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Introduction

Steps for a Successful Deployment

Before You Begin

- Because the contents of this guide are subject to continual updates, make sure that you have the latest guide. You can always access the latest release of this guide from the following site:
  
  SAS Viya Deployment Guides

  If you accessed this guide directly from the Software Order Email (SOE), you are viewing the latest guide. If you are viewing a saved copy of the PDF version of this guide, the content might be outdated.

- To use this guide successfully, you should have a working knowledge of Microsoft Windows PowerShell and the Windows operating system.

- This guide also contains instructions for installing and deploying SAS Event Stream Manager, which is automatically included with orders of SAS Event Stream Processing.

Use this guide to deploy SAS Event Stream Processing and SAS Event Stream Manager in your Windows environment. SAS Event Stream Processing 6.2 is compatible with both SAS 9.4 and SAS Viya. It uses the same deployment tools and process as SAS Viya. However, SAS Event Stream Processing can still be installed as a stand-alone product without additional SAS Viya components.

To install on Linux, a separate order that specifies the Linux platform is required.
Step 1 — Prepare for the Deployment

1. Perform one of the following tasks:
   - To upgrade or update an existing deployment, go directly to Chapter 6, “Managing Your Software,” on page 39.
     
     Note: If the existing deployment includes SAS Event Stream Manager, it will be upgraded automatically. Otherwise, the SAS Event Stream Manager software will be installed automatically as an add-on package when the deployment is upgraded.
     
   - To deploy a new instance of the software, continue with the following steps.
     
     2. Go to Chapter 2, “System Requirements,” on page 3 to learn about requirements for hardware, software, user accounts, and more.
     
     3. Go to Chapter 3, “Pre-installation Tasks,” on page 9 to prepare your environment before you deploy the software.

Step 2 — Perform the Deployment

1. Go to Chapter 4, “Installing SAS Event Stream Processing,” on page 21 to deploy the software.

2. Go to Chapter 5, “Post-installation Tasks,” on page 23 to perform post-installation configuration.

Contact SAS Technical Support

Technical support is available to all customers who license SAS software. However, you are encouraged to engage your designated on-site SAS support personnel as your first support contact. If your on-site SAS support personnel cannot resolve your issue, have them contact SAS Technical Support to report your problem.

Before you contact SAS Technical Support, explore the SAS Support website at support.sas.com/techsup/. This site offers access to the SAS Knowledge Base, as well as SAS communities, Technical Support contact options, and other support materials that might answer your questions.

When you contact SAS Technical Support, you are required to provide information, such as your SAS site number, company name, email address, and phone number, that identifies you as a licensed SAS software customer.
Hardware Requirements for SAS Event Stream Processing

SAS Event Stream Processing can be installed as a stand-alone product. It can also coexist with either SAS Viya or with SAS 9.4. All components of SAS Event Stream Processing are installed on the same machine, including the three clients (SAS Event Stream Manager, SAS Event Stream Processing Studio, and SAS Event Stream Processing Streamviewer).

The following table describes a standard set of specifications for a machine where SAS Event Stream Processing is deployed:

Table 2.1 Minimum Hardware Requirements

<table>
<thead>
<tr>
<th>Item</th>
<th>Recommended Level*</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>4 cores (x86 architecture).</td>
</tr>
<tr>
<td></td>
<td>8 cores are recommended for improved performance.</td>
</tr>
<tr>
<td></td>
<td>Intel or AMD 64-bit chip set with a minimum speed of 2.6 GHz</td>
</tr>
<tr>
<td>Item</td>
<td>Recommended Level*</td>
</tr>
<tr>
<td>-------------------------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>Memory</td>
<td>32 - 64 GB of RAM</td>
</tr>
<tr>
<td></td>
<td>Memory clock speed of 1600 MHz</td>
</tr>
<tr>
<td>Disk Space and Speed</td>
<td>20 GB or more</td>
</tr>
<tr>
<td></td>
<td>10,000 RPM</td>
</tr>
</tbody>
</table>

Additional machines can be used to access the client user interfaces. These machines require minimal processing power and storage space and can run on Windows or UNIX.

To use SAS Foundation in SAS Event Stream Processing deployments, as when, for example, you want to run SAS in a procedural window, SAS Event Stream Processing must be installed on the same machine as SAS Foundation. Depending on your version of SAS, a SAS/ACCESS engine might also be required.

---

### Operating System Requirements

#### Supported Operating Systems

For the full list of supported platforms, see: [https://support.sas.com/en/documentation/third-party-software-reference/viya/35/support-for-operating-systems.html](https://support.sas.com/en/documentation/third-party-software-reference/viya/35/support-for-operating-systems.html).

---

**Note:** SAS Event Stream Processing and the clients can also be installed on Red Hat Enterprise Linux, but a separate package, based on your software order, is required.

---

### SAS Support for Alternative Operating Systems

SAS provides support on a limited basis for alternative operating system distributions that customers might select. For more information, see the official support policy statement at [http://support.sas.com/techsup/pcn/altopsys.html](http://support.sas.com/techsup/pcn/altopsys.html).
Software Requirements

Windows PowerShell

Microsoft Windows PowerShell version 5.1 or later is required in order to install SAS Event Stream Processing on Windows. PowerShell is a framework that supports a scripting language and configuration management capabilities on Windows.

Follow these steps to determine the current version of PowerShell if it is already installed:

1 Start PowerShell.

2 At the PowerShell command prompt, enter the following command to find out the PowerShell version:

   $PSVersionTable.PSVersion

   In the output, verify that the major version is 5 and that the minor version is 1 or later.

3 If required, install a newer version of PowerShell by installing Windows Management Framework 5.1. Follow these steps:

   Note: You can skip this step if you are installing SAS Viya on Microsoft Windows Server 2016.


   b Double-click the executable, and follow the prompts to install it.

4 SAS Viya will use PowerShell scripts to configure and run services. Manually enable script execution in PowerShell by running the following command:

   Set-ExecutionPolicy -scope LocalMachine Unrestricted

Additional Software

If you are installing on Windows Server 2012 R2, the Microsoft .NET Framework 4.6.1 or later is required.


The Microsoft Visual C++ Redistributable Packages for Visual Studio 2013 and 2015 (64-bit version) are required for all supported platforms.
Download the packages from the following Microsoft website: https://support.microsoft.com/en-us/help/2977003/the-latest-supported-visual-c-downloads.

**Note:** Both packages must be installed before you can install SAS Event Stream Processing software.

### Java Requirements

The Java Runtime Environment (JRE) must be installed on each machine in your deployment. Oracle Java 1.8.x is required for all SAS Event Stream Processing components and for SAS Event Stream Manager. Only the JRE is required, not the full JDK.

To determine the version of Java that is installed on the local machine, follow these steps:

1. Open the Windows Control Panel.
2. Navigate to Programs and Features.

   If Java is installed, one or more Java versions are listed in the Programs and Features panel.

You can also navigate to java.com to automatically detect the Java version on your machine and to update your version.

### Web Browsers

The SAS Event Stream Processing clients include some advanced user interface features, which require a newer web browser. For information about supported browsers, see: https://support.sas.com/en/documentation/third-party-software-reference/viya/35/support-for-web-browsers.html

If you cannot install one of the supported web browsers, be aware of possible unexpected user interface behavior. Because session cookies are required in order to maintain session state, be sure to enable cookies in your browser.

### Screen Resolution

The minimum screen resolution for each client machine that will access the SAS Viya user interfaces is 1280 x 1024.

### User Account Requirements

The user account that is used to perform the deployment requires Administrator privileges. However, Administrator privileges are not required after the deployment has completed in order to run an instance of the ESP server. The installation
directory path enables Write access per user group, and it is owned by the user account that is used to perform the installation. To enable users to edit the product configuration files, the administrator can use a Group policy to grant Write access to these files to any user.

A user account is required in order to enable the SAS Infrastructure Data Server to start automatically. The SAS Infrastructure Data Server runs on PostgreSQL. Create the account before you start the deployment process. Make sure that it has the following attributes:

**Table 2.2** Required User Account for SAS Infrastructure Data Server

<table>
<thead>
<tr>
<th>Account Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PostgreSQL server user account</td>
<td>It can be either a local account or a domain account, but it must be a standard user account that lacks administrator privileges. The user name <em>postgres</em> is recommended. This account requires the privilege to Log on as a Service. When you create the user account:</td>
</tr>
<tr>
<td></td>
<td>- Clear the check box labeled <em>User must change the password at the next logon</em>.</td>
</tr>
<tr>
<td></td>
<td>- Select the check box labeled <em>User cannot change password</em>.</td>
</tr>
<tr>
<td></td>
<td>If the security policies at your enterprise allow you to disable password expiration, disable it by selecting the check box labeled <em>Password never expires</em>. If the password expires, the PostgreSQL service will no longer start. You can periodically change the password for the service in the Windows Control Panel and restart the service. However, you must also regenerate the required credentials file each time the password changes. The following restrictions apply to the password:</td>
</tr>
<tr>
<td></td>
<td>- Must contain alphanumeric characters only. Cannot contain any non-alphanumeric characters, such as hyphens or underscores.</td>
</tr>
<tr>
<td></td>
<td>- Must be at least six characters long.</td>
</tr>
</tbody>
</table>

As part of the installation process, you must specify security parameters for this user account. For more information, see “Specify Credentials for the postgres User Account” on page 18.

**LDAP Requirements**

An LDAP server is required to enable users to log on to all three SAS Event Stream Processing clients: SAS Event Stream Processing Studio, SAS Event Stream Processing Streamviewer, and SAS Event Stream Manager. LDAP also enables some critical services. Read access to your LDAP provider is required.
Note: You have the option to install the three clients as stand-alone applications. In this case, they are not integrated with SAS Event Stream Processing authentication services. If they are running as stand-alone applications, the client components use OAuth 2.0 for user authentication and run with authentication enabled by default. For instructions on setting up these components to run independently, see Chapter 5, “Post-installation Tasks,” on page 23.

SAS software requires a userDN and password in order to bind to the LDAP server. Anonymous binding is supported for clients that are authenticating to the LDAP server.

If the mail attribute is specified for LDAP accounts, it must have a non-null value that is unique for each user.

LDAPS is supported, but the required certificates are not configured automatically by the deployment process.

To configure LDAP to enable access to SAS Event Stream Processing Studio, SAS Event Stream Processing Streamviewer, and SAS Event Stream Manager, follow the steps in "Configure LDAP Settings" on page 21 before you run the deployment script.

Encryption and Authentication Options

SAS Event Stream Processing provides optional encryption and authentication features. You can enable encryption on TCP/IP connections within an event stream processing engine. You can also configure ESP servers to require client authentication for SAS TCP/IP clients.

To enable encryption, the OpenSSL libraries must be installed on systems that run the ESP server and clients. Version 1.0.2 or later of the Transport Layer Security (TLS) Protocol is required in order to take advantage of ECDH support for encryption ciphers used in encrypted connections.

Authentication and encryption apply to the following ESP server APIs:

- The ESP Server (XML Server) HTTPS API
  - Connections that are created by a client to communicate with an ESP server
  - Connections that are created by a file and socket connector or adapter that acts as a socket client or server
- C, Java, or Python Publish/Subscribe API
  - Connections that are created by a client that uses the C, Java, or Python Publish/Subscribe API to communicate with an ESP server
  - Connections that are created by an adapter to communicate with an ESP server

For more information about enabling security for an ESP server or for SAS Event Stream Processing Streamviewer, see SAS Event Stream Processing: Security.
Pre-installation Tasks

Create a Mirror Repository

A mirror repository is required for all SAS Viya deployments on SUSE Linux. For other platforms, it is optional.

Overview

SAS Mirror Manager is a command-line utility for synchronizing a collection of software repositories from SAS. Its primary purpose is to create and manage mirror repositories for software deployment. Mirror repositories are useful if your deployment does not have access to the internet, or if you must always deploy the same version of software (such as for regulatory reasons).

SAS Mirror Manager downloads the software that you ordered and creates a mirror repository. It can create the mirror repository in a specified location, such as a shared NFS mount point or a web server that serves the files with HTTP. The default location for the files that SAS Mirror Manager will download is the `sas_repos` directory in the installation user’s home directory. Make sure that the default location or another location that you select has adequate space. Also ensure that the machine where the mirror repository will be located has adequate space.
This guide refers to the default location as `sas_repos`. If you specify a different mirror destination, replace instances of `sas_repos` that are used in this guide with the actual location that you select.

The directories and files that are downloaded to `sas_repos` are explained as follows:

- The entitlements.json is a list of the repositories to which you are entitled.
- The `location_group_declarations.json` file and the `sasmd` directory contain data that is used by the SAS Orchestration CLI to create the order-specific tools for your deployment.
- Any remaining directories are the software repositories, organized by native deployment tools:
  - `repos` contains `yum` files for Linux.
  - `win` contains `MSI` files for Windows.
  - `deb` contains `APT` files for Debian.

By default, SAS Mirror Manager downloads the contents of all repositories to which your order entitles you. However, the tool provides options to download software selectively, based on the target platform for the installation. If you run SAS Mirror Manager without options, make sure that the machine where the software is downloaded has adequate disk space to accommodate all platforms:

<table>
<thead>
<tr>
<th>Platform</th>
<th>Command Option</th>
<th>Required Disk Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>All platforms</td>
<td>None</td>
<td>159 GB</td>
</tr>
<tr>
<td>Linux on Power</td>
<td>ppc64le-redhat-linux-7</td>
<td>54 GB</td>
</tr>
<tr>
<td>Red Hat Enterprise Linux or equivalent, such as Oracle Enterprise Linux, only</td>
<td>x64-redhat-linux-6</td>
<td>89 GB</td>
</tr>
<tr>
<td>SUSE Linux Enterprise Server only</td>
<td>x64-suse-linux-12</td>
<td>70 GB</td>
</tr>
<tr>
<td>Windows only</td>
<td>64-windows-61</td>
<td>38 GB</td>
</tr>
</tbody>
</table>

### Using SAS Mirror Manager

To create a mirror repository with SAS Mirror Manager:

1. The Software Order Email (SOE) indicated that you should save the `SAS_Viya_deployment_data.zip` file attachment. If you have not already saved the file, save it now.
2 Download SAS Mirror Manager from the SAS Mirror Manager download site to the machine where you want to create your mirror repository.

Note: If you use Microsoft Internet Explorer or Microsoft Edge to download the Linux or Macintosh version, save the file as a .tgz file instead of a .gz file.

3 Uncompress the downloaded file.

4 (Optional) Add the location of SAS Mirror Manager to your PATH environment variable.

Note: This step is not required. However, the example SAS Mirror Manager commands in this section assume that you have added the recommended location to your PATH.

5 Run the following basic command to create the mirror repository in the default location:

Note: All the software to which your order entitles you is downloaded if you use the basic command.

```
mirrormgr mirror --deployment-data path-to-SAS_Viya_deployment_data.zip
```

By default, the repositories are placed in the `sas_repos` directory in the installation user’s home directory. Use the `--path` option, followed by the full directory location of the mirror destination, to change this location.

```
mirrormgr mirror --deployment-data path-to-SAS_Viya_deployment_data.zip --path location-of-mirror-repository
```

Note: If you have an HTTPS proxy, you might also need the `--cacert` option, followed by the location of the certificate (PEM file) that the proxy will use. The proxy certificate is one that your organization manages.

```
mirrormgr mirror --deployment-data path-to-SAS_Viya_deployment_data.zip --platform platform –latest --trusted-certificate cert-file-name.pem
```

6 (Optional) If your mirror repository is being created on a machine that is secured by TLS (HTTPS), use the `--trusted-certificate` option to define the Certificate Authority chain (such as a file named `ca_cert.pem`).

```
mirrormgr mirror --deployment-data path-to-SAS_Viya_deployment_data.zip --path location-of-mirror-repository --platform platform –latest --trusted-certificate cert-file-name.pem
```

7 (Optional) After the initial download is complete, move the file structure to a web server or shared NFS mount. The destination machine does not have to be connected to the internet.
Using SAS Mirror Manager with a Proxy Server

If your environment requires a proxy server and is set up to use it, the SAS Mirror Manager commands will work automatically. However, if your environment is not set up to send data through the proxy, you can add an environment variable to the command to run SAS Mirror Manager. The environment variable identifies where the proxy is located and what is required to send data through it.

Use the environment variable that is appropriate for the target of the query that passes through the proxy. For example, if you are trying to reach a SAS repository, you should use the HTTPS environment variable because the SAS repository is on an HTTPS site. In most cases, the HTTPS environment variable is appropriate.

Here are some examples of SAS Mirror Manager commands that include environment variables.

**Example 1:** An HTTPS site.

```bash
set https_proxy=http://user-name:password@internet-proxy-server-FQDN:proxy-port
```

For example:

```bash
set https_proxy=http://proxyid:password@proxy.company.com:3129
```

**Note:** If you use the https_proxy variable, the command for SAS Mirror Manager might also require the `--cacert` option, which indicates the location of the certificate that the proxy will use. The proxy certificate will be one that your organization manages.

**Example 2:** An HTTP site.

```bash
set http_proxy=http://user-name:password@internet-proxy-server-FQDN:proxy-port
```

For example:

```bash
set http_proxy=http://proxyid:password@proxy.company.com:443
```

Specify a Log Location

The default location for the logs for SAS Mirror Manager is `%LOCALAPPDATA%\mirrormgr\mirrormgr.log` on Windows and `user-home-directory/.local/share/mirrormgr/mirrormgr.log` on Linux. To specify an alternative log location:

```bash
mirrormgr.exe mirror --deployment-data path-to-SAS_Viya_deployment_data.zip --path location-of-mirror-repository --log-file location-of-logs\mirrormgr.log --latest
```

**Note:** Specify the command on a single line. Multiple lines are used here to improve readability.
Create the Deployment Scripts

The SAS Orchestration Command Line Interface (CLI) uses the order information that was included in your Software Order Email (SOE) to create deployment scripts for your SAS Viya software. The SAS Orchestration CLI can be run on Linux or Windows and it requires the Java Runtime Environment 1.8.x. It also requires access to the internet.

Before you use the SAS Orchestration CLI, ensure that the SAS_Viya_deployment_data.zip file attachment from your SOE is copied to a directory on a machine that runs the Linux, Macintosh, or Windows operating system.

Download the SAS Orchestration CLI

1. The SOE indicated that you should save the SAS_Viya_deployment_data.zip file attachment. If you have not already done so, save that file now.

2. Go to the SAS Orchestration CLI download site and download the SAS Orchestration CLI for the operating system where you stored the ZIP file. The SOE recommended that you save the ZIP file to a machine that runs Windows, which is where you install the SAS software that you purchased. But you could also store it on a machine that runs Macintosh or Linux.

3. If you use Microsoft Internet Explorer or Microsoft Edge to download the Linux or Macintosh version of the SAS Orchestration CLI, change the file extension from .gz to .tgz.

4. Uncompress the TGZ file (Linux or Macintosh) or ZIP file (Windows) in the same location where you downloaded it. The result is a file named sas-orchestration on Linux or Macintosh or a file named sas-orchestration.exe on Windows.

Create the Deployment Scripts with the SAS Orchestration CLI

Basic Command

To create the deployment scripts, use the command that is appropriate for the operating system where the SAS Orchestration CLI is located.

Note: The following commands are organized by the operating system where the SAS Orchestration CLI runs, rather than by the operating system where your SAS software runs.
Viya software will be deployed. After you create the deployment scripts, you can move them to the machine where you deploy your software.

Linux or Macintosh

```
./sas-orchestration build --input location-of-ZIP-file-including-file-name
```

Windows

```
\sas-orchestration.exe build --input location-of-ZIP-file-including-file-name
```

Using the SAS Orchestration CLI creates a new file named sas-viya-deployment-script.zip.

Options

Use a Proxy Server

If you use an unauthenticated proxy to reach the internet, you must add the following option to the run command in order to make an outgoing connection:

```
--java-option "-Dhttps.proxyHost=proxy-server-IP-address-or-host-name"
```

In addition, if the proxy server is not using the default proxy port of 80, you must also add the following option:

```
--java-option "-Dhttps.proxyPort=proxy-server-port-number"
```

If you use both options, they should not be combined into a single option. The following is an example of using both options on a Linux machine:

```
./sas-orchestration --java-option "-Dhttps.proxyHost=my.proxy.com
--java-option "-Dhttps.proxyPort=1111" build --input
/tmp/SAS_Viya_deployment_data.zip
```

The `--java-option` tags must come before the `build` command.

Use a Mirror Repository

If you created a mirror repository with SAS Mirror Manager, you must include its location with the `--repository-warehouse` option.

```
\sas-orchestration build --input c:\sas\install\SAS_Viya_deployment_data.zip
--repository-warehouse URL-to-mirror-repository-content
```

Here is an example:

```
\sas-orchestration build --input c:\sas\install\SAS_Viya_deployment_data.zip
--repository-warehouse c:\DeploymentFiles\sas_repos
```

For more information about SAS Mirror Manager, see “Create a Mirror Repository” on page 9.

Help with Options

The SAS Orchestration CLI includes several options. To learn about all the options for the SAS Orchestration CLI, use the appropriate command:

Linux or Macintosh

```
./sas-orchestration build --help
```

Windows

```
\sas-orchestration.exe build --help
```
Store the Deployment Files

SAS recommends that you create a directory for storing files that are used to deploy and maintain your software. SAS recommends using \sas\install. This guide assumes that you will use \sas\install. However, if you do not use \sas\install, replace those instances in this guide with the actual location that you select.

1. If necessary, move the sas-viya-deployment-script.zip file to the machine where you will be deploying your software. The recommended location is \sas\install.

2. In the same directory where you have saved sas-viya-deployment-script.zip, uncompress it.

Deployment Scripts and Security

The deployment scripts created by the SAS Orchestration CLI are PowerShell scripts. The PowerShell scripts are not digitally signed because they are created at deployment time based on your software order and the options you set when you run the SAS Orchestration CLI. If your organization requires that PowerShell scripts be digitally signed, you will have to sign the created scripts yourself. For information about how to digitally sign PowerShell scripts, see “About Signing” and the Microsoft PowerShell support site.

By default, the deployment scripts include a statement that allows them to bypass any PowerShell security policy that may be set up. Perform the following steps to remove this ability.

1. Open one of the BAT files from the uncompressed ZIP file. If you accepted the defaults, those files are located in C:\sas\install\powershell-deployment.

2. Locate the following line:
   ```bash
   set ARGS=%ARGS% -ExecutionPolicy Bypass
   ```

3. Revise the line using one of the following methods:
   - Turn the command into a comment by adding rem to the beginning of the line.
     ```bash
     rem set ARGS=%ARGS% -ExecutionPolicy Bypass
     ```
     Using this option allows you to enable the command later if you change your mind about the security policy or if it changes.
   - Delete the line completely.

4. Save and close the BAT file.

5. Repeat these steps for each BAT file in the directory.
Enable Required Ports

The following ports are used by SAS software and should be available before you begin the deployment process. The same ports should also be available for any firewalls that are configured on the operating system or the network.

Table 3.2  Ports to Be Made Available

<table>
<thead>
<tr>
<th>Process</th>
<th>Required Port</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>httpd</td>
<td>80 (internal)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>443 (external)</td>
<td>See note below.</td>
</tr>
<tr>
<td>default SAS Messaging Broker AMQP client access port</td>
<td>5672</td>
<td></td>
</tr>
<tr>
<td>Vault</td>
<td>8200</td>
<td></td>
</tr>
<tr>
<td>SAS Configuration Server</td>
<td>8300–8309, 8500, 8501</td>
<td>SAS uses HashiCorp Consul as its configuration server. Ports should be open to both UDP and TCP traffic.</td>
</tr>
<tr>
<td>default SAS Messaging Broker management web console port</td>
<td>15672</td>
<td></td>
</tr>
</tbody>
</table>

Note:  In order to secure web access to your SAS software, only port 443 (HTTPS) should be open externally on the machine where SAS Event Stream Processing is deployed, and port 80 should be open internally.

In addition, any ports that will be used for ESP servers must be open to HTTP traffic. For more information, see Using the ESP Server.

Update the user port range. From a command prompt, run the following commands, based on your version of Internet Protocol:

```
netsh int ipvn set dynamicport tcp start=32768 num=32767
netsh int ipvn set dynamicport udp start=32768 num=32767
```

where $n$ indicates the version of your Internet protocol, either 4 or 6.

After you run the command, restart Windows.
Tune Your Windows System

Update the Windows Registry

Microsoft recommends performing a system backup before editing the registry.

1. At a command prompt, type `REGEDIT`. The Registry Editor opens.
2. Go to the `HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Tcpip \Parameters` registry subkey.
3. Add the DWORD value with a name of `TcpTimedWaitDelay` and a value of `30 Decimal`.
4. Go to the `HKEY_LOCAL_MACHINE\SYSTEM\ControlSet001\Control \PriorityControl` registry subkey.
5. Add the DWORD value with a name of `Win32PrioritySeparation` and a value of `36 decimal`.
6. Go to the `HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\AFD \Parameters` registry subkey.
7. Add the following DWORD values:

<table>
<thead>
<tr>
<th>Name</th>
<th>Recommended Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>EnableDynamicBacklog</td>
<td>1 decimal</td>
</tr>
<tr>
<td>MinimumDynamicBacklog</td>
<td>20 decimal</td>
</tr>
<tr>
<td>MaximumDynamicBacklog</td>
<td>1000 decimal</td>
</tr>
<tr>
<td>DynamicBacklogGrowthDelta</td>
<td>10 decimal</td>
</tr>
</tbody>
</table>

The recommended values specify the number of connections that you want to be available. These values request a minimum of 20 and a maximum of 1000 available connections. The number of available connections is increased by 10 each time.

8. Modify the SubSystems registry value.

Note: If you are performing a programming-only deployment, skip this step.

a. Go to the `HKEY_LOCAL_MACHINE\System\CurrentControlSet\Control \Session Manager\SubSystems\Windows` registry subkey. Here is an example of the value:
Right-click the Windows registry name and select Modify. The Edit String window appears.

Change the value for the third number in the SharedSection entry according to 20480. Here is an example of the revised entry:

%SystemRoot%\system32\csrss.exe ObjectDirectory=\Windows
SharedSection=1024,20480,20480 ...

Click OK.

Close the Registry Editor.

Restart Windows.

**Additional Tuning Suggestions**

The following list includes general recommendations for configuring Windows systems:

- Disable Windows indexing on any directories that are used by SAS software.
- Set Windows performance settings so that background processes are favored.
- Set the maximum power profile in the system BIOS for all systems, except Intel Sandy Bridge.
- Disable the C1E BIOS setting on Dell systems.

**Specify Credentials for the postgres User Account**

Use a deployment script to save the credentials for the postgres user account that you created previously. This user account enables the SAS Infrastructure Data Server, which runs on PostgreSQL, to start automatically. SAS Infrastructure Data Server is required to support the SAS Event Stream Processing clients. Be sure to complete these steps before you start the deployment process.

*Note:* The name for this user account, postgres, is recommended. However, you might have selected another name for this account when you created it.

1. Navigate to the directory where you extracted the contents of the sas-viya-deployment-script.zip file that you created using the SAS Orchestration CLI. The recommended location is \sas\install.

2. In the \sas\install\powershell-deployment directory, verify the presence of the encryptPostgresUser.bat script.
Note: The setup.bat script and the encryptPostgresUser.bat script must be in the same directory.

3 From that directory, run the following command:

.\encryptPostgresUser.bat

4 The script prompts you for the user ID and password of the postgres user account. If you are using a localhost account, you should provide only the user name. If you are using a domain account, the user name should include the domain name.

domain-name\user-name

As the script runs, it creates a file named postgres.xml in the same directory.

Note: Do not delete the postgres.xml file. Deployment components continue to use it after the deployment process has completed. Similarly, do not delete the postgres user account.
Installing SAS Event Stream Processing

Deploy the Software on Windows

Use the procedures in this section to deploy your SAS software. The information in this section assumes that you have completed the steps that are described in “Create the Deployment Scripts” on page 13.

When you order SAS software, SAS sends a Software Order Email (SOE) to your business or organization. Your SOE includes information about the software order, including several file attachments and instructions for generating a deployment playbook using the SAS Orchestration CLI.

If you have not already done so, be sure to uncompress the file that is attached to your SOE, as instructed in the email text.

The user account that performs the deployment requires Administrator privileges for the Windows machine where the software is installed.

Configure LDAP Settings

The sitedefault.yml file is used to configure authentication for SAS Event Stream Processing Studio, SAS Event Stream Processing Streamviewer, and SAS Event Stream Manager. Before you run the installation script, enable the script to configure the LDAP server for use with SAS Logon Manager:

1. Locate the sitedefault_sample.yml file on the machine where you will be deploying your software.

The unzip operation saves the file in \powershell-deployment\config\consul\files\sitedefault_sample.yml. The recommended location to unzip the sasviya-deployment-script.zip is \sas\install.
Install SAS Event Stream Processing

1. Navigate to the C:sas\install\ directory where you uncompressed the sas-viya-deployment-script.zip file that you created.

2. Locate the setup.bat file in the C:sas\install\powershell-deployment directory. You can use this file in one of two ways:
   - Right-click the file, and select Run as Administrator from the menu. Using this method does not include command options. The software is downloaded and installed on the local machine, and then the script configures and starts any necessary services.
   - Open a command prompt (being sure to select Run as administrator) from the Windows Start menu. Run the following command:

     ```
     setup.bat options
     ```

     When the command is run without options, the script downloads and installs software on the local machine and then configures and starts any necessary services. Descriptions of the optional flags follow.

     - `-install`
       Only installs the software and services. If you use this option, the software and services will not be configured and the services will not be started.

     - `-config`
       Configures the installed software, and configures and starts the services. This option fails if you run the command before the software and services have been installed.

     As the batch job runs, a Downloads folder is created in the directory where you are running the batch script. The software is downloaded from secure repositories to this new folder on your computer.

     To conserve space, after the setup.bat script has been run and the deployment is complete, you can delete the .msi files in the C:sas\install\downloads directory.

     If the deployment process fails, but you are able to recover from the error, be sure to restart the deployment using the appropriate deployment commands. In addition, if you receive a message to reboot during the deployment process, make sure that you use the same deployment commands.
### Post-installation Tasks

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- Enable Metering for ESP Servers ................................................. 23
- Start the ESP Server ................................................................... 25
- Log On to SAS Event Stream Processing Studio ........................... 25
  - (Optional) Set Up SAS Event Stream Processing Studio as a Stand-Alone Client Application .......................... 26
  - (Optional) Enable Kerberos Connections for SAS Event Stream Processing Studio ...................................... 28
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- Configure the ESP Server for SAS Event Stream Manager .......... 30
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**Prepare the Windows Environment for Migration of Your XML Models** ......................................................... 38

---

### Complete SAS Event Stream Processing Setup

Take a few steps to complete the SAS Event Stream Processing deployment.

### Set the Environment Variables

You must set several environment variables before you install SAS Event Stream Processing. You can set these variables as either User or System variables.

1. Open the Control Panel from the **Start** menu. Navigate to **System and Security**.
2. Click **System ➤ Advanced System Settings** in the left pane.
   The System Properties dialog box appears. Click **Environment Variables**.
3 Click **New** to add the following variable definitions. Or select the variable from the list and click **Edit** to modify an existing variable definition:

**Table 5.1  SAS Event Stream Processing Variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
</table>
| DFESP_HOME             | C:\PROGRA~1\SAS\Viya\SASEventStreamProcessingEngine\6.2  
The setting for this variable does not affect the default installation location, which is C:\Program Files\SAS \Viya.  
If you installed in a location other than the default, update the path to match the installation directory. |
| PATH                   | %PATH%;%DFESP_HOME%;bin;C:\PROGRA~1\SAS\Viya\SASFoundation\sasexe;C:\PROGRA~1\SAS\Viya \SASEventStreamProcessingEngine\6.2\ssl\bin  
If you installed in a location other than the default, update the path to match the installation directory. |
| (Optional) ESP_STUDIO_DB | This variable defines the location of the H2 database when SAS Event Stream Processing Studio has been set up to run as a stand-alone client application. By default, SAS Event Stream Processing Studio uses the PostgreSQL database that is also used as the SAS Viya Configuration Server.  
For more information about setting up the SAS Event Stream Processing Studio client to run as a stand-alone applications, see "(Optional) Set Up SAS Event Stream Processing Studio as a Stand-Alone Client Application" on page 26. |
| (Optional) SV_ENABLE_DATA_SHARING | This variable disables CSRF protection so that you can embed charts and import data from this instance of SAS Event Stream Processing Streamviewer. |
| (Optional) PYTHONPATH or PYTHONHOME | Add the Python Lib directory to PYTHONPATH. Or set PYTHONHOME to the top-level Python directory:  
- PYTHONPATH=C:\Program Files\Miniconda3\envs\pythonversion\Lib  
- PYTHONHOME=C:\Program Files\Miniconda3\envs\pythonversion |

4 Click **OK** to save your variable settings.

SAS Event Stream Processing includes the internal component SAS Micro Analytic Service. To use the Anaconda Python support in SAS Micro Analytic Service, you must set one of the optional variables listed in the table for your version of Python. For more information, see **SAS Micro Analytic Service: Programming and Administration Guide**, which is available on the **SAS Event Stream Processing product page**.
Enable Metering for ESP Servers

The deployment process applies the product license on each machine where you have deployed SAS Event Stream Processing. However, additional steps are required in order to enable the license. You must set up and run at least one metering server to track the number of incoming events and to maintain event counts.

The metering server aggregates counts that are based on the license, the source window, and the hour of day. It stores aggregated results so that a client can query and track the total volume of messages that are processed. Enabling the metering server ensures that your ESP server is in compliance with the terms of its license. Event metering is not required on development servers because they do not contribute to the event volume that is assigned to a license.

The metering server saves log files in `C:\ProgramData\SAS\Viya\SASEventStreamProcessingEngine\default`. A permissions issue might prevent the server from writing to the log directory unless you launch the metering server executable as an administrator.

1. Log on to the Windows server as an administrator.

2. Type `cmd` in the Windows Search box. In the search results, right-click `Command Prompt` and select `Run as Administrator`.

3. Run the following command:
   
   ```
   %DFESP_HOME%\bin\dfesp_metering.bat -d
   ```

   The `-d` argument creates a log file in the configuration directory.

   For more information about the metering server, see Setting Up and Using the Metering Server.

Start the ESP Server

When the playbook has completed, the client processes (SAS Event Stream Processing Studio, SAS Event Stream Processing Streamviewer, and SAS Event Stream Manager) are already running. Before you can open or create a model in SAS Event Stream Processing Studio, you must start the ESP server.

If you want to use SAS Event Stream Manager to manage the SAS Event Stream Processing environment, you can take some additional steps to set up a connection between the ESP server and SAS Event Stream Manager. For more information, see “Configure the ESP Server for SAS Event Stream Manager” on page 30.

To start an ESP server:

1. Open a command prompt by clicking Start and entering `cmd` in the Search box.

2. Start the ESP server. Here is an example of the command:

   ```
   %DFESP_HOME%\bin\dfesp_xml_server -pubsub n -http port &
   ```

   The ampersand (`&`) enables additional commands to be entered in the same window that started the server. Other values that provide server start-up
instructions are defined in the esp-properties.yml configuration file. For more information, see Server Configuration Properties.

3 The following message is displayed:

   Access control disabled (permissions.yml not present)

   The file that is referenced is required only to enable access control on the ESP server. You can ignore this message.

   For more information about the ESP server, see Setting Up and Using the ESP Server.

---

### Log On to SAS Event Stream Processing Studio

SAS Event Stream Processing Studio provides a user interface for creating models. It is automatically started during the installation. However, you can start it manually if you find that the service is not running.

1 Verify that the SAS Event Stream Processing Studio service is running. Click Start, and enter services.msc in the Search box. Select services.msc from the search results.

   The Services panel is displayed.

2 Scroll through the list of services and locate the SAS Event Stream Processing Studio service. If it has not been started automatically, click Start to start the service.

3 Launch the SAS Event Stream Processing Studio user interface from a browser window using the following URL: http://server-host-name/SASEventStreamProcessingStudio/index.html.

   For server-host-name, substitute the host name or IP address of the server where you installed the SAS Event Stream Processing Studio software.

   SAS Event Stream Processing Studio is integrated with SAS Viya authentication and uses SAS Logon Manager.

---

### (Optional) Set Up SAS Event Stream Processing Studio as a Stand-Alone Client Application

SAS Event Stream Processing Studio is a web-based client that enables you to create, edit, upload, publish, and test event stream processing models. By default, SAS Event Stream Processing Studio is installed as an integrated component of SAS Event Stream Processing. However, you can install it as a stand-alone client application. If you do not want to run it as a separate application, you can start using SAS Event Stream Processing Studio as soon as the deployment has completed.

**Note:** When SAS Event Stream Processing Studio is running in stand-alone mode, it cannot integrate with SAS Model Manager.
Modify the Start-Up Script

To enable SAS Event Stream Processing Studio to run in stand-alone mode, modify the start-up script:

---

**Note:** When run as a stand-alone application, SAS Event Stream Processing Studio does not use the same proxy server, configuration database, or logon service as SAS Event Stream Processing.

1. Stop the SAS Event Stream Processing Studio service. Click **Start**, and enter `services.msc` in the **Search** box. Select `services.msc` from the search results.
   
   The **Services** panel is displayed.

2. Scroll through the list of services and locate the **SAS Event Stream Processing Studio** service. Click **Stop Service**.

3. Set the ESP_STUDIO_DB to a value that defines the location of the H2 database that is installed along with SAS Event Stream Processing Studio. For more information, see “Set the Environment Variables” on page 23.

4. Use your preferred text editor to open the start-up script for modification:
   
   ```
c:\Program Files\SAS\Viya\bin\sas-sasespvm
   ```

5. Search for the following line in the start-up script:
   
   ```
   $env:java_option_xmx = "-Xmx512m"
   ```
   
   Add the following line below it:
   
   ```
   $env:java_option_server_port = "-Dserver.port=8080"
   ```
   
   The new line of code sets a server port for the standalone client to use.

6. (Optional) If SAS Event Stream Processing Studio will be running in a Kerberos environment, two additional environment variables are required in order to enable Kerberos connections to the ESP server.

   a. Contact a system administrator who maintains Kerberos configuration at your organization. Request the location of the keytab file and the user principal name for the machine where the ESP server is running.

   b. At the beginning of the sas-espvm start-up script, add the following lines, substituting the values that you obtained from your system administrator. Here is an example:

   ```
   export ESM_KEYTAB_LOCATION= \etc\keytab-file-name
   export ESM_USER_PRINCIPAL=user-name/fully-qualified-host-name@KERBEROS-REALM
   ```

   For `keytab-file-name`, substitute the name of the keytab file such as krb5.keytab.

   For `user-name`, substitute the primary portion of the user principal name, which is typically a user name.

   For `fully-qualified-host-name`, substitute the fully qualified host name of the machine where the ESP server is running. An example is myhost.machine.domain.com.
For KERBEROS-REALM, substitute the name of the Kerberos realm of which the user is a member such as MYREALM.COM.

7 Save and close the start-up script.

8 Start the service. In the Services panel, scroll through the list of services and locate the SAS Event Stream Processing Studio service. Click Start Service.

Connecting to Secure ESP Servers from SAS Event Stream Processing Studio

If you have set up authentication for an ESP server, you must provide authentication tokens or security credentials to the stand-alone application in order to connect to the ESP server. When connecting to a secure server, check the Is Secure box in the Edit ESP Server window. SAS Event Stream Processing Studio prompts you for authentication information for the authentication that you have set up for the ESP server. For example, if you are using OAuth for authentication, an OAuth token is requested. If you are using access control, make sure that the permissions.yml file is configured correctly.

Note: If you are using a permissions file for access control, every user-object combination must have its Read and Write access explicitly defined as true or false for all engines, projects, continuous queries, and windows in a model. You cannot view model objects for which you do not have explicit Read access.

(Optional) Enable Kerberos Connections for SAS Event Stream Processing Studio

When Kerberos is configured for the machine where the ESP server is running, additional setup is required to enable connections from SAS Event Stream Processing Studio. If Kerberos is not used for authentication in your environment, you can skip these steps.

If you also plan to use SAS Event Stream Manager, the required steps to enable Kerberos connections are similar. For more information, see “(Optional) Enable Kerberos Connections for SAS Event Stream Manager” on page 33.

1 Open the Control Panel from the Start menu. Navigate to System and Security.

2 Click System → Advanced System Settings in the left pane.

   The System Properties dialog box appears. Click Environment Variables.

3 Click New to add the following variable definitions. Or select the variable from the list and click Edit to modify an existing variable definition:
Table 5.2  SAS Event Stream Processing Kerberos Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESM_KEYTAB_LOCATION</td>
<td>C:\ProgramData\SAS\Viya\etc\keytab-file-name</td>
</tr>
<tr>
<td></td>
<td>For keytab-file-name, substitute the name of the keytab file, such as krb5.keytab.</td>
</tr>
<tr>
<td>ESM_USER_PRINCIPAL</td>
<td>user-name\fully-qualified-host-name@KERBEROS-REALM</td>
</tr>
<tr>
<td></td>
<td>For user-name, substitute the primary portion of the user principal name, which is typically a user name.</td>
</tr>
<tr>
<td></td>
<td>For fully-qualified-host-name, substitute the fully qualified host name of the machine where the ESP server is running. An example might be myhost.machine.domain.com.</td>
</tr>
<tr>
<td></td>
<td>For KERBEROS-REALM, substitute the name of the Kerberos realm of which the user is a member, such as MYREALM.COM.</td>
</tr>
</tbody>
</table>

4 Click **OK** to save your variable settings.

5 Restart the SAS Event Stream Processing Studio service. Click **Start**, and enter services.msc in the **Search** box. Select services.msc from the search results. The Services panel appears.

6 In the list of services, select the SAS Event Stream Processing Studio service. Click the **Start** link to start the service.

**Note:** The ESP server does not require a restart.

---

(Optional) Enable Kerberos Connections for SAS Event Stream Processing Streamviewer

When Kerberos is configured for the machine where the ESP server is running, additional setup is required to enable connections from SAS Event Stream Processing Streamviewer. If Kerberos is not used for authentication in your environment, you can skip these steps.

1 Open the Control Panel from the **Start** menu. Navigate to **System and Security**.

2 Click **System** ➔ **Advanced System Settings** in the left pane. The System Properties dialog box appears. Click **Environment Variables**.

3 Click **New** to add the following variable definitions. Or select the variable from the list and click **Edit** to modify an existing variable definition:
## Table 5.3 SAS Event Stream Processing Kerberos Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESM_KEYTAB_LOCATION</td>
<td>C:\ProgramData\SAS\Viya\etc\keytab-file-name</td>
</tr>
<tr>
<td></td>
<td>For keytab-file-name, substitute the name of the keytab file, such as krb5.keytab.</td>
</tr>
<tr>
<td>ESM_USER_PRINCIPAL</td>
<td>user-name\fully-qualified-host-name@KERBEROS-REALM</td>
</tr>
<tr>
<td></td>
<td>For user-name, substitute the primary portion of the user principal name, which is typically a user name.</td>
</tr>
<tr>
<td></td>
<td>For fully-qualified-host-name, substitute the fully qualified host name of the machine where the ESP server is running. An example might be myhost.machine.domain.com.</td>
</tr>
<tr>
<td></td>
<td>For KERBEROS-REALM, substitute the name of the Kerberos realm of which the user is a member, such as MYREALM.COM.</td>
</tr>
</tbody>
</table>

4. Click OK to save your variable settings.

5. Restart the SAS Event Stream Processing Streamviewer service. Click Start, and enter services.msc in the Search box. Select services.msc from the search results.

   The Services panel appears.

6. In the list of services, select the Streamviewer service. Click the Start link to start the service.

   Note: The ESP server does not require a restart.

---

### Complete SAS Event Stream Manager Setup

If you plan to use SAS Event Stream Manager to automate the deployment of SAS Event Stream Processing projects and monitor their health, take a few steps after the installation has completed to prepare the environment. Otherwise, you can skip this section.

### Configure the ESP Server for SAS Event Stream Manager

Note: If you do not plan to use SAS Event Stream Manager, skip this section.
In order to manage SAS Event Stream Processing instances with SAS Event Stream Manager, you must define the ESP servers that are running in your environment. However, instead of manually defining ESP servers, you can start your ESP servers with some additional instructions that enable secure, persistent sockets between SAS Event Stream Manager and ESP servers.

To start an ESP server with a connection to SAS Event Stream Manager:

1. Provide SAS Logon Manager with a client ID and client secret for SAS Event Stream Manager. First, obtain the value of the SAS Configuration Server (Consul) token for your environment. The Consul token is located in the following directory:

   C:\ProgramData\SAS\Viya\etc\SASSecurityCertificateFramework\tokens\consul\default\client.token

2. Run a curl command to request a registration token for a new client. In this example, the client is named app:

   ```
   curl -X POST "http://localhost/SASLogon/oauth/clients/consul?callback=false&serviceId=app" -H "X-Consul-Token: X-Consul-Token-value"
   ```

   For `X-Consul-Token-value`, substitute the value for the Consul token, which you obtained from the previous step.

   **Note:** Specify the command on a single line. This request must pass a `callback=false` query string parameter and authenticate directly by passing a Consul token. If the Consul token that you specified in the command is valid, SAS Logon Manager returns the OAuth access token for registration in the response.

3. Use the registration token to register the client ID. This step establishes the ESP server as a new client of SAS Logon Manager. Run the following curl command:

   ```
   "client_id": "client-id",
   "client_secret": "client-secret",
   "scope": ["openid", "]",
   "resource_ids": "none",
   "authorities": ["uaa.none"],
   "authorized_grant_types": ["password"]
   }
   ```

   **Note:** You can find more information about the required steps to configure a new client for SAS Logon Manager in Obtain an Access Token Using Password Credentials in SAS Viya Administration: Authentication.

4. Create an XML file with filename esm.xml. Make sure that it uses the required syntax.
Here is an example:

```xml
<esm>
  <server name="SAS-Event-Stream-Manager-host">
    <url>http://reverse-proxy-server</url>
    <port>port-number</port>
    <context-path>context-path-to-SAS-Event-Stream-Manager</context-path>
    <auth>
      <clientId>client-id</clientId>
      <clientSecret>client-secret</clientSecret>
      <user>user-name</user>
      <password>password</password>
    </auth>
  </server>
</esm>
```

a. For `SAS-Event-Stream-Manager-host`, substitute the host name of the machine where SAS Event Stream Manager is running.

b. For `reverse-proxy-server`, substitute the fully-qualified host name of the machine where the SAS Viya HTTP proxy server is running.

c. (Optional) For `port-number`, substitute the port where SAS Event Stream Manager is listening. This parameter is only needed if your instance is running without the SAS Viya HTTP proxy service.

d. (Optional) For `context-path-to-SAS-Event-Stream-Manager`, substitute the context path to your instance of SAS Event Stream Manager that is deployed without SAS Viya services. If nothing is specified, the default context path (`/SASEventStreamManager`) is used.

e. For `client-id`, substitute the client ID that you provided to SAS Logon Manager for the SAS Event Stream Manager instance.

f. For `client-secret`, substitute the client secret that you provided to SAS Logon Manager for SAS Event Stream Manager.

g. For `user-name`, substitute a user name for an LDAP user account that is valid for use with SAS Logon Manager.

h. For `password`, substitute the password that corresponds to the user account that you specified.

Repeat the `<server></server>` section of the file as many times as required to accommodate all SAS Event Stream Manager servers.

5. Save the file in a network-accessible directory.

6. Open a command prompt by clicking Start and entering `cmd` in the Search box.

7. Start the ESP server. Here is an example of the command:

```
$DFESP_HOME\bin\dfesp_xml_server -esm file:\full-path-to-file\esm.xml
```

The `-esm file:\esm.xml` argument instructs the ESP server to read the contents of the esm.xml file. Other values that provide server start-up instructions are defined in the esp-properties.yml configuration file. For more information, see Server Configuration Properties.

8. The following message is displayed:
Access control disabled (permissions.yml not present)

The file that is referenced is required only to enable access control on the ESP server. You can ignore this message.

When it is started with the optional -esm file:\esm.xml argument, the ESP server automatically registers with SAS Event Stream Manager, which can then manage it. The esm.xml file instructs the ESP server where to locate SAS Event Stream Manager. The ESP server registers itself with SAS Logon Manager as a new client with a new secret. SAS Logon Manager can then provide a token that enables the ESP server to set up a persistent web socket for secure communications with SAS Event Stream Manager.

For more information about the ESP server, see SAS Event Stream Processing: Setting Up and Using the ESP Server.

---

Log on to SAS Event Stream Manager

SAS Event Stream Manager is a web-based client that enables you to manage your SAS Event Stream Processing environment. It is included with orders of SAS Event Stream Processing. You can use SAS Event Stream Processing Studio to create the projects that you deploy to ESP servers using SAS Event Stream Manager.

SAS Event Stream Manager uses SAS Logon Manager for logon functionality. LDAP is required for user authentication.

The Event Stream Manager process is started automatically by the deployment script. To log on to SAS Event Stream Manager:

1. Open the following URL:
   
   http://host:port/SASEventStreamManager

   The host is the system on which SAS Event Stream Manager is installed. The port is the port number used by the system that hosts SAS Event Stream Manager. The default port is 80.

   The Sign In to SAS window is displayed.

2. Enter your user ID and password, and click **Sign In**.

   If you are a member of the SASAdministrators group, the Assumable Groups window is displayed. Group membership is not required.

   Successful logon to the SAS Event Stream Manager user interface indicates that the software has been installed correctly.

---

(Optional) Enable Kerberos Connections for SAS Event Stream Manager

**Note:** If you do not plan to use SAS Event Stream Manager or if Kerberos is not used for authentication in your environment, skip this section.
When Kerberos is configured for the machine where the ESP server is running, additional setup is required. You must set two environment variables in order to enable SAS Event Stream Manager to connect to the ESP server.

1. Open the Control Panel from the **Start** menu. Navigate to **System and Security**.
2. Click **System** ⇒ **Advanced System Settings** in the left pane. The System Properties dialog box appears. Click **Environment Variables**.
3. Click **New** to add the following variable definitions. Or select the variable from the list and click **Edit** to modify an existing variable definition:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ESM_KEYTAB_LOCATION</strong></td>
<td>C:\ProgramData\SAS\Viya\etc\keytab-file-name</td>
</tr>
<tr>
<td></td>
<td>For <code>keytab-file-name</code>, substitute the name of the keytab file, such as krb5.keytab.</td>
</tr>
<tr>
<td><strong>ESM_USER_PRINCIPAL</strong></td>
<td><code>user-name</code>\fully-qualified-host-name@KERBEROS-REALM</td>
</tr>
<tr>
<td></td>
<td>For <code>user-name</code>, substitute the primary portion of the user principal name, which is typically a user name.</td>
</tr>
<tr>
<td></td>
<td>For <code>fully-qualified-host-name</code>, substitute the fully qualified host name of the machine where the ESP server is running. An example might be myhost.machine.domain.com.</td>
</tr>
<tr>
<td></td>
<td>For <code>KERBEROS-REALM</code>, substitute the name of the Kerberos realm of which the user is a member, such as MYREALM.COM.</td>
</tr>
</tbody>
</table>

4. Click **OK** to save your variable settings.
5. Restart the service. Click **Start**, and enter **services.msc** in the **Search** box. Select **services.msc** from the search results. The Services panel appears.
6. In the list of services, select the SAS Event Stream Manager service. Click the **Start** link to start the service.

**Note:** The Event Stream Processing XML Server does not require a restart.
Complete SAS Event Stream Processing Streamviewer Setup

SAS Event Stream Processing Streamviewer is a web-based client that visualizes events that stream through event stream processing models. SAS Event Stream Processing Streamviewer is installed automatically along with SAS Event Stream Processing.

You can also set up and run SAS Event Stream Processing Streamviewer as a stand-alone application. In stand-alone mode, it is not integrated with SAS Viya authentication and uses a separate database to store project information. For more information, see “(Optional) Set Up and Run SAS Event Stream Processing Streamviewer as a Stand-Alone Application” on page 35.

Log on to SAS Event Stream Processing Streamviewer

When the deployment process has completed, take the following steps to access SAS Event Stream Processing Streamviewer:

1. The Streamviewer service is started automatically by the deployment script. If it is not running, start the service from the Windows Services panel.

2. Open the following URL:
   
   http://ESP-server-host-name/SASEventStreamProcessingStreamviewer

   For ESP-server-host-name, substitute the host name of the machine where SAS Event Stream Processing Streamviewer is installed.

3. Enter your user ID and password and click Sign in.

When you successfully log on to SAS Event Stream Processing Streamviewer, the home page appears.

(Optional) Set Up and Run SAS Event Stream Processing Streamviewer as a Stand-Alone Application

By default, SAS Event Stream Processing Streamviewer is installed as an integrated component of SAS Event Stream Processing. You can start using SAS Event Stream Processing Streamviewer as soon as the deployment process has completed.

However, you can also install SAS Event Stream Processing Streamviewer as a stand-alone application. If you prefer to run it as an integrated component, skip this section.
SAS Event Stream Processing Streamviewer Database Options

SAS Event Stream Processing Streamviewer database support changed with version 6.1 and later. By default, SAS Event Stream Processing Streamviewer is configured to use the same PostgreSQL database that SAS Event Stream Processing Studio uses. The PostgreSQL database is compatible with other SAS Viya products.

When you instead run SAS Event Stream Processing Streamviewer as a stand-alone application, it uses a different database than when it runs as an integrated component of SAS Event Stream Processing. The SAS Event Stream Processing Streamviewer JAR file includes H2, a file-based database engine. When it runs as a stand-alone application, only the H2 database is supported. The configuration is stored in a file that is created when you invoke the application from the command line. For more information about H2, see [http://www.h2database.com/](http://www.h2database.com/).

Note: Previous versions of SAS Event Stream Processing Streamviewer supported some additional database management systems. If you have used one of those databases with a previous version of SAS Event Stream Processing Streamviewer, you can export data from that database and import it into version 6.2. For more information, see “Exporting SAS Event Stream Processing Streamviewer Data” on page 47.

Start SAS Event Stream Processing Streamviewer as a Stand-alone Application

Use the streamviewer.bat file to start SAS Event Stream Processing Streamviewer as a stand-alone application. By default, the BAT file is included in the SAS Event Stream Processing Streamviewer JAR file, in $DFESP_HOME\bin\$. All supported JDBC drivers are included in this JAR file.

On a Windows system where the JAR file has been saved, run a command that resembles the following example to start SAS Event Stream Processing Streamviewer:

```
streamviewer.bat -http 5990 -h2file localpath\config -jar localpath\streamviewer-6.2.jar -noauth
```

For `http_port`, substitute an available port number. Do not specify the `http` or `pubsub` port that you specified when starting the ESP server.

The H2 database file has the name `config`. If the database file `config` does not exist, the script creates the file in the current directory.
Table 5.5  Additional Command Arguments for SAS Event Stream Processing Streamviewer

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-h2file</td>
<td>Specifies the name of a file where you want H2 to store the configuration. The file is created if it does not already exist. Specify the database file directory with a full path or point to the appropriate relative directory. The H2 database file has the name config. If the database file config does not exist, the script creates the file in the current directory.</td>
</tr>
<tr>
<td>-jar jarfile</td>
<td>Specifies the JAR file and script location. Defaults to $DFESSP_HOME/lib/streamviewer-6.2.jar.</td>
</tr>
</tbody>
</table>

To log on to the SAS Event Stream Processing Streamviewer user interface, open the following URL:

http://Streamviewer-host-name/SASEventStreamProcessingStreamviewer

For Streamviewer-host-name, substitute the host name of the machine where SAS Event Stream Processing Streamviewer is installed.

Connecting to Secure ESP Servers from SAS Event Stream Processing Streamviewer

If you have set up authentication for an ESP server, you must provide authentication tokens or security credentials to the stand-alone application in order to connect to the ESP server. When connecting to a secure server, select the Is Secure check box in the Edit ESP Server window. SAS Event Stream Processing Streamviewer then prompts you for authentication information for the authentication that you have set up for the ESP server. For example, if you are using OAuth for authentication, an OAuth token is requested. If you are using SAS Logon, a user name and password are requested. If you are using access control, make sure that the permissions.yml file is configured correctly.

Note: If you are using a permissions file for access control, every user-object combination must have Read and Write access explicitly defined for all engines, projects, continuous queries, and windows in a model. You cannot view model objects for which you do not have explicit Read access.

Stop SAS Event Stream Processing Streamviewer

You can terminate the stand-alone application from a command prompt by using the Ctrl + C command.
Prepare the Windows Environment for Migration of Your XML Models

SAS Technical Support maintains a migration script that enables you to upgrade the XML models that you previously created using SAS Event Stream Processing 3.x so that they are compatible with SAS Event Stream Processing 6.x.

Before you can run the migration script, you must prepare your Windows environment by installing the XSLT libraries.

1. Download the XSLT files from the following FTP site:
   SAS recommends selecting the 32-bit package. Be sure to install the libxml, libxslt, zlib, and iconv libraries.

2. Add the \bin folder of each downloaded library to the PATH environment variable.

3. Validate the installation by running the following command from a prompt:
   xsltproc -version

For more information about the migration script, contact SAS Technical Support.
Overview

SAS Event Stream Processing supports upgrades from a previous version of the software to version 6.2.

What Is an Upgrade?

An upgrade adds significant feature changes or improvements to your deployed software. To perform an upgrade, you run the same tools that were run during the initial deployment. You will need a new software order to upgrade your deployed software. An upgrade might require changes to the deployed software’s configuration.

However, you can reuse models and data from a previous release. For more information, see “Support for Upgrades” on page 40.
What Is an Update?

An update replaces some or all of your deployed software with the latest versions of that software. Updated software is intended to be compatible with existing configuration, content, and data. To perform an update, you will run the same tools that were run during the initial deployment. You do not need a new software order to perform an update.

You might determine that your software requires an update, or you might be notified by SAS that updates are available.

SAS recommends that you create a backup of the deployed software environment before you perform an update.

Support for Upgrades

On Windows, you can upgrade SAS Event Stream Processing 5.x or 6.1 to the current version, SAS Event Stream Processing 6.2. Upgrades of older versions of SAS Event Stream Processing are not supported.

If you installed SAS Event Stream Manager 6.1 on the same machine, it is also upgraded automatically. (Versions of SAS Event Stream Manager earlier than 6.1 were not available for Windows.)

Migrating models and data that you generated from a previous release of SAS Event Stream Processing is supported on a limited basis. You can import files from SAS Event Stream Processing 3.2, 4.x, 5.x, or 6.1. However, if you plan to import files that you created with SAS Event Stream Processing 3.2, be aware of the following issues:

- Multiple XML elements in SAS Event Stream Processing 6.x have changed since 3.2. You must replace the elements that differ. Opening a legacy project in SAS Event Stream Processing Studio does not automatically upgrade your XML code to a valid format.

- If you are using the Rabbit MQ connector, an additional post-upgrade step might be required. In previous releases, this connector did not have a protobuf message format type. Instead, you configured the connector with the rmqtype parameter set to binary. When the protofile and protomsg parameters were also set, protobuf support was used. Starting with SAS Event Stream Processing 6.1, the rmqtype parameter must be explicitly set to protobuf as soon as the upgrade has completed.

- If you are upgrading from SAS Event Stream Processing 5.2 with SSL enabled, be aware of an additional upgrade step. In previous releases, you configured settings in the security-properties.yml file to enable SSL. Specifying the location of the certificate file (which contained the encryption key) was not required because SAS Event Stream Processing looked for a server.pem file if nothing was specified. However, SAS Event Stream Processing 6.1 and later require the location of the certificate file to enable SSL. Be sure to follow the steps in "Merge Configuration Changes into New File" on page 45 in order to enable SSL for SAS Event Stream Processing 6.1.
Review your C++ code that was used with SAS Event Stream Processing 3.2. You must replace the registerMethod_ds2 function with the registerMethod_DS2TS function.

The default date format of %Y-%m-%d %H:%M:%S for CSV timestamp and datetime fields is no longer valid. The new ESP_DATETIME fields contain a 64-bit integer that represents seconds since UNIX epoch. The new ESP_TIMESTAMP fields contain a 64-bit integer that represents microseconds since UNIX epoch.

In addition, you can no longer specify an alternative date format when initializing a SAS Event Stream Processing engine. To pass CSV events using an alternative date format, that format must now be specified on the connector or adapter that is the source or sink of CSV data. All connectors and adapters that support CSV include an optional DateFormat parameter for this purpose.

To upgrade models that you created in SAS Event Stream Processing 4.x, 5.x, or 6.1 to the current version, take the following steps:

1. In SAS Event Stream Processing Studio 4.x or 5.x, export the models that you want to use in the newer version of SAS Event Stream Processing.
2. Install SAS Event Stream Processing 6.2.
3. Use SAS Event Stream Processing Studio 6.2 to import the 4.x models that you previously exported. For more information, see SAS Event Stream Processing: Using SAS Event Stream Processing Studio.

To import models that you created in SAS Event Stream Processing Studio 3.2, a separate migration step is required. As noted above, you must run the dfesp_xml_migrate script to migrate your XML code to the 6.x XML schema. Some advance preparation is required to install the script on Windows, but you can run it on Linux without installing any prerequisites. For more information, see “Prepare the Windows Environment for Migration of Your XML Models” on page 38. For information about the migration script, contact SAS Technical Support.

You can also export data from an earlier version of SAS Event Stream Processing Streamviewer and import it into the current version. For more information, see “Exporting SAS Event Stream Processing Streamviewer Data” on page 47.

Upgrading Your SAS Software

Overview

An upgrade adds significant feature changes or improvements to your deployed software. To perform an upgrade, you will run the same tools that were run during the initial deployment. You will need a new software order to upgrade your deployed software. An upgrade might require changes to the deployed software's configuration.

You might determine that your software needs to be upgraded or you might be notified by SAS that upgrades are available.
An outage period is required, during which all SAS services must be stopped and then restarted.

**Note:** The process preserves any user-modified configuration values in the vars.psd1 file, but changes made to other files in the deployment might be lost. These steps include instructions for preserving customizations that you made to other SAS Event Stream Processing configuration files.

Before you begin, you should review the Chapter 2, “System Requirements,” on page 3 and Chapter 3, “Pre-installation Tasks,” on page 9 chapters of this guide.

You will need the location of the directory on each machine where you stored deployment and maintenance files. For more information about this directory, see “Create the Deployment Scripts with the SAS Orchestration CLI” on page 13.

Before you start the upgrade, SAS recommends reviewing all the steps to determine the tasks that are applicable to your deployed software. During your review, identify the tasks that can be performed before a scheduled outage and those that must be performed during a scheduled outage.

If you are using a PDF version of this guide, go to the Deployment Guides web page at [https://support.sas.com/en/documentation/install-center/sas-viya/deployment-guides.html](https://support.sas.com/en/documentation/install-center/sas-viya/deployment-guides.html) and verify that you have the latest version of the deployment documentation before you start the upgrade process. The release date of each document is located in the bottom right corner of the front page.

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### User Requirements

You must have administrator privileges for the machine.

### Prepare to Upgrade SAS Event Stream Processing

SAS recommends that you create a backup of the deployed software environment before performing an upgrade.

To prepare to upgrade a SAS Event Stream Processing deployment:

1. If you are upgrading from a version earlier than SAS Event Stream Processing 6.1, check for configuration files that have been customized.

   With SAS Event Stream Processing 6.1 and later, a single configuration file, esp-properties.yml, is used. Some customizations that you have made to an earlier version will not be used after the upgrade process has completed unless you merge them into the new file.

   On the machine where SAS Event Stream Processing is installed, compare any modified files with the copies that were included with the older version of the software. Run the following commands:

   **Note:** Specify each command on a single line. Multiple lines are used here for improved readability.
fc /N "%DFESP_HOME%\etc\connectors.excluded" C:\ProgramData\SAS\Viya\etc\SASEventStreamProcessingEngine\default\connectors.excluded
fc /N "%DFESP_HOME%\etc\connectors.excluded" C:\ProgramData\SAS\Viya\etc\SASEventStreamProcessingEngine\default\esp-logger.xml
fc /N "%DFESP_HOME%\etc\connectors.excluded" C:\ProgramData\SAS\Viya\etc\SASEventStreamProcessingEngine\default\metatags.conf
fc /N "%DFESP_HOME%\etc\connectors.excluded" C:\ProgramData\SAS\Viya\etc\SASEventStreamProcessingEngine\default\security-properties.yml

2 Save the results of the commands to a file. You will consult this file when you are ready to migrate the configuration changes to esp-properties.yml. For more information, see “Merge Configuration Changes into New File” on page 45.

3 If the user performing the upgrade is different from the user that performed the original deployment, or the password for the postgres account has changed, the postgresUser.xml file must be regenerated using the encryptPostgresUser.bat script. For more information, see “Specify Credentials for the postgres User Account” on page 18.

4 If you are upgrading a deployment that used a mirror repository and you want to use a mirror repository again, download the current version of SAS Mirror Manager. For more information, see “Create a Mirror Repository” on page 9.

5 When you upgrade SAS software, you receive a new Software Order Email (SOE) from SAS. Use your SOE to download the SAS Orchestration CLI.

Note: Your upgrade must use a newer version of the SAS Orchestration CLI.

6 Using the SAS Orchestration CLI that you downloaded, create new deployment scripts using the instructions on the SAS Orchestration Command Line Interface (CLI) download site. For more information, see “Create the Deployment Scripts” on page 13.

7 Extract the new deployment scripts to a location that is different from that of your original deployment scripts. For example, if you extracted your original deployment scripts to C:\ProgramData\SAS, you might extract the new deployment scripts to C:\ProgramData\SAUpgrade instead. Extract the new deployment scripts to a different location for the following reasons:

- To preserve the original vars.psd1 file.
- To ensure that the directory that contains the deployment scripts correctly reflects what is delivered. If the new deployment scripts are accidentally extracted over existing deployment scripts, files that have been removed in the newer version of the orchestration tools would still be available and could negatively affect the process for researching and resolving deployment issues.

8 Copy the postgresUser.xml file that is used to store the encrypted passwords for the postgres user account from the previously generated deployment scripting directory to the new deployment scripting directory.

9 Locate the sitedefault.yml file from the previous deployment. Make a copy of it with a new filename, sitedefault_original.yml. You will use it as a reference for any future deployments.
10 Follow the steps that are described in “Tune Your Windows System” on page 17 on the target machine before starting the upgrade process.

11 System requirements for RAM, CPU, and disk space are likely to change with each SAS Event Stream Processing release. Verify that your environment meets the requirements that are listed in Chapter 2, “System Requirements,” on page 3.

Upgrade SAS Software

To upgrade a SAS Event Stream Processing deployment on Windows:

1 Stop all SAS services. For more information, see Start and Stop Servers and Services in General Servers and Services: SAS Viya Administration.

2 Stop the metering server:

   dfesp_xml_client -url "http://host-name:port/SASESP/exit"

   Replace host-name:port with the host name and port of the machine where the metering server is running. By default, it uses port 31001.

3 Run the following command:

   setup.bat

   Available upgrades will be downloaded and installed. If you installed it previously, SAS Event Stream Manager is upgraded automatically. Otherwise, it is installed.

4 If any SAS services are running, the following message is displayed:

   Viya services are still running.

   Please shut down all Viya services before an install or update.

   See 'General Servers and Services: Start and Stop All Servers and Services' in the 'SAS Viya Administration' documentation for instructions on shutting down Viya services.

   Stop all services as described in Step 1, then run setup.bat.

5 When the upgrade completes, one of the following two events will happen:

   a If a reboot is not required, setup.bat exits to a prompt and the upgrade is complete.

   b If a reboot is required, the following message is displayed:

      You must reboot in order to complete install

      Reboot the machine, then run setup.bat -config to configure the upgraded products and start all the services.
About Updates

A software update makes your deployed software up-to-date with the latest software. Updates are performed by running the same tools that you ran during the initial deployment. You might determine that your software needs to be updated, or you might be notified by SAS that updates are available.

The term *upgrade* is used to refer to a type of software update that introduces new functionality. At SAS, an upgrade generally involves a new release number. By contrast, an *update* refers to minor changes to the software such as fixes. A new Software Order Email (SOE) is not required in order to retrieve the updated software packages.

---

Merge Configuration Changes into New File

In “Prepare to Upgrade SAS Event Stream Processing” on page 42, you were instructed to compare versions of SAS Event Stream Processing configuration files and save a file reflecting the differences between them. Now merge any differences that you found into the new configuration file for SAS Event Stream Processing 6.2, named esp-properties.yml. Or, if no changes were detected, your upgrade has completed.

1. Open the file that contains the results of the fc commands that you saved in “Prepare to Upgrade SAS Event Stream Processing” on page 42.

2. Use your preferred text editor to modify the following file: %ProgramData%\SAS \Viya\etc\SASEventStreamProcessingEngine\default\esp-properties.yml.

3. For the customizations that you found in connectors.excluded, locate the connectors: section of esp-properties.yml. For each connector that you excluded, set the connector’s value to false.

4. For the customizations that you found in esp-logger.xml, copy the changes from your comparison file to the logging: section of esp-properties.yml.

5. For the customizations that you found in metatags.conf, copy the changes from your comparison file to the meta: section of esp-properties.yml.

6. For the customizations that you found in security-properties.yml, copy the changes from your comparison file to the security: section of esp-properties.yml.

7. If your merged changes included enabling SSL but did not include updating the server_cert_file parameter, specify server.pem for the server_cert_file name in that same section of the file.

8. When you have completed the modifications, save esp-properties.yml.

9. Now complete the post-installation tasks that are described in Chapter 5, “Post-installation Tasks,” on page 23.
Applying Updates

You apply updates to the deployed software environment in order to bring the software to the latest version. For SAS Event Stream Processing, you can perform the update using Windows installation tools along with MSI files.

After an update has completed, any user-modified configuration values are maintained.

Update SAS Event Stream Processing on Windows

You can use Windows installation tools that work with MSI files to apply all available updates to SAS software on a selected machine.

1. On the machine where you installed SAS Event Stream Processing, create a backup copy of the current configuration by saving copies of any files that are located in `C:\ProgramData\SAS\Viya\etc\SASEventStreamProcessingEngine\default`. Save them in a directory outside of the installation directory, which is `C:\Program Files\SAS` by default.

2. Stop the metering server:
   ```
   dfesp_xml_client -url "http://host-name:port/SASESP/exit"
   ```
   Replace `host-name:port` with the host name and the port of the machine where the Metering Server is running. By default, it uses port 31001.

3. Navigate to the directory where you uncompressed the ZIP file that you downloaded.

   Note: The SOE that enabled you to install the SAS software provided a link to the ZIP file to be downloaded.

4. Locate the setup.bat file. Right-click the file, and select Run as Administrator from the menu.

The update proceeds automatically.

When the software update has completed successfully, a message is displayed that indicates success.
Exporting SAS Event Stream Processing Streamviewer Data

SAS Event Stream Processing Streamviewer 6.1 and later are integrated with SAS Viya. By default, it uses the SAS Viya database, known as SAS Infrastructure Data Server and running on PostgreSQL. You also have the option to install SAS Event Stream Processing Streamviewer as a stand-alone application, in which case, it uses an H2 database.

Previous versions of SAS Event Stream Processing Streamviewer supported multiple database types. If you have data that you want to preserve from a previous version of SAS Event Stream Processing Streamviewer, you must export it to a file. You can then import the file into SAS Event Stream Processing Streamviewer 6.2.

1. Open the SAS Event Stream Processing Streamviewer user interface from the following URL:
2. Supply your credentials to log on.
3. Click on the dashboard pane to export SAS Event Stream Processing Streamviewer data to a file. The Export Data window appears. This window shows the dashboard configuration in XML format.
4. Copy the XML configuration from the Export Data window to save it to a local file.

The file that was created by the export operation can be imported into any instance of SAS Event Stream Processing Streamviewer.

Importing SAS Event Stream Processing Streamviewer Data

You can import data directly from another running SAS Event Stream Processing Streamviewer instance or from a file. Take the following steps:

1. Log on to the SAS Event Stream Processing Streamviewer user interface.
2. Click . The Import Data window appears.
3. Select whether to import data from a running SAS Event Stream Processing Streamviewer Server or from a File.
Note: SAS Event Stream Processing Streamviewer 6.2 supports only data imports from SAS Event Stream Processing Streamviewer 6.1 and 5.2 instances.

If you select **Server**, complete the following fields and click **Ok**:

- **Source Config URL**
  
Enter the configuration URL of the server from which to import data. The URL is the host name and port of the SAS Event Stream Processing Streamviewer instance.

  **Note:** The SV_ENABLE_DATA_SHARING environment variable must be set to "true" on the source machine if it has SAS Event Stream Processing 6.2. For more information, see “Set the Environment Variables” on page 23.

- **Access Token**
  
  If the SAS Event Stream Processing Streamviewer instance is secure, enter the access token. Access tokens are not supported when SAS Event Stream Processing Streamviewer is running as a standalone application.

  If you select **File**, click **Choose File** to browse for the file to upload.

  **Note:** The imported file has a particular XML structure. Here is an example of the output from following the instructions in “Exporting SAS Event Stream Processing Streamviewer Data” on page 47:

```xml
<rows continue-on-error='false'>
  <insert table='streamviewer_server'>
    <values>
    <value column='id'>e01b157a0318250a09408857a472898e</value>
    <value column='name'>bserv</value>
    ...
    </values>
  </insert>
  <insert table='streamviewer_dashboard'>
    <values>
    <value column='id'>e01ab91c-0318250a-09408857-455cf343</value>
    <value column='name'>sample</value>
    <value column='creation_time'>1485523728055</value>
    ...
    </values>
  </insert>
  ...
</rows>
```
Completing the Deployment

Directory Structure and Permissions

After you install SAS Event Stream Processing, the files for the engine and files to support optional authentication are located in the following directory:

C:\Program Files\SAS\Viya\SASEventStreamProcessingEngine

Configuration files are located in the following directory:

%ProgramData%\SAS\Viya\SASEventStreamProcessingEngine\default

The basic directory path is owned by the user who performed the installation. To grant permission to users to edit the configuration files, the administrator can set up Group permissions.

The metering server saves log files in C:\ProgramData\SAS\Viya \SASEventStreamProcessingEngine\default. If the metering server is running on Windows, a permissions issue might prevent the server from writing to the log directory. Launch the metering server executable as an administrator, even if you are logged in as a member of the Administrators group.

SAS Event Stream Manager files are located in C:\Program Files\SAS\Viya \SASEventStreamProcessingManager.

Review Code Examples for SAS Event Stream Processing

After the deployment has completed, you can find examples to help you write SAS Event Stream Processing applications here.

The examples include files for XML, Python, and Java, with a brief description of each example and its usage. SAS recommends that you copy the files that you require to a writable directory on the local computer so that you can run them.
Two documents are helpful in understanding the examples. You can find links on the SAS Event Stream Processing product page to the following user guides:

- *DataFlux Expression Language Reference Guide*
- *SAS Micro Analytic Service Programming and Administration Guide*

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**Review Product Documentation**

After you install, configure, and verify the deployment, you are ready to begin writing applications that capture and analyze streaming event data in real time.

Now refer to the product documentation, which is included in SAS Help Center. A link to all SAS Event Stream Processing documentation is available on the SAS Event Stream Processing product page. SAS Help Center is also available as a menu item that you can access from the login ID in each client user interface. SAS recommends starting with *SAS Event Stream Processing: Overview*, which provides an introduction to product features and explains how to proceed with creating event stream processing models and incorporating them into applications.


If you plan to use SAS Event Stream Manager to automate and monitor your environment, find a full set of instructions in *Using SAS Event Stream Manager*.

The product page also offers multiple tutorials and examples to help you learn to use the software. See: [https://support.sas.com/en/software/event-stream-processing-support.html#tutorials](https://support.sas.com/en/software/event-stream-processing-support.html#tutorials).
Uninstalling SAS Event Stream Processing

Overview

You can remove your SAS software by using the remove.bat script or by using the Windows control panel. After the software is removed, you must clean up the deployment by performing a few steps.

Use the Software Removal Script

1. Navigate to the C:\sas\install\ directory where you uncompressed the sas-viya-deployment-script.zip file that you created.

   SAS Viya software is installed in the C:\Program Files\SAS and C:\ProgramData\SAS directories.

2. Locate the remove.bat file in the C:\sas\install\powershell-deployment directory. You can use this file in one of two ways:
   - Right-click the file, and select Run as Administrator from the menu.
   - Open a command prompt (being sure to select Run as administrator) from the Windows Start menu. Run the following command:

     remove.bat

The services will be stopped, and the SAS Event Stream Processing software and services will be uninstalled.
Use the Windows Control Panel

1. Go to the Control Panel for your Windows machine and select either **Add/Remove Programs** or **Programs and Features**, whichever is appropriate for the version of Windows that you are using.

2. Select **SAS Viya**, right-click, and select **Uninstall**.

   The services will be stopped, and the SAS Event Stream Processing software and services will be uninstalled.

Final Cleanup Steps

1. After most of the software is removed, the SAS Package Manager for Windows will still be installed. To remove SAS Package Manager for Windows:
   
a. Go to the Control Panel for your Windows machine and select either **Add/Remove Programs** or **Programs and Features**, whichever is appropriate for the version of Windows that you are using.

   b. Select **SAS Package Manager for Windows**, right-click, and select **Uninstall**.

2. Manually remove the **C:\Program Files\SAS** and **C:\ProgramData\SAS** directories.

   Note: **C:\ProgramData** is a hidden directory. If it is not viewable, go to the **View** tab on Windows Explorer and select **Hidden Items** under **Show/hide**.

   After the directories are manually removed, the removal of your SAS Event Stream Processing deployment is complete.