SAS® Event Stream Processing 5.2 on 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 If you are viewing a saved copy of the PDF version of this guide, the content might be outdated.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.

■ Use this guide to deploy SAS Event Stream Processing in your Windows environment. SAS Event Stream Processing 5.2 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 "Managing Your Software" on page 23.

■ To deploy a new instance of the software, continue with the following steps.

2 Go to "System Requirements" on page 3 to learn about requirements for hardware, software, user accounts and more.

3 Go to "Pre-installation Tasks" on page 9 to prepare your environment before you deploy the software.

Step 2 — Perform the Deployment

1 Go to "Installing SAS Event Stream Processing" on page 17 to deploy the software.

2 Go to "Post-installation Tasks" on page 19 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.

2

System Requirements

Hardware Requirements

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 must be installed on the same machine.

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*

Item	Recommended Level*
CPU	4 cores (x86 architecture)
	Intel or AMD 64-bit chip set with a minimum speed of 2.6 GHz
Memory	32 - 64 GB of RAM
	Memory clock speed of 1600 MHz
Disk Space and Speed	20 GB or more
	10,000 RPM

An additional machine can be used as a thin client from which end users can access the user interface for SAS Event Stream Processing Studio. This machine requires 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/34/support-for-operating-systems.html.

Note: SAS Event Stream Processing 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.

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.

a Download Windows Management Framework 5.1. Navigate to https://www.microsoft.com/en-us/download/details.aspx?id=54616 to download the package.

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.

Download the package from the following Microsoft website: https://www.microsoft.com/en-us/download/details.aspx?id=49981.

The Microsoft Visual C++ Redistributable Package for Visual Studio 2015 (64-bit version) is required for all supported platforms.

Download the package from the following Microsoft website: https://support.microsoft.com/en-us/help/2977003/the-latest-supported-visual-c-downloads.

Note: This package is required to support SAS Event Stream Processing Studio. It must be installed before you can use SAS Event Stream Processing Studio.

After you have completed the installation of SAS Event Stream Processing Studio, you must install the 2013 version of this package. For more information, see "Install Required Microsoft Package" on page 19.

Java Requirements

The Java Runtime Environment (JRE) must be installed on the machine where you install SAS Event Stream Processing. 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 Processing Studio and Streamviewer 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/34/support-for-web-browsers.html

If you cannot install one of the supported web browsers for use with SAS Event Stream Processing, 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 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**.

  □ Select the check box labeled **Password never expires**.

■ 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.

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 15.

LDAP Requirements

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

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

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.

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

Configuration of these security options has been greatly simplified in SAS Event Stream Processing 5.2. For more information about enabling security for an ESP server or for Streamviewer, see SAS Event Stream Processing: Security.

3

Pre-installation Tasks

(Optional) Create a Mirror Repository

Overview

SAS Mirror Manager is a command line utility for synchronizing a collection of software repositories from SAS. Its primary use is to create and manage mirror repositories for software deployment. Mirror repositories are optional and should be used 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).

Consider the requirements for your mirror repository:

■ SAS Mirror Manager can be used to save the files in several locations, such as on a web server that serves the files up by HTTP or on a shared NFS mount.

■ The default location for the files that SAS Mirror Manager will download is the `C:\Users\`*`user-ID`*`\sas_repos` directory. Ensure that the default location or the location that you select has adequate space. Also ensure that the machine where the mirror repository will be located has adequate space.

Proxies

If your environment requires a proxy and is set up to use it, the SAS Mirror Manager commands will work without intervention. However, if your environment is not set up to go through the proxy, you must first set an environment variable.

You should use the environment variable that is appropriate for the target of the query going 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 will be the appropriate one to use.

If you are trying to reach an HTTP site, the command to set the environment variable looks like this:

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

Here is an example of the command:

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

If you are trying to reach an HTTPS site, the command to set the environment variable looks like this:

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

Here is an example of the command:

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

In addition, if you use the https_proxy variable, the run 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 company manages.

Using the 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 done so, save that file 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 At a command prompt, run the following command:

```
mirrormgr.exe mirror --deployment-data path-to-deployment-zip-file-from-SOE --latest
```

Note: If you have an HTTPS proxy, you might also need the `--cacert` option, which indicates the location of the certificate that the proxy will use. The proxy certificate will be one that your company manages.

By default, the repositories are placed in `C:\Users\user-ID\sas_repos`. If you want to place them in another location, use the `--path` option followed by the full directory location of the mirror destination. The rest of this document will refer to that location as `\sas_repos`. However, if you choose to use a different location, replace instances of `\sas_repos` in this guide with the actual location that you select.

The default location for the logs for SAS Mirror Manager is `user-home-directory\.local\share\mirrormgr\mirrormgr.log`. To specify an alternative log location:

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

Note: SAS recommends storing the logs in the same location as the mirror repository.

The `\sas_repos` directories are broken down 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.

    - bosh contains BOSH releases for BOSH.

5 (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.

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 will 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 will run, rather than by the operating system where your SAS Viya software will be deployed. After you create the deployment scripts, you can move them to the machine where you will 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 "file:///sas_repos"
```

For more information about SAS Mirror Manager, see "(Optional) 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:

```
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.

Process	Required Port	Requires Allowed Inbound Traffic From	Notes
httpd	80 (internal) 443 (external)	anywhere	See note below.
default SAS Messaging Broker AMQP client access port	5672		
Vault	8200		
SAS Configuration Server	8300–8309, 8500, 8501		SAS uses HashiCorp Consul as its configuration server. Ports should be open to both UDP and TCP traffic.

Process	Required Port	Requires Allowed Inbound Traffic From	Notes
default SAS Messaging Broker management web console port	15672		

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:

Name	Recommended Value
EnableDynamicBacklog	1 decimal
MinimumDynamicBacklog	20 decimal
MaximumDynamicBacklog	1000 decimal
DynamicBacklogGrowthDelta	10 decimal

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:

   ```
   %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 ...
   ```

9   Click **OK**.

10   Close the **Registry Editor**.

11   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 Processing Studio. 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.

4

Installing SAS Event Stream Processing

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 11.

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. 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`.

2   Make a copy of sitedefault_sample.yml in the same directory, and name the copy sitedefault.yml.

3   Use your preferred text editor to open sitedefault.yml.

4   Add values that are valid for your site, and save the file.

When you run setup.bat, the updated sitedefault.yml file is used automatically.

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, 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.

5

Post-installation Tasks

Install Required Microsoft Package

The Microsoft Visual C++ Redistributable Package for Visual Studio 2013 (64-bit version) is required to install and run SAS Event Stream Processing on Windows.

The required package is included with the SAS software. During the installation, it is copied to the machine where you are performing the deployment.

When the deployment process has completed, launch the following executable file: `%DFESP_HOME%\etc\vs2013\1033\vcredist_x64.exe`.

Follow the prompts in order to install the Microsoft Visual Studio 2013 package.

Set the Environment Variables

You must set several environment variables before you install SAS Event Stream Processing. Some variables are required to support core product features. Others are required only to support optional components and features. 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*

Variable	Value
DFESP_HOME	C:\PROGRA~1\SAS\Viya \SASEventStreamProcessingEngine\5.2 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	%DFESP_HOME%\bin;C:\PROGRA~1\SAS\Viya \SASFoundation\sasexe If you installed in a location other than the default, update the path to match the installation directory.
(Optional) PYTHONPATH or PYTHONHOME Enables you to use the Anaconda Python support in SAS Micro Analytic Service.	Add the Python Lib directory to PYTHONPATH. Or set PYTHONHOME to the top-level Python directory: ■ PYTHONPATH=C:\Program Files \Miniconda3\envs\python*version*\Lib ■ PYTHONHOME=C:\Program Files \Miniconda3\envs\python*version*

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.

Log On to SAS Event Stream Processing Studio

You must manually start the Event Stream Processing XML Server (the ESP server) to enable users to log on to SAS Event Stream Processing Studio. Take the following steps:

1 Verify that you have set the required environment variables. For more information, see "Set the Environment Variables " on page 19.

2 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.

3 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.

4 Start the ESP server in order to enable model creation. Open a command prompt.

5 Change directories to the default installation directory or to its equivalent in your deployment:

```
cd c:\"Program Files"\SAS\Viya\SASEventStreamProcessingEngine\5.2\bin
```

6 Run the following command:

```
dfesp_xml_server -pubsub n -http port
```

The `-pubsub` argument specifies a port for publish and subscribe actions. Replace *n* with the appropriate port number.

The `-http` argument specifies the port for the HTTP REST API. The value of *port* cannot exceed 65535.

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

7 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.

8 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.

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.

For more information about enabling metering, see Using the Metering Server in the SAS Event Stream Processing user documentation.

Preparing 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 5.**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:

ftp://ftp.zlatkovic.com/libxml/

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.

Code Examples

The SAS Event Stream Processing code examples are automatically installed along with the software in the following location:

C:\Program Files\SAS\Viya\SASEventStreamProcessingEngine\5.2\examples

The examples directory includes files for C++, XML, Python, and Java. It also includes a readme.examples file, which briefly describes each example and its usage.

SAS recommends that you copy the examples that you require to a writable directory on the local computer so that you can run them.

For help with understanding the examples, see the following documents on the SAS Event Stream Processing product page.

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

6

Managing Your Software

Overview

SAS Event Stream Processing supports updates, but it does not support upgrades from a previous version of the software to version 5.2.

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.

The installation process for previous releases of SAS Event Stream Processing has changed significantly for SAS Event Stream Processing 5.2. As a result, you cannot upgrade a previous version of the software to version 5.2. You must instead uninstall the existing version of the software and then use this *Deployment Guide* to install SAS Event Stream Processing 5.2.

However, you can reuse models and data from a previous release. For more information, see "Support for Upgrades " on page 24.

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

SAS Event Stream Processing does not support upgrades from previous versions to version 5.2. On Windows, you must uninstall the older version of the software and then install the newer version.

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, or 5.1. 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 5.*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.

- 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* to the current version, take the following steps:

1 In SAS Event Stream Processing Studio 4.*x*, export the 4.*x* models that you want to use in the newer version of SAS Event Stream Processing.

2 Install SAS Event Stream Processing 5.2.

3 Use SAS Event Stream Processing Studio 5.2 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 5.*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 "Preparing the Windows Environment for Migration of Your XML Models" on page 21. For information about the migration script, contact SAS Technical Support.

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. Upgrading SAS Event Stream Processing software is not supported on Windows. Instead, you must uninstall the older version of the software and then install the newer version.

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 SAS Event Stream Processing Studio service from the Windows Services panel.

3 (Optional) If you installed Streamviewer, stop the Streamviewer process:

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

Replace *host-name* with the host name of the machine where Streamviewer is running.

Replace *http-port* with the port number that you provided when you started Streamviewer with the start-up script. For more information, see Examples for Starting Streamviewer on Windows.

4 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.

5 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.

6 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.

7

Uninstalling SAS Viya

Remove the Deployment

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

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 Viya software and services will be uninstalled.

3   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.

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

5   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**.

   When the directories are manually removed, the removal of your SAS Viya deployment is complete.