SAS® Event Stream Manager 6.2 for Windows: Deployment Guide
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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 If you are viewing a saved copy of the PDF version of this guide, the content might be outdated.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.

SAS Event Stream Manager is a web-based client that enables you to manage SAS Event Stream Processing environments. SAS Event Stream Manager 6.2 for Windows is optimized to support SAS Event Stream Processing 6.2 on Windows.

Use this guide to deploy SAS Event Stream Manager in your Windows environment. To install on Linux, a separate order that specifies the Linux platform is required.

Step 1 — Prepare for the Deployment

Perform one of the following tasks:

To update, upgrade, or add software to an existing deployment, go directly to Chapter 7, “Managing Your Software,” on page 25.
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, security, and more.

3 Go to Chapter 3, “Pre-installation Tasks,” on page 7 to prepare the environment before you deploy the software.

Step 2 — Perform the Deployment

1 Go to Chapter 4, “Installing SAS Event Stream Manager,” on page 17 to run the deployment scripts and install the software.

2 Go to Chapter 5, “Post-installation Tasks,” on page 19 to perform post-installation configuration.

Step 3 — Complete the Deployment

Go to Chapter 6, “Completing the Deployment,” on page 23 for best practices after deployment, including where to find additional documentation.

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.
System Requirements

Hardware Requirements

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

<table>
<thead>
<tr>
<th>Item</th>
<th>Recommended Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>2 cores (x86 architecture)</td>
</tr>
<tr>
<td></td>
<td>Intel Xeon chip set with a minimum speed of 2.6 GHz</td>
</tr>
<tr>
<td>Memory</td>
<td>16 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>10 GB</td>
</tr>
<tr>
<td></td>
<td>10,000 RPM</td>
</tr>
</tbody>
</table>

Each machine that is used to access the user interface must have a minimum screen resolution setting of 1280 x 1024.
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.

Note: SAS Event Stream Manager can also be installed on 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.

Software Requirements

Windows PowerShell

Microsoft Windows PowerShell version 5.1 or later is required in order to install SAS Event Stream Manager 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 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

---

Java Requirements

The Java Runtime Environment (JRE) must be installed on the machine where you install SAS Event Stream Manager. Only the JRE is required; the full JDK is not required. Oracle Java 1.8.x is supported.

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

SAS Event Stream Manager includes 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 for use with SAS Event Stream Manager, 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.

---

User Account Requirements

The user account that is used to perform the deployment process requires Administrator privileges. Administrator privileges are not required after the installation has completed in order to run an instance of an 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. SAS recommends using the name postgres for this user account. Create the account before you start the deployment process. Make sure that the account has the following attributes:

- A standard user account without administrator privileges
  (Optional) You can use a domain account for this purpose.
- A password that does not expire

When you create the postgres user account:

- Clear the check box labeled **User must change the password at the next logon**.
- Select the check box labeled **User cannot change password**.

If the security policies at your enterprise allow you to disable password expiration, disable it by selecting the check box labeled **Password never expires**. You can also periodically change the password for the service in the Windows Control Panel and restart the PostgreSQL service. However, you must also regenerate the credentials file each time the password changes.

- The privilege to Log on as a Service
  This setting requires explicit configuration even if the postgres user has administrator privileges. Use the Local Security Policy editor to add the postgres user to the Log on as a Service policy.

Before you start 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 15.

### LDAP Requirements

An LDAP server is required to enable users to log on to SAS Event Stream Manager. LDAP also enables some critical services. Read access to your LDAP provider is required.

SAS Viya 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 Manager, follow the steps in “Configure LDAP Settings” on page 17 before you run the deployment script.
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.

### 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 Internet Explorer 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.

   ```bash
   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.

   ```bash
   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.

6 (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.

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

For example:

```plaintext
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.

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

For example:

```plaintext
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 C:\%LOCALAPPDATA%\mirrormgr\mirrormgr.log on Windows and user-home-directory/./local/share/mirrormgr/mirrormgr.log on Linux. To specify an alternative log location:

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 used Internet Explorer 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

```
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
```
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=llll1" 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 7.

**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:
   ```
   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.
     ```
     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 Viya and should be available before you begin to deploy your software. The same ports should also be available for any firewalls that are configured on the operating system or the network.

<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>443 (external)</td>
</tr>
<tr>
<td></td>
<td></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 Manager 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 [Setting Up and 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.
At a command prompt, type `REGEDIT`. The Registry Editor opens.

Go to the `HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Tcpip \Parameters` registry subkey.

Add the DWORD value with a name of `TcpTimedWaitDelay` and a value of 30 Decimal.

Go to the `HKEY_LOCAL_MACHINE\SYSTEM\ControlSet001\Control \PriorityControl` registry subkey.

Add the DWORD value with a name of `Win32PrioritySeparation` and a value of 36 decimal.

Go to the `HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\AFD \Parameters` registry subkey.

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.

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:

```
%SystemRoot%\system32\csrss.exe ObjectDirectory=\Windows
SharedSection=1024,20480,768...
```

b. Right-click the Windows registry name and select Modify. The Edit String window appears.

c. 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 SAS Event Stream Manager. 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 Manager

Deploy the Software on Windows

Use the procedures in this section to deploy your SAS software on a single machine. The information in this section assumes that you have completed the steps that are described in “Create the Deployment Scripts” on page 10.

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 unzip 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 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 sas-viya-deployment-script.zip is \sas\install.
Install SAS Event Stream Manager

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, 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 use the same deployment commands.
Post-installation Tasks

Complete SAS Event Stream Manager Setup
Take a few steps after the installation has completed to prepare the environment.

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:

   Note: Install curl if necessary.

   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:

```bash
    "client_id": "client-id",
    "client_secret": "client-secret",
    "scope": ["openid", "*"]
}
```

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.

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

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

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

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 uses SAS Logon Manager for logon functionality. SAS Logon Manager uses LDAP for user authentication.

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

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. 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 5.1** SAS Event Stream Manager Kerberos Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESM_KEYTAB_LOCATION</td>
<td><code>C:\ProgramData\SAS\Viya\etc\keytab-file-name</code></td>
</tr>
<tr>
<td></td>
<td>For <code>keytab-file-name</code>, substitute the name of the keytab file, such as <code>krb5.keytab</code>.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESM_USER_PRINCIPAL</td>
<td><code>user-name\fully-qualified-host-name@KERBEROS-REALM</code></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 <code>myhost.machine.domain.com</code>.</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 <code>MYREALM.COM</code>.</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 ESP server does not require a restart.
Completing the Deployment

Product Documentation

After you install, configure, and verify the deployment, you are ready to begin using SAS Event Stream Manager to manage SAS Event Stream Processing applications and analyze streaming event data in real time.

The next step is to read the SAS Event Stream Manager user documentation, which explains how to manage SAS Event Stream Processing deployments. You can find all the SAS Event Stream Processing documentation on the SAS Event Stream Processing product page.

The SAS Event Stream Processing product page also offers multiple tutorials and examples to help you learn to use SAS Event Stream Manager. See: https://support.sas.com/en/software/event-stream-processing-support.html#tutorials.
Managing Your Software

Overview

SAS Event Stream Manager supports software updates, as well as upgrades from version 6.1 to 6.2. Earlier versions of SAS Event Stream Manager did not run on Windows and cannot be upgraded on Windows.

SAS Event Stream Manager 6.2 has not been tested with back-level versions of SAS Event Stream Processing. SAS recommends that you upgrade both products at the same time.

What Is an Update?

An update provides modifications for features that are not working as intended or adds minor software enhancements and compatibility. Software updates are released to address security issues when they occur, to address minor bugs discovered in the software, and to improve the operation of hardware or peripherals. These incremental updates improve the operation of your software and are small enough that they do not require a new order. 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 might determine that your software needs updating or you might be notified by SAS that updates are available.
Update SAS Event Stream Manager 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 Manager, create a backup copy of the current configuration by saving copies of any files that are located in `C:\ProgramData\SAS\Viya\etc\SASEventStreamManager\default`. Save them in a directory outside of the installation directory, which is `C:\Program Files\SAS` by default.

2. 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.

3. 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.

What Is an Upgrade?

An upgrade adds significant feature changes or improvements to SAS Event Stream Manager. To perform an upgrade, you will run the same tools that were run during the initial deployment. You will need a new order to upgrade your deployed software, and you must get an updated version of the Orchestration CLI to create a new playbook.

An upgrade might require changes to the deployed software’s configuration.

You might determine that your software needs upgrading or you might be notified by SAS that upgrades are available. SAS recommends creating a backup of the deployed software environment before performing an upgrade.
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 7 chapters of this guide.

You will need to know 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 10.

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 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.

User Requirements

You must have administrator privileges for the machine.

Prepare to Upgrade SAS Event Stream Manager

To prepare to upgrade a SAS Event Stream Manager deployment:
1. 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, regenerate the postgresUser.xml file using the encryptPostgresUser.bat script. For more information, see “Specify Credentials for the postgres User Account” on page 15.

2. 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 7.

3. 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.

4. 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 10.

5. 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\SASupgrade instead.

   Extracting the new deployment scripts to a different location ensures 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.

6. 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.

7. 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.
   
   Note: Do not edit sitedefault.yml or sitedefault_original.yml.

8. Follow the steps that are described in “Tune Your Windows System” on page 13 on the target machine before starting the upgrade process.

---

Upgrade SAS Software

To upgrade a SAS Event Stream Manager 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, and then run `setup.bat`.

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

- If a reboot is not required, `setup.bat` exits to a prompt and the upgrade is complete.
- 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.
Uninstalling SAS Event Stream Manager

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 sashviya-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.