start a Project on an ESP Server That Is in a Cluster

For an introduction to deploying projects to a Kubernetes cluster, see “ESP Server in a Cluster” on page 8.

To deploy a project to a Kubernetes cluster:

1. Open the deployment if it is not already open: on the **Deployments** page, select the deployment that you want to open and click .

2. Click and select **Load and start project in cluster**.

   The Load and Start Project in Cluster window appears.

3. In the **Project** field, select the project.

4. In the **Version** field, select the project version. The options available in this field include the latest minor version for each major version of the project.

5. (Optional) Adjust the settings for creating an ESP server in the cluster. Contact your system administrator for advice.
a Clear the Use default settings check box.

b Click Edit deployment settings. The Deployment Settings window appears.

c In the Requests section, specify the amount of memory and CPU that you want to allocate to the ESP server when it is created.

d In the Limits section, specify the maximum amount of memory and CPU that the ESP server is allowed to use.

e In the Autoscale section, specify the minimum and maximum number of ESP server instances (replicas) that you want to allow.

f Click OK.

6 Click OK. The ESP server that is created on demand appears in main table on the page for the specific deployment.

---

Stop a Project That Is Running on an ESP Server in a Cluster

When you stop a project that is running on an ESP server that is in a cluster, the ESP server is deleted from the cluster.

To stop projects that are running on ESP servers that are in a cluster:

1 Open the deployment if it is not already open: on the Deployments page, select the deployment that you want to open and click .

2 In the main table, select the ESP servers on which the projects are running. You can select multiple ESP servers by holding down the Ctrl key and using your mouse to select the ESP servers. You can also select all ESP servers by clicking .

   **TIP** ESP servers that are in a cluster are identified with the icon.

3 Click on the toolbar and select Stop projects and delete servers from cluster. The Stop Projects and Delete ESP Servers from Cluster window appears.

4 Click Delete.

The ESP servers are deleted from the cluster.

**Note:** In step 2, if you selected any ESP servers that are not in a cluster, no action is taken on those ESP servers. Projects running on ESP servers that are not in a cluster are not stopped, and the ESP servers are not deleted.
Working with Job Templates

Job Template

A job template is an XML document that contains a set of instructions used to create a job. That is, a job template outlines the steps required to execute a project on an ESP server. When you deploy a job template, a job is created.

The job template also specifies what input you must supply when you deploy the job template. For example, when you deploy a job template that contains an instruction to load a project, SAS Event Stream Manager prompts you to select the project that you want to load.

A job template can contain the following elements:

- strings that display localized output
- user parameters that allow a user to enter data into the deployment and customize a job template when it is deployed
- enumerations that restrict user input when used with user parameters
- initializations that replace placeholders to alter a project when it is deployed
- filters that specify a subset of available ESP servers
- instructions that execute and modify projects
- failure instructions that attempt to return the system to normal operation after an instruction has failed to execute

If the job template contains user parameters, you are prompted to enter each of the user parameters when you deploy the job template. SAS Event Stream Manager displays a list of projects and ESP servers that are available.

The string values from a job template’s localizable strings are used to construct labels used when specifying user parameters. After you have selected your user parameters, SAS Event Stream Manager produces and executes a job derived from the job template and the user parameters that you entered. As the job executes, you receive progress updates. The string values from the localizable strings are used to display labels for each instruction.

For examples of job templates, see SAS Event Stream Manager: Examples.

For more information about the elements that you can add to a job template, see SAS Event Stream Manager: XML Language Reference for SAS Event Stream Manager Job Templates.

As previously explained, job templates contain instructions that execute projects. Some of these actions, such as modifying a running project, can be performed only by using instructions in a job template. However, some actions can also be performed by using controls in the SAS Event Stream Manager user interface. These actions include loading, starting, stopping, and unloading projects. For more information about loading and starting a project without using a job template, see “Load and Start a Project on an ESP Server That Is Not in a Cluster” on page 16. For more information about stopping and unloading a project without using a job template, see “Stop and Unload a Project That Is Running on an ESP Server That Is Not in a Cluster” on page 16.

You cannot deploy a job template to an ESP server that is in a cluster. For more information, see “ESP Server in a Cluster” on page 8.
Create a Job Template

1. On the **Job Templates** page, click [+] .
   
   The Create New Job Template window appears.

2. In the **Name** field, enter a unique ID for the job template.

3. In the **Description** field, you can enter the purpose of the job template. For example, you can enter the purpose of the job template to enable users to differentiate between job templates with similar names. This description is displayed as a tooltip when you place the cursor over the job template's name in the Name column on the **Job Templates** page.

4. In the **Tags** field, you can attribute one or more tags to the job template.

   To add a tag, enter text and press Enter. Tags can be used to group and filter job templates. Tags are single-term descriptors for the job template. Tags cannot contain spaces. Duplicate tags are not permitted on a single job template.

5. If you want to create a production job template, select the **Production template** check box. For more information, see “Production Assets” in SAS Event Stream Manager: Overview.

6. In the **Version notes** field, you can add notes to further describe the job template.

   Adding notes is especially useful if you want to track changes between versions of the same job template within SAS Event Stream Manager.

7. Click **OK**.

   Your new job template appears on the **Job Templates** page.

You must now add content to your job template to make it functional. For more information, see “Edit Job Template Content” on page 21.

Upload a Job Template

To upload a job template:

1. On the **Job Templates** page, click [+] and select **Upload job template**.

   The Upload Job Template window appears.

2. In the **File** field, click **Browse** and navigate to the location of your job template.

   Job templates must be in XML format.

3. In the **Tags** field, you can attribute one or more tags to the job template.

   To add a tag, enter text and press Enter. Tags can be used to group and filter job templates. Tags are single-term descriptors for the job template. Tags cannot contain spaces. Duplicate tags are not permitted on a single job template.

4. If you want this job template to be a production job template, select the **Production template** check box. For more information, see “Production Assets” in SAS Event Stream Manager: Overview.
5 In the **Version notes** field, you can add notes to further describe the job template. Adding notes is especially useful if you want to track changes between versions of the same job template within SAS Event Stream Manager.

6 Click **OK**.

When successfully uploaded, the job template appears on the **Job Templates** page.

**Note:** If the job template fails validation, an error message appears. You can use the information in the message to correct the issue and then upload a revised job template.

---

## Edit a Job Template

### Edit Job Template Content

1. On the **Job Templates** page, select the job template that you want to edit, and click **.**

   A separate page appears and displays the XML that defines the job template.

2. Edit the content of the job template as required. For more information, see "Overview of Job Template Content" in *SAS Event Stream Manager: XML Language Reference for SAS Event Stream Manager Job Templates*.

   The following table describes the buttons on the XML editor toolbar:

<table>
<thead>
<tr>
<th>Icon</th>
<th>Action</th>
<th>Keyboard Shortcut</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Revert]</td>
<td>Reverts your previous change.</td>
<td>Ctrl + Z</td>
</tr>
<tr>
<td>![Revert]</td>
<td>Reverts the effects of the undo action.</td>
<td>Ctrl + Y</td>
</tr>
<tr>
<td>![Search]</td>
<td>Searches for specific text.</td>
<td>Ctrl + F</td>
</tr>
<tr>
<td>![Format]</td>
<td>Formats manually entered XML code.</td>
<td>not available</td>
</tr>
</tbody>
</table>

3. Click **.** Alternatively, you can click ** and select **Save template as** to save your changes as a new job template.

### Edit Job Template Properties

1. On the **Job Templates** page, select the job template that you want to edit and click **.**

   A separate page appears and displays the XML that defines the job template.

2. Click **.**

   The Job Template Properties window appears.
3 Edit the Tags field as required. You can also select or deselect the Production template check box to move the job template from test to production or from production to test. For more information about these fields, see “Create a Job Template” on page 20.

Note: You cannot edit the Name and Description fields.

4 Click OK.

Change the Production Status of a Job Template

Certain assets can be marked as production assets. For more information, see “Production Assets” in SAS Event Stream Manager: Overview.

To change the production status of a job template, on the Job Templates page, right-click the job template and select Set as production or Remove as production.

The Production column on the Job Templates page changes to reflect your choice.

Deploy a Job Template

You cannot deploy a job template to an ESP server that is in a cluster. For more information, see “ESP Server in a Cluster” on page 8.

To deploy a job template:

1 On the Job Templates page, select a job template and click .

The Job Template window appears.

2 In the Deployment field, select the deployment to which you want to deploy the job template.

The Job Template window is refreshed to display additional fields, which reflect the parameters element of the job template that you are deploying. Complete these additional fields.

Note: By default, SAS Event Stream Manager deploys the latest version of the project. To deploy a different version, select a value from the Project version drop-down list. You cannot specify the minor version number — instead, SAS Event Stream Manager always uses the latest minor version of the specified major version.

3 Click OK.

SAS Event Stream Manager creates a job from the job template that you deployed. The result of running the job is displayed on a new page. For more information, see “View Job Details” on page 37.

You can also monitor the deployment. For more information, see “Monitor Deployments” on page 27.

For information about stopping a running job, see “Stop a Running Job” on page 39.

Download a Job Template

1 On the Job Templates page, select the job template that you want to download.
2 Click and select **Download job template**.

The job template is downloaded to your computer. The location of the downloaded job template might vary depending on your browser's configuration.

---

**Delete a Job Template**

You can delete a job template if there are no running jobs that reference it.

To delete a job template:

1. **On the Job Templates page, select the job template that you want to delete.**
2. **Click .**

   The Delete Job Template window appears.
3. **Click Yes to confirm the deletion.**

---

**Working with Filters**

**Filters**

SAS Event Stream Manager enables you to search for ESP servers that match certain criteria and save those criteria as a filter that you can reference in job templates. For example, you might want to deploy a project to ESP servers that have the tag `primary`. If the number of ESP servers that have this tag changes, a filter that references this tag still finds any matching ESP servers.

A filter contains a filter expression. The filter expression specifies the search criteria for ESP servers.

You can specify that a filter is available only to a specific deployment or that a filter is available for use with all deployments. For example, this means that the filters available to a deployment called `Deployment1` include filters specific to that deployment as well as filters available to all deployments. However, filters specific to another deployment called `Deployment2` are not available to `Deployment1`.

In addition, the SAS Event Stream Manager user interface can show the result of applying a filter. This means that for a given deployment, the user interface lists the ESP servers that match the filter criteria. This functionality is different from applying a filter. A filter is applied when a job template that references the filter is deployed.

You can reference filters from the `server-filters` and `server-filter-selector` elements in job templates. You can also specify a filter expression directly in the `server-filters` element. For more information about the `server-filters` element, see “server-filters” in *SAS Event Stream Manager: XML Language Reference for SAS Event Stream Manager Job Templates*. For more information about the `server-filter-selector` element, see “server-filter-selector” in *SAS Event Stream Manager: XML Language Reference for SAS Event Stream Manager Job Templates*. 
In addition to creating filters yourself, there is one situation where SAS Event Stream Manager constructs a filter expression that you can then save as a filter. If a job fails to execute on some ESP servers, SAS Event Stream Manager enables you to save a filter that references those failed servers. For more information, see “Rerun a Job” on page 38.

---

**Working with Filters for a Specific Deployment**

When you open a deployment, you can work with filters that are available for that specific deployment.

To work with filters that are available for use with all deployments, use the Filters page instead. For more information, see “Managing Filters” on page 25.

**Show the Result of Applying a Filter**

Showing the result of applying a filter means showing only those ESP servers that match a selected filter. This functionality is different from applying a filter. A filter is applied when a job template that references the filter is deployed.

1. Open the deployment if it is not already open: on the **Deployments** page, select the deployment that you want to open and click .

   A separate page opens to display the deployment.

2. Click on the toolbar and select **Advanced Filtering**.

   The **Advanced Filtering** area appears on the page.

3. In the drop-down list that displays the text **Enter a filter expression**, either select an existing filter or enter a filter expression. For more information, see “Filter Expression Syntax” on page 26.

4. Click **Apply** to see what the result of applying this filter would be.

   The table on the page changes to display only those ESP servers that match the filter expression.

You can save your filter for further use. For more information, see “Save a Filter” on page 24.

To display all ESP servers in the table again, click **Clear**.

**Save a Filter**

1. Complete the steps in “Show the Result of Applying a Filter” on page 24.

2. Click **Save**.

   The Filter Properties window appears.

3. Edit the fields as required:

   - **Name**: The name of the filter. To rename an existing filter, enter a new name.
     
     To overwrite an existing filter, select the filter name from the drop-down list. The contents of all fields, except for **Filter expression**, are replaced with the values from the selected existing filter.

   - **Description**: A description of the purpose of the filter.
Managing Filters

The Filters page enables you to manage filters that are available in SAS Event Stream Manager. This includes filters that are available for use only with specific deployments as well as filters that are available for use with all deployments.

Sort Filters

You can arrange the information in the table on the Filters page in several ways. However, you might find it particularly helpful to sort the table using the Usage column, so that filters available to different deployments or to all deployments are listed together.

For more information about sorting tables, see “Arrange Information in Tables” on page 6.

Create a Filter

The Filters page enables you to create a filter by entering a filter expression. However, you cannot check the result of applying your filter on this page. This functionality is available only when you open the page for a specific deployment and enter a filter expression there. For more information, see “Working with Filters for a Specific Deployment” on page 24.

1  Click 

The Filter Properties window appears.

2  Edit the fields as required:

- **Name**: The name of the filter.
- **Description**: A description of the purpose of the filter.
- **Tags**: One or more tags attributed to the filter.
  
  To add a tag, enter text and press Enter. Tags can be used to group and sort filters. Tags are single-term descriptors for the filter. Tags cannot contain spaces. Duplicate tags are not permitted on a single filter.

- **Filter expression**: A valid expression that defines the filter criteria. For more information, see “Filter Expression Syntax” on page 26.

- **Scope**: Select One deployment or Any deployment. If you select One deployment, the filter is assigned to the current deployment only. You cannot assign the filter to a different deployment on this page. This functionality is available only when you edit the filter on the Filters page. For more information, see “Edit a Filter” on page 26.

4  Click OK.
3 Click **OK**.

**Edit a Filter**

1 Click **Edit**.

   The Filter Properties window appears.

2 Edit the fields as required. For more information about how to use the fields in this window, see “Create a Filter” on page 25.

3 Click **OK**.

**Delete a Filter**

1 Click **Delete**.

   The Delete Filter window appears.

2 Click **Delete**.

---

**Filter Expression Syntax**

Here are examples of supported filter expressions:

- `hostname='server1234.example.com'`
  
  Finds ESP servers that are running on the host server1234.example.com.

- `label~'Test*'`
  
  Finds ESP servers whose names begin with the characters *Test* and are followed by any other characters. For example, this filter finds an ESP server with the name *Test_1* but not *ESP_Test_1* or *test_1*.

  **Note:** If the name of the ESP server contains an apostrophe, enclose the filter term in double quotation marks, and escape the apostrophe with a backslash or an apostrophe. For example, the filter `label~"SiteA's*'` finds an ESP server with the name *SiteA's ESP_server*.

- `((tags='tag1')|(tags='tag2'))`
  
  Finds ESP servers that have the tag *tag1* or *tag2* or both.

- `((tags='tag1')&(tags='tag2'))`
  
  Finds ESP servers that have the tags *tag1* and *tag2*.

- `((tags='tag1')&(tags='tag3')&!(tags='tag5'))`
  
  Finds ESP servers that have the tags *tag1* and *tag3*, but do not have the tag *tag5*.

- `metering=true`
  
  Finds ESP servers whose hosts have metering enabled.

- `version='1.1'`
Finds ESP servers that run with a specific version of SAS Event Stream Processing. Replace 1.1 with the relevant version.

- `ssl=true`
  Finds ESP servers with SSL authentication.
- `analyticsLicensed=true`
  Finds ESP servers whose hosts have a SAS Event Stream Processing Analytics license installed.

---

**Monitoring a Deployment**

**Monitor Deployments**

You can use SAS Event Stream Manager to review details of the active deployments in a SAS Event Stream Processing environment.

**Monitor All Deployments**

The **Deployments** page displays any active deployments in your SAS Event Stream Processing environment.
The **Deployments** page displays the following information about the deployment:

- The number of ESP servers associated with the deployment.
- The status of the ESP servers associated with the deployment.
- The deployment’s name. If the deployment has a description, it is displayed as a tooltip when you place the cursor over the deployment name.
- Whether the deployment is a production deployment. For more information, see “Production Assets” in SAS Event Stream Manager: Overview.
- The tags attributed to the deployment. Tags can be used to group and filter deployments. You can attribute tags to a deployment by editing the deployment. For more information, see “Edit a Deployment” on page 7.
- The date on which the deployment was last updated.
- The user ID or user name of the account that last updated the deployment.

The **Status** column provides a summary of the condition of the ESP servers associated with the deployment. The condition of an ESP server is determined by comparing the state of its projects with their expected state. This information helps you focus on those deployments that have problems. The number of ESP servers associated with the deployment is shown in the center of the icon. The following icons can appear in the **Status** column:
<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="" alt="Available (good)" /></td>
<td>The ESP servers associated with this deployment are available and do not have any projects in a warning or error state.</td>
</tr>
<tr>
<td><img src="" alt="Available (project error)" /></td>
<td>The ESP servers associated with this deployment are available, but at least one ESP server has one or more projects that are in an error state. For more information about the status of ESP servers, see “Monitor a Specific Deployment” on page 30.</td>
</tr>
<tr>
<td><img src="" alt="Available (unmanaged)" /></td>
<td>The ESP servers associated with this deployment are available and do not have any projects that are in an error state. However, at least one ESP server has one or more unmanaged projects (that is, projects that were not initiated from within SAS Event Stream Manager).</td>
</tr>
<tr>
<td><img src="" alt="Unavailable" /></td>
<td>The ESP servers associated with this deployment are not available.</td>
</tr>
<tr>
<td><img src="" alt="This deployment" /></td>
<td>This deployment (for example, a newly created deployment) does not contain any associated ESP servers.</td>
</tr>
</tbody>
</table>

The icons shown in the preceding table assume that the deployment has multiple ESP servers that are all in the same state. If a deployment has more than one ESP server that are in different states, the icon in the Status column is displayed in multiple colors. These colors indicate the status of each of the ESP servers associated with the deployment. For example, the following icon shows a deployment that has five ESP servers — three are in the state Available (good), one is Available (unmanaged), and one is Unavailable:

![Five ESP servers]( )

You can arrange information in the table in several ways. For more information, see “Arrange Information in Tables” on page 6.

Clicking a deployment populates the **ESP Server Status** and **Running Projects** tiles:

- The **ESP Server Status** tile shows the number of ESP servers in each state.
- The **Running Projects** tile shows the number of running instances for each project in the deployment and the state of the instances. The project names and versions displayed in this tile correspond to the project names and versions displayed on the **Projects** page. The name of a running instance can be different from the project name, but in this tile such running instances are grouped under the project name.
Monitor a Specific Deployment

To view more details for a specific deployment, select the deployment on the Deployments page and click Click. A separate page appears, displaying information about the ESP servers assigned to the deployment and the projects running on those ESP servers. Clicking an ESP server in the main table populates the bottom pane with tabs that contain further information about that ESP server.

**Figure 8  Example of a Page for a Specific Deployment**

The main table displays the following information for each server or device defined as an ESP server:

- The ESP server’s status.
- The ESP server’s name.
- The ESP server’s type. **ESP server** indicates an ESP server that is not in a Kubernetes cluster. **Cluster server** indicates an ESP server that is in a Kubernetes cluster. For more information, see “ESP Server in a Cluster” on page 8.
- The tags attributed to the ESP server. Tags can be used to group and filter ESP servers. You can attribute tags to an ESP server by editing the ESP server. For more information, see “Edit an ESP Server” on page 11.
- The host on which the ESP server is running.
- The port for HTTP administration requests and for the HTTP publish/subscribe server.
- The SAS Event Stream Processing version installed on the host on which the ESP server is running.
- Whether a SAS Event Stream Processing Analytics license is installed on the host. To deploy a project that contains SAS Event Stream Processing Analytics windows, an appropriate license must be available.
- Whether SAS Event Stream Processing has been enabled to meter the number of events that are processed on the ESP server.
- A count of projects with different statuses. An example is (4) 2 Running, 1 Loaded, 1 Stopped.
The Status column provides a summary of the ESP server’s condition. The condition of an ESP server is determined by comparing the state of its projects with their expected state. This information helps you identify ESP servers that have problems. The Status column also indicates whether an ESP server is in a cluster. The following icons can appear in the Status column:

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>🟢 Available (good) — The ESP server is available and does not have any projects in a warning or error state.</td>
<td></td>
</tr>
<tr>
<td>🔴 Available (project error) — The ESP server is available, but at least one project is in an error state. For more information about the status of ESP servers, see “Monitor Unassigned ESP Servers” on page 36.</td>
<td></td>
</tr>
<tr>
<td>🟠 Available (unmanaged) — The ESP server is available and does not have any projects that are in an error state. However, it is running at least one unmanaged project (that is, a project that was not initiated from within SAS Event Stream Manager).</td>
<td></td>
</tr>
<tr>
<td>🔴 Unavailable — The ESP server is not available.</td>
<td></td>
</tr>
<tr>
<td>🚄 Cluster server — The ESP server is in a Kubernetes cluster.</td>
<td></td>
</tr>
</tbody>
</table>

You can arrange information in the table in several ways. For more information, see “Arrange Information in Tables” on page 6.

Clicking an ESP server populates the bottom pane with tabs that contain information relating to that ESP server:

- The Projects tab displays projects that are running on the ESP server.
  - The status icon provides information that is similar to the status icon in the main table on the page for a specific deployment: the status of a project is determined by comparing its state with its expected state. For example, if the status and the expected status do not match, the icon is red and its tooltip shows the message Unexpected status.
  - The Server Properties tab displays identifying information about the ESP server. You can click Edit properties to change most of these properties.
  - The Server Configuration tab displays information about connector types, streaming analytics, and whether SAS Event Stream Processing has been enabled to meter the number of events that are processed on the ESP server.
  - The Performance tab provides information about memory use. It also provides information about CPU use for each project and window.
  - The Log tab displays log messages for the ESP server. For more information, see “View the ESP Server Log” on page 32.

On this page you can also perform actions on projects associated with your deployment:

- Load and start projects. If the ESP server is not running in a cluster, see “Load and Start a Project on an ESP Server That Is Not in a Cluster” on page 16. If the ESP server is running in a cluster, see “Load and Start a Project on an ESP Server That Is in a Cluster” on page 17.
- View sample data for running projects. For more information, see “View Sample Data” on page 33.
- Stop and unload projects. If the ESP server is not running in a cluster, see “Stop and Unload a Project That Is Running on an ESP Server That Is Not in a Cluster” on page 16. If the ESP server
is running in a cluster, see “Stop a Project That Is Running on an ESP Server in a Cluster” on page 18.

View the ESP Server Log

Access the Log

If an ESP server is assigned to a deployment, you can use SAS Event Stream Manager to view the ESP server log.

To view the ESP server log:

1. Open the deployment to which the ESP server is assigned: on the Deployments page, select the deployment and click .

2. In the main table, select the relevant ESP server.

3. In the bottom pane, click the Log tab.

4. If the Enable button is displayed in the Log tab, click it to enable logging on the ESP server. By default, logging is disabled on each ESP server.

About the Log Tab

SAS Event Stream Manager displays a real-time view of the ESP server log. Historical log messages are not displayed.

SAS Event Stream Manager displays messages that were logged after you opened the deployment in SAS Event Stream Manager and selected the ESP server.

If you select another ESP server or close the page for the specific deployment, log messages that were displayed in SAS Event Stream Manager are not retained. If you subsequently return to viewing the same deployment and select same the ESP server, only new log messages are displayed.

If you want to keep viewing log messages for an ESP server, keep the page open for the specific deployment.

You can clear the messages in the Log tab by clicking Clear log. The ESP server continues to log messages, and these new messages appear in the Log tab.

Filter Log Messages

To filter log messages by message type, select one or more of the following options in the Log tab:

- All – Shows all log message types.
- Informational – Shows general log messages that are not warnings or errors.
- Warning – Shows only warning messages.
- Fatal and Error – Shows only error messages, including fatal errors and normal errors.
View Sample Data

To view sample data for a running project:

1. On the **Deployments** page, select a deployment that has a running project and click.

   **TIP** You can use the **Running Projects** tile on the **Deployments** page to identify deployments that have running projects. For more information, see “Monitor Deployments” on page 27.

   A page that displays information about the selected deployment appears.

2. In the main table, select the ESP server that contains the running project that you are interested in.

   Tabs appear in the bottom pane.

3. Right-click a running project in the **Projects** tab in the bottom pane, and select **Open running project**.

   A new page opens, where sample data is displayed using tables, with a tab for each window. The following figure shows an example:

   ![Sample Data Table](image)

   **Note:** SAS Event Stream Manager displays a real-time view of the data. If your data source contains a limited number of events (for example, the data source is a CSV file rather than a stream of data), the table will be empty after all the events have been displayed.

   You can arrange information in the table in several ways. For more information, see “Arrange Information in Tables” on page 6.

   You can use the **Show formatted fields** check box to choose whether data appears exactly as it was received from the ESP server or with additional formatting. Here are some examples of additional formatting that is applied when the check box is selected:

   - Dates are shown as Coordinated Universal Time (UTC) in ISO 8601 format. An example is 2018-11-30T13:33:47.000Z. If you clear the check box, dates appear in UNIX Epoch time, as this is the format in which the data is received from the ESP server.
A dot is used as a separator in certain types of numerical data, rather than another separator, such as a comma. If you clear the check box and your locale is set to a locale that uses another separator, that separator is displayed instead of a dot.

Opcodes are displayed using their localized names if your locale is not set to an English-language locale. If you clear the check box, opcodes are always shown in English, as this is how the data is received from the ESP server.

You can use the buttons on the navigation toolbar below the table to move between pages of sample data, or to jump to a specific page of sample data. The following table describes the buttons on the navigation toolbar:

<table>
<thead>
<tr>
<th>Icon</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>←</td>
<td>Displays the first page of sample data.</td>
</tr>
<tr>
<td>←</td>
<td>Displays the previous page of sample data.</td>
</tr>
<tr>
<td>→</td>
<td>Displays the next page of sample data.</td>
</tr>
<tr>
<td>→</td>
<td>Displays the last page of sample data.</td>
</tr>
</tbody>
</table>

Update SAS Micro Analytic Service Modules

About SAS Micro Analytic Store Modules

SAS Event Stream Processing projects can refer to models that are stored in the SAS Model Manager common model repository. When a project is deployed, the model is retrieved from the SAS Model Manager common model repository and written to the ESP server. SAS Micro Analytic Service modules are used to accommodate such models. The following figure shows the process.
These models can be subsequently updated if a new champion model is declared. If a running project in SAS Event Stream Manager refers to a model stored in the SAS Model Manager common model repository, you can update the running project to reflect updates to the model.

Accept Updates to SAS Micro Analytic Store Modules

If an update is available, a notification bar is displayed on the page for the affected deployment. The following figure shows an example. You can update all projects that are running the specified version of the model, or you can select the projects that you want to update.

To hide the notification for a specific update temporarily, click **Ignore**. The notification for that update is hidden until you return to the **Deployments** page.

To accept the update for one or more projects that are running the specified version of the model:

1. Click **Deploy** on the notification bar.
   
   The Update SAS Micro Analytic Service modules window appears.

2. Click **All projects running this version** or **Select projects**, as required.

3. If you clicked **Select projects**, a drop-down list is displayed. Use this drop-down list to select the projects that you want to update. The drop-down list displays all the projects that reference the updated model. For each project, the ESP server that the project is currently deployed to is shown in brackets.

4. Click **OK**.

   SAS Event Stream Manager runs a job to fetch and deploy the new champion model for the selected projects. To view the status of this job, open the **Log** page.
SAS Event Stream Manager updates the SAS Micro Analytic Service store with the model content and then replaces the SAS Micro Analytic Service module that each selected project is using. The schemas for the existing windows in the project are not altered during this operation. The new champion model must contain function input and output variables that are compatible with the existing schema.

The minor version of the project is updated. For example, the project version is updated from 1.2 to 1.3. The new version is also available in SAS Event Stream Processing Studio.

Monitor Unassigned ESP Servers

You can use the Unassigned Servers page to view all ESP servers that SAS Event Stream Manager is aware of, and which are available to be assigned to a deployment. ESP servers that already belong to a deployment are not displayed.

The Unassigned Servers page does not indicate why SAS Event Stream Manager is aware of a particular ESP server. SAS Event Stream Manager is aware of an ESP server for one of the following reasons:

- SAS Event Stream Manager received information about the specific ESP server from SAS Event Stream Processing.
- You made a direct connection to the specific ESP server. For more information, see “Connecting Directly to an ESP Server” on page 10.

The information about the status and properties of ESP servers is similar to the information about the page for a specific deployment. For more information, see “Monitor a Specific Deployment” on page 30.

Monitor Jobs

View All Jobs

The Log page displays the status of active and historical jobs, except for any jobs that you have deleted from the page. You can use this information to help resolve problems with your deployments. The following information is displayed for each job:

- the name of the job template from which the job was created
- the name of the deployment that the job template belongs to
- the user who deployed the job template
- the time at which the job template was deployed
- the time at which the job was completed
- the time it took for all the tasks in this job to be completed (whether they were completed successfully or not)
- the status of the job
- the job’s progress (specified as a percentage)
To refresh the table, click . If the table contains too much information, you can arrange the information in several ways to find the jobs that you are interested in. For more information, see "Arrange Information in Tables" on page 6. In addition, you can use the drop-down menu that has the text Jobs started today to select a time period. You can also delete jobs from the table. For more information, see "Delete a Job" on page 38.

To view more information for a specific job, select the job in the table at the top of the page. The bottom pane displays the following information:

- The Progress tab shows how many tasks were completed and whether tasks were completed on all relevant ESP servers.
- The Failed Tasks tab lists tasks that were not completed.
- The Parameters tab lists parameters in the job template along with the value entered by the user for each parameter.
- The Details tab shows the job template description and other basic information.

View Job Details

A page that contains job details is displayed when you execute a project or when you select a job in the main table on the Log page and click . The following figure shows an example:
Figure 12  Open Job

The top of the page shows a summary and contains information about how many tasks were completed and whether tasks were completed on all relevant ESP servers.

The table on this page shows all tasks for the job, in the order in which the instructions are executed. You can expand items in the Task column to view the required level of detail. In the example, the Stop the running project and Unload the loaded or stopped project rows relate to instructions in this specific example. That is, the names of the rows are derived from the job template. The table also shows that each task was completed on the same ESP server fraud_esp1_1.

You can also use the following check boxes to filter the contents of the table: Running, Not started, Completed, Completed with failures, and Cancelled.

Delete a Job

Deleting a job removes it from the main table on the Log page. Deleting jobs can be useful if the table contains jobs that are no longer relevant.

Deleting a job affects only the information that appears in the table; it does not affect job execution. Nevertheless, you cannot delete a job that is still running.

1  Do one of the following:
   - To delete a specific job from the Log page, select the job and click .
   - To delete several jobs, click and select Delete all canceled jobs, Delete all failed jobs, or Delete all successful jobs.

2  Click OK.

Rerun a Job

If a job fails to complete successfully, you can run it again. For example, a job might not complete successfully because an ESP server was unavailable or a data file was not present. After you have
resolved the problem, you can rerun the job quickly from the page for that specific job rather than deploying the job template again. You can also rerun jobs that completed successfully.

Rerunning a job creates a new job, as opposed to starting the original job again.

To rerun a job:

1. Open the job if it is not already open: on the Log page, select the job and click .
2. Click .

   The Rerun Job window appears.
3. In the Strategy field, select your preferred option:
   - Rerun all instructions
   - Rerun all instructions on servers that failed to complete successfully
   - Save failed servers to a filter

   Select this option to create a filter that references the failed ESP servers. If you select this option, you must enter a name in the Filter name field. You can then reference this filter in another job template that addresses errors or cleans up ESP servers. For example, consider a situation where a project was loaded but a connector was not started because files were not available. A job template that addresses this error might include the start-connectors instruction. Consider another situation where a project could not be loaded because it had already been loaded. A cleanup job template might contain the unload-project and stop-project instructions.

   If the original job template needs to be run instead, use the Rerun all instructions on servers that failed to complete successfully.

   For more information about how you can use filters, see “Filters” on page 23.
4. If required, select Skip failed instructions.
5. Click OK.

   SAS Event Stream Manager reruns the job. The result appears on a new page and also on a new row in the table on the Log page.

Stop a Running Job

Stopping a running job can be helpful if, for example, you want to stop a job that is taking a long time to complete. Stopping a running job means canceling the execution of instructions that have not yet been executed. That is, when you stop a running job, the instruction that is currently being processed will be executed, but any subsequent instructions will not be executed.

Stopping a running job does not stop a running project. For more information, see “Stop and Unload a Project That Is Running on an ESP Server That Is Not in a Cluster” on page 16.

To stop a running job:

1. Select the job in the main table of the Log page and click .

   The Cancel Job window appears.
2. Click OK.
Working with Metering Servers

Metering
SAS Event Stream Manager enables you to monitor your metering servers. This ensures that your production ESP servers are in compliance with the terms of your software license. You must run at least one metering server to track usage data (that is, event counts) on your production ESP servers.

You do not need to track events on development servers because they do not contribute to the event volume assigned to your software license.

Add a Metering Server
To monitor an ESP metering server, you must add it to the list of defined metering servers in SAS Event Stream Manager.

To add a metering server:
1. On the Metering page, click  
   The Metering Server Properties window appears.
2. In the Host field, enter the host name of the server containing the metering server.
3. In the Metering port field, either accept the default value (31001) or replace it with the network port defined on the metering server.
4. Click OK.

The metering server is displayed on the Metering page, along with any other metering servers that were added previously.

Monitor a Metering Server

View Metering Server Details
To view details about a metering server, select the required metering server on the Metering page.

Note: If the metering server that you want to monitor is not listed, you must add it to SAS Event Stream Manager. For more information, see “Add a Metering Server” on page 40.

The Events tile displays each license associated with the selected metering server. It also displays the total number of events recorded for that license for each month or year in the selected time period.
To change the time period, click the drop-down list and select the required time period. For example, select **Show yearly totals**, **Show last 12 months**, or **Show monthly breakdown for year**. The event information is shown for the selected time period.

You can click ![refresh icon] to refresh the results in the **Events** tile to reflect any further metered events that have taken place after you selected the metering server.

Expanding each license in the Events tile enables you to view the total number of events for each host that uses the license. For metering servers that run with SAS Event Stream Processing 6.1 or a later release, each host can be expanded to view events for individual servers.

**Export Detailed Events Information**

You can export detailed information about metering server events to a comma-separated values (CSV) file. The CSV file contains the following events information, with separate rows for each unique combination: license, host, ESP server, server type, event date, event time (for each hour), continuous query, project, and window. The total number of events for the specific hour is displayed in the final column.

To export a CSV file:

1. On the **Events** tile, click the drop-down list and select a time period.
2. (Optional) Select a row in the table to specify the license, host, or server that you want to export detailed event information for. If you do not select a row in the table, detailed event information is exported for all licenses, hosts, and servers on the metering server.
   
   **Note:** All rows within a group are included in the export file. For example, if you select a license, the export file will contain details of all hosts that use that license and all servers on each of those hosts.
3. Click ![export icon].

   The **Export Metering Data** window appears. The **Months** field contains a filter token for each month in the selected time period. Here is an example of a filter token: ![3/2019 filter token].

   **Note:** To add a month to the export, click in the **Months** field and select a month from the drop-down list. To remove a month from the export, click in the corresponding filter token. If you remove all filter tokens, so that the **Months** field is empty, the CSV file will contain details of all events on the metering server regardless of date.

4. Edit the file name as required and click **OK**.

   The CSV file containing the exported data is downloaded to your computer.

**Group Metering Servers**

You can arrange the information in the table on the **Metering** page in several ways. However, you might find it particularly helpful to group the table by the **Host** column, so that all ESP metering servers on a particular host are grouped together.

For more information, see "Arrange Information in Tables" on page 6.