# Contents

**Chapter 1 / Introduction**  ................................................................. 1
  Steps for a Successful Deployment ............................................. 1
  SAS Products and Supporting Components .................................. 2
  Contact SAS Technical Support ..................................................... 3

**Chapter 2 / System Requirements**  .............................................. 5
  Hardware Requirements ............................................................... 5
  Operating System Requirements .................................................. 7
  Server Software Requirements ..................................................... 9
  Security Requirements ............................................................... 10
  User and Group Requirements .................................................... 11
  Client Requirements .................................................................... 12

**Chapter 3 / Pre-installation Tasks**  ............................................ 13
  Create a Mirror Repository .......................................................... 13
  Configure SELinux ......................................................................... 16
  Enable the Yum Cache .................................................................. 18
  Perform Linux Tuning ................................................................. 18
  Confirm the Identities of the Hosts .............................................. 20

**Chapter 4 / Installation and Post-installation Tasks**  .................... 21
  Install SAS Business Orchestration Services ......................... 21
  Configure SAS Business Orchestration Services .................... 23
  Verify SAS Business Orchestration Services .......................... 23

**Chapter 5 / Completing the Deployment**  .................................... 25
  Refer to Additional Documentation ............................................ 25

**Chapter 6 / Managing Your Software**  ....................................... 27
  Overview .................................................................................... 27
  Adding Adapters to SAS Business Orchestration Services ....... 28

**Chapter 7 / Uninstalling Your Software**  .................................... 31
  Uninstall SAS Business Orchestration Services ...................... 31
  Uninstall a Mirror Repository .................................................... 31
Introduction

Steps for a Successful Deployment

Before You Begin

If you are viewing a saved copy of a PDF of this guide, the content might be outdated because this guide is subject to continual updates. You can always view the latest SAS Viya deployment guides at the SAS Viya Install Center.

To use this guide successfully, you should have a working knowledge of the Linux operating system and familiarity with the deployment tools that are provided by SAS.

Step 1 — Prepare for the Deployment

1. Go to Chapter 2, “System Requirements,” on page 5 to learn about requirements for hardware, software, data sources, storage, users and groups, security, and clients.

2. Go to Chapter 3, “Pre-installation Tasks,” on page 13 to prepare your environment before you deploy the software.
Step 2 — Perform the Deployment

1. Go to “Install SAS Business Orchestration Services” on page 21 to deploy the software to a single machine or across multiple machines.

2. Go to “Configure SAS Business Orchestration Services” on page 23 to configure settings for your specific environment.

Step 3 — Validate and Complete the Deployment

1. Take a few steps to test your deployment and perform validation tasks. See “Verify SAS Business Orchestration Services” on page 23 for more information.

2. Go to Chapter 5, “Completing the Deployment,” on page 25 to learn about post-deployment best practices and to find documentation about administrative tasks.

SAS Products and Supporting Components

This guide provides information for deploying the following software:

| SAS Business Orchestration Services 10.1 | SAS Orchestration Adapter for Intellicheck |
| SAS Orchestration Adapter for BioCatch | SAS Orchestration Adapter for Iovation |
| SAS Orchestration Adapter for Boku | SAS Orchestration Adapter for Payfone |
| SAS Orchestration Adapter for DataVisor | SAS Orchestration Adapter for Socure |
| SAS Orchestration Adapter for GIACT | SAS Orchestration Adapter for ThreatMetrix |

Note: Check your Software Order Email (SOE) for the list of software that you have licensed.
Contact SAS Technical Support

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

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

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

Host Requirements

Each target machine in your deployment must have all of the following attributes:

- A static IP address

The SAS Configuration Server component binds to a single private IP address per machine. If any of your intended hosts has multiple network interface cards (NICs), verify whether multiple NICs have been assigned IP addresses, including private IP addresses.
Hardware Requirements for SAS Business Orchestration Services

SAS Business Orchestration Services can be installed on a single machine or on multiple machines. SAS recommends using a separate machine for any adapters that you plan to use.

The following table describes a standard set of specifications for a machine where SAS Business Orchestration Services is deployed:

<table>
<thead>
<tr>
<th>Item</th>
<th>Recommended Level</th>
</tr>
</thead>
</table>
| CPU           | 4 cores (x86 architecture).  
               | 8 cores are recommended for improved performance.  
               | Intel or AMD 64-bit chip set with a minimum speed of 2.6 GHz |
| Memory        | 6 GB of RAM  
               | Memory clock speed of 1600 MHz |
### Disk Space Considerations

The software is installed in the `/opt` directory on each target machine. If you need to increase the available disk space, SAS recommends that you mount additional volumes at `/opt/sas` instead of to a subdirectory of `/opt/sas`. Mounting a volume in the installation directories increases the difficulty of uninstalling the software or of moving the volume to another location at a later time. Additional space for logs is required in `/opt/sas/viya`. The amount that is required depends on the logging level that you have set.

If disk space is limited, SAS recommends that you create symbolic links from the installation or log directories to the partitions where sufficient disk space is available. For example, you can create a symbolic link from the log directory (`/var/log`) to a directory that has additional free space:

```
/var/log/sas/viya -> ../../../opt/sas/viya/config/var/log/sas/
```

As part of your log management strategy, create symbolic links at the `/opt/sas` level in order to capture all logging activity.

The Apache `httpd` component of the Apache HTTP Server logs to `/var/log/httpd`. The logs in this directory can grow very large. In addition to using symbolic links to change the log location, you should also implement a log rollover strategy. See the Apache documentation for guidance about log rotation.

---

### Operating System Requirements

#### Supported Operating Systems


In a multi-machine deployment, SAS recommends that all server machines have the same version of Linux, including the same distribution, release, and patch level.

---

<table>
<thead>
<tr>
<th>Item</th>
<th>Recommended Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disk Space and Speed</td>
<td>1 GB or more</td>
</tr>
<tr>
<td></td>
<td>10,000 RPM</td>
</tr>
</tbody>
</table>

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

The requirements in this section apply to all the supported Linux operating systems.

Libraries and Packages

The typical Linux installation includes most of the packages and libraries that SAS requires. Problems can occur if default packages were removed from the base operating system (for example, X11 libraries and system utilities).

The following libraries and packages are required for Red Hat Enterprise Linux and Oracle Enterprise Linux:

- acl-2.2 or later
  The acl package is installed with Red Hat Enterprise Linux by default.
- curl–7.19.7-53 or later (Red Hat Enterprise Linux 6.x)
  On Red Hat Enterprise Linux 6.x, apply the RHSA-2017:0847-01 security update for curl to ensure that you have a supported version of the utility.
  On Oracle Linux 6.7 and later within 6.x, apply the ELSA-2017-0847 security update.
- curl–7.29.0-25 or later (Red Hat Enterprise Linux 7.x)
  Red Hat Enterprise Linux 7.x and Oracle Linux 7.x have a supported version of curl by default.
- glibc-2.12-1.166.el6 and later (on Red Hat Enterprise Linux 6.x or the equivalent). Refer to RHBA-2015:1465 on the Red Hat Customer Portal to obtain the latest updated package list.
- glibc-2.17-107.el7 and later (on Red Hat Enterprise Linux 7.x or the equivalent). Refer to RHSA-2016:2573 on the Red Hat Customer Portal to obtain the latest updated package list.
- libpng (on Red Hat Enterprise Linux 6.x or the equivalent)
  libpng12 (on Red Hat Enterprise Linux 7.x and Oracle Linux 7.x)
- libXmu
- net-tools
- nss 3.36.0-7 or later
- the numactl package
- systemd version 219-30 or later
- the X11 and Motif (GUI) packages
- xterm

Verifying systemd

On Linux 7.x, verify that the systemd package on each machine is a supported version. Run the following command:
rpm -qa | grep systemd

For Red Hat or Oracle, if the version that is returned is not at least 219-30, run the following command to retrieve the most recent package:

yum update systemd

SAS Support for Alternative Operating Systems

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

Server Software Requirements

Java

A Java Developers Kit (JDK) must be installed on every machine in your deployment. SAS Business Orchestration Services requires JDK 1.8. SAS also supports third-party distributions of JDK 1.8 but does not support IBM SDK, Java Technology Edition.

The current options for SAS Viya software have been tuned for OpenJDK and Oracle JDK. If you use a JDK from another vendor and experience performance issues, SAS might recommend using OpenJDK or Oracle JDK. You must also verify that all machines in the deployment run the same version of Java. You can determine the current Java version on a Linux machine by running the following command:

```
java -version
```

Apache httpd

The deployment process automatically installs Apache httpd on the machines that you designate as targets for the HTTP proxy installation unless it has already been installed. Apache httpd with the mod_ssl module is required in order to create the Apache HTTP Server, which provides security and load balancing for multiple SAS components. This server is also referred to as the reverse proxy server in this guide.


SAS recommends that you install Apache httpd and configure the Apache HTTP Server to use certificates that comply with the security policies at your enterprise before you start the deployment process.
The Apache HTTP Server must be dedicated to a single SAS software deployment.

Third-Party Legal Notices

SAS includes various third-party code and components in its software. Visit the following website to view third-party legal notices that apply to SAS Business Orchestration Services: https://support.sas.com/en/documentation/thirdpartynotices.html.

Security Requirements

Transport Layer Security

Transport Layer Security (TLS) is applied to many of the network connections in the deployment. These connections are secured by SAS Secrets Manager, which is based on HashiCorp Vault. In a full deployment that is also fully compliant with SAS security standards, the certificates are all signed by a root CA that is generated by SAS Secrets Manager and an intermediate certificate.

How Default Security Is Applied

An Apache HTTP server is used as a reverse proxy server to secure your environment. Default security settings use the Apache mod_ssl module to secure the server with self-signed certificates.

Install Apache httpd with the mod_ssl module. SAS Business Orchestration Services uses default Apache security settings. You should add your own certificates after the completion of the deployment process, which will require a brief outage. If you do not add compliant certificates and instead keep the default security settings and certificates, end users will see a standard web browser warning message. SAS recommends replacing the certificates before giving end users access to the software.

The deployment process provides a default level of encryption for data in motion (transmitted data). SAS Business Orchestration Services attempts to use the highest level of the TLS protocol that the operating system library supports, up to TLS 1.2. The OpenSSL implementation is used for TLS protocols. SAS Business Orchestration Services attempts to use the cipher suites that ensure Perfect Forward Secrecy and that provide the highest level of security that the host can support. For more information, see TLS Encryption.

Enhance Default Security Settings

SAS recommends that you enhance the default security that is applied by the installation process. As a best practice, follow these steps before you start the deployment process:
1 Install the Apache httpd module and the Apache mod_ssl module on all the web servers in your environment.

2 Add certificates that conform to the policies at your enterprise.

3 Perform a full deployment rather than a programming-only deployment.

The installation process can enhance the security of your software deployment automatically. It detects the CA chain that is configured for mod_ssl and incorporates it into the truststores for all other machines in your deployment. The installation process also performs additional security configuration.

(Optional) You can also perform these actions after the installation has completed:

- Block external connections to port 80.
- Use HTTPS for access to the user interfaces from a web browser.
- Add custom certificates to the self-signed certificates that are provided on all machines in a full deployment.
  
  SAS self-signed certificates are valid for one year. Be sure to renew them before they expire.
- Upgrade the security protocol and ciphers that are enabled by default using the sas-ssl.conf file.
- Prevent administrators from altering the default permissions on subdirectories of `opt/sas/viya`. Use your preferred network monitoring or security tool to monitor permissions on subdirectories of `opt/sas/viya` after the deployment has completed.

For more information about setting up the Apache HTTP Server and configuring additional security settings, see Encryption in SAS Viya: Data in Motion in SAS Viya Administration.

User and Group Requirements

Set Up the User Account that Deploys the Software

The user account that is used to configure and start the deployment process must meet the following requirements:

- Super user (sudo) or root access.

  To verify that your user ID is included in the sudoers file, run the following command:

  ```
  sudo -v
  ```

  As an alternative, to verify your sudoers privileges, run this command:

  ```
  sudo -l
  ```

  Make sure that commands that can be run as “sudo” are unrestricted on the installation computer.
Appropriate permissions to create subdirectories in the directory where you plan to install the software from the RPM. For more information, see “Install SAS Business Orchestration Services” on page 21.

A home directory.

Client Requirements

Web Browsers

End users can access the product user interfaces for SAS Viya applications from a desktop computer, using a supported web browser. Because SAS software is not installed on this machine, the requirements are minimal. UNIX and 64-bit Windows operating systems are supported.

Some SAS Viya user interfaces include some advanced features that require recent versions of popular web browsers. For information about supported web browsers and the corresponding platforms to access SAS user interfaces, see: https://support.sas.com/en/documentation/third-party-software-reference/viya/35/support-for-web-browsers.html.

Mobile Platform and Touchscreen Support

The SAS Visual Analytics Apps run natively on iOS, Android, and Windows 10, and provide the ability to view and explore reports using a touchscreen.

Some SAS Viya user interfaces are not currently supported on mobile devices.

For more information about mobile device support, see: https://support.sas.com/en/documentation/third-party-software-reference/viya/35/support-for-web-browsers.html.

Database Drivers

Make sure that each client where users will access SAS software has the required database drivers already installed.

Screen Resolution

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

SAS Mirror Manager is a command-line utility for synchronizing a collection of SAS software repositories. Its primary use is to create and manage mirror repositories for software deployment.

SAS Mirror Manager and the Mirror Repository

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 download is the `sas_repos` directory that is created in the installation user’s home directory. Make sure that the default location for the download and the destination for the mirror repository have adequate space.

This guide refers to the default location as `sas_repos`. If you want to specify the mirror destination, use the `--path` option, followed by the full directory path. In addition, replace instances of `sas_repos` that are used in this guide with the actual location that you select.
The `sas_repos` directories and files are explained as follows:

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

By default, SAS Mirror Manager downloads the contents of all repositories to which your order entitles you. Make sure that the machine where the software is downloaded has adequate disk space to accommodate the software that is downloaded.

---

**Running SAS Mirror Manager**

To create a mirror repository with SAS Mirror Manager:

1. The Software Order Email (SOE) instructed you to save the SAS_Viya_deployment_data.zip file attachment. If you have not already saved the file, save it to the location where you intend to use it.

2. Download SAS Mirror Manager from the SAS Mirror Manager download site to the machine where you want to create your mirror repository. If you use Microsoft Internet Explorer or Microsoft Edge to download the Linux or Macintosh version, save the file as a .tgz file instead of a .gz file.

3. Uncompress the downloaded file.

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

   ```
   export PATH=/opt/sas/viya/home/bin:$PATH
   ```

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

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

   **Note:** All the software to which your order entitles you is downloaded if you use the basic command in the previous step. To download software for selected target platforms, skip to the next step.
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.

6  (Optional) Run the following command to see a list of the platforms that you can select for the download operation:

```
mirrormgr list remote platforms --deployment-data path-to-SAS_Viya_deployment_data.zip
```

7  (Optional) Use the `--platform` option and one of the values that were returned by the `list remote platforms` command to download software only for a selected target platform:

```
IMPORTANT Use x64-redhat-linux-6 for all supported versions of Red Hat Enterprise Linux and its equivalent, such as Oracle Linux. The x64-redhat-linux-7 value indicates a package type that is only compatible with a different type of deployment.
```

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

8  (Optional) Use the `--latest` option to exclude any obsolete packages from the mirror repository that is being created.

If you use this option, be sure to use it with any subsequent `mirrormgr` commands. For example, to compare the contents of your mirror with the contents of SAS repositories, use the `diff` command with `--latest` if you used this option with the `mirror` command.

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

9  (Optional) After the initial download is complete, move the file structure to a web server or shared NFS mount point. Internet connectivity is not required for the destination machine.

Depending on your platform, you can use tools like `rsync` and `scp` to move the files. Here is a typical command for `rsync`:

```
rsync -av --progress sas_repos target_machine:/var/www/html/pulp/
```

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 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,
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.

Note: Specify these commands on a single line. Multiple lines are used here to improve readability.

**Example 1:** An HTTPS site.

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

**Example 2:** HTTPS with the certificate location.

If you use the https_proxy variable, the run command for SAS Mirror Manager might also require the `--cacert` option. That option indicates the location of the certificate that the proxy must use. The proxy certificate is managed by your organization. Here is an example of the environment variable and the run command for SAS Mirror Manager used together:

```bash
https_proxy=https://proxyid:password@proxy.company.com:3129 mirrormgr
mirror --deployment-data SAS_Viya_deployment_data.zip --platform x64-redhat-linux-6 --path sas_repos --cacert ../proxycert.crt --latest
```

**Example 3:** An HTTP site.

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

**Example 4:** An HTTP site with the environment variable and the run command for SAS Mirror Manager used together.

```bash
http_proxy=http://proxyid:password@proxy.company.com:443 mirrormgr
mirror --deployment-data SAS_Viya_deployment_data.zip --platform x64-redhat-linux-6 --path sas_repos --latest
```

## Specify a Log Location

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

```bash
mirrormgr mirror --deployment-data path-to-SAS_Viya_deployment_data.zip --path location-of-mirror-repository --log-file location-of-mirror-repository/mirrormgr.log --platform Linux-distribution --latest
```

## Configure SELinux

If Security-Enhanced Linux (SELinux) is enabled in your environment, it must be disabled or accommodated before you can deploy SAS Business Orchestration Services.
Options for Deploying SAS Viya with SELinux

If SELinux is required in your environment, it is supported on Red Hat Enterprise Linux if you perform some additional tasks.

To determine the present status of SELinux in your environment:

```
sudo sestatus -v
```

- If you see a message that the command is not enabled, SELinux is not active in your environment. You can proceed with deployment of SAS Business Orchestration Services.
- If a mode that is not permissive is returned, SELinux is enabled. In order to deploy SAS Business Orchestration Services, you must select one of the following options:
  - Disable SELinux and deploy SAS Business Orchestration Services.
  - Configure the environment to accommodate SELinux.
  - Disable SELinux, deploy SAS Business Orchestration Services, and then re-enable SELinux after the deployment has completed.

Disable SELinux and Deploy SAS Viya

If SELinux is active in your environment, one option is to configure permissive mode for SELinux on all the target machines in your deployment.

**Note:** Permissive mode effectively disables SELinux.

To change the mode value to permissive on all target machines in your deployment:

```
sudo setenforce 0
```

```
sudo sed -i.bak -e 's/SELINUX=enforcing/SELINUX=permissive/g' /etc/selinux/config
```

Configure the Environment to Accommodate SELinux

To deploy SAS Business Orchestration Services with SELinux enabled on all target machine in your deployment, perform all the following tasks:

1. Configure SELinux to enable the Apache HTTP Server. By default, SELinux does not allow the Apache httpd component to access the network.

   Run the following command on any machines that are deployTargets for the [httpproxy] host group in the inventory.ini file:

   ```
sudo setsebool -P httpd_can_network_connect 1
```
2 Make sure that the SELinux Policy deny_unknown status is set to allowed. Perform the following steps:
   a Run the following command to determine the current SELinux settings:
      `sudo sestatus -v`
   b Check the value of Policy deny_unknown status in the output. If the value is not allowed, you must change the policy setting.
   c As root, edit the `/etc/selinux/semanage.conf` file.
   d Add the following line:
      `handle-unknown=allow`
   e As root, run the following command to rebuild and reload the policy:
      `semodule -B`

Disable SELinux, Deploy SAS Viya, then Re-enable SELinux

A final option is to disable SELinux during the deployment and then re-enable it as soon as the deployment has completed. If you select this option, perform tasks 1 and 2, as described in “Configure the Environment to Accommodate SELinux”.

Enable the Yum Cache

By default, yum deletes downloaded files after a successful operation when they are no longer needed, minimizing the amount of storage space that yum uses. However, you can enable caching so that the files that yum downloads remain in cache directories. By using cached data, you can perform certain operations without a network connection.

In order to enable caching, add the following text to the `[main]` section of `/etc/yum.conf`.

```plaintext
keepcache = 1
```

This task should be performed on each machine in the deployment.

Perform Linux Tuning

This section describes tuning that should be performed on your Linux machines before you deploy your software. For information about tuning that can be performed after you deploy your software, see Linux in SAS Viya Administration: Tuning.
Set the ulimit Values

Overview

The Linux operating system provides mechanisms that enable you to set the
maximum limit for the amount of resources that a process can consume. Here are
some of the resource types:

- open file descriptors
- stack size
- processes available to a user ID

Each resource type with limits is stored in the appropriate file on each machine in
your deployment.

Here is the format of the `/etc/security/limits.conf` file for setting the maximum
number of open file descriptors:

```
*     -     nofile     value
```

The asterisk (*) indicates all user accounts.

For a single user account, * can be replaced with the user ID for that account. Here
is an example:

```
account-name     -     nofile     value
```

This line is duplicated in the file for each user ID.

For a group, * can be replaced with the at symbol (@) followed by the group name.
Here is an example:

```
@group-name     -     nofile     value
```

Set the Maximum Number of Processes Available

For each machine in your deployment:

1. Open the appropriate file. For Red Hat Enterprise Linux 6.7 or an equivalent
distribution, open `/etc/security/limits.d/90-nproc.conf`. For Red Hat
Enterprise Linux 7.1 and later or an equivalent distribution, open `/etc/
security/limits.d/20-nproc.conf`.

2. Set the limit for the number of processes.
   If you are performing a single-machine deployment, use the highest limit for all
users.

```
*     -     nproc     100000
```

3. Save and close the *-nproc.conf file.
Change the Default Time-Outs

Note: The information in this section applies only to systems running Red Hat Enterprise Linux 7.1 and later or equivalent distributions. If you are using an earlier Linux distribution, skip this section.

To change the default time-out values:

1. Open the `/etc/systemd/system.conf` file.
2. Find the two variables that control time-outs: `DefaultTimeoutStartSec` and `DefaultTimeoutStopSec`.
3. If the lines that contain these variables are not already uncommented, uncomment each line by removing the number sign (#).
4. Assign both the `DefaultTimeoutStartSec` and `DefaultTimeoutStopSec` variables a value of `1800s`.
   
   `DefaultTimeoutStartSec=1800s`
   `DefaultTimeoutStopSec=1800s`
5. Save and close the `/etc/systemd/system.conf` file.

Confirm the Identities of the Hosts

Each machine in the deployment must have a fully qualified domain name (FQDN). To ensure that each machine in the deployment has the host name that you expect, run the `hostname`, `hostname -f`, and the `hostname -s` commands on each machine. If any of the machines are not named as you expect or do not have an FQDN, correct the issue and run the commands again to confirm the correction.

Note: For more information about the `hostname` command and its options, see the Linux man pages.
Installation and Post-installation Tasks

Install SAS Business Orchestration Services

Configure SAS Business Orchestration Services

Verify SAS Business Orchestration Services

To install the SAS Business Orchestration Services RPM file:

1. Locate the SAS Business Orchestration Services RPM file, sas-boss.version
   build-date.build-ID.x86_64.rpm. The version is the version of the RPM file.
   The RPM file is located in the path-to-mirror-repository/repos/shipped/
   boss/100/boss-100-x64_redhat_linux_6-yum/Packages/s/ directory in the
   mirror repository.

2. Copy sas-boss.version-build-date.build-ID.x86_64.rpm to a location on a
   machine where you want to install SAS Business Orchestration Services.

3. Log on as a user who has root privileges from a secured shell such as SSH.

4. Install the RPM file.
   rpm -ivh sas-boss.version-build-date.build-ID.x86_64.rpm

5. After you install the primary RPM file, install any adapters that are included in
   your order.
   a. Locate the adapter RPM using the following table.

   Table 4.1 SAS Business Orchestration Services Adapters and Their Repository
      Locations

<table>
<thead>
<tr>
<th>Adapter Name</th>
<th>Repository Location</th>
</tr>
</thead>
</table>
   | Biocatch     | path-to-mirror-repository/repos/shipped/oada
gap/oada-125-redhat-linux_6-yum/Packages/s/sas-boss-biocatch-version-build
deate.build-ID.x86_64.rpm |
<table>
<thead>
<tr>
<th>Adapter Name</th>
<th>Repository Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boku</td>
<td>path-to-mirror-repository/repos/shipped/oadapboku/125/oadapboku-125-x64_redhat_linux_6-yum/Packages/s/sas-boss-boku-version-build-date.build-ID.x86_64.rpm</td>
</tr>
<tr>
<td>Datavisor</td>
<td>path-to-mirror-repository/repos/shipped/oadapdvsr/125/oadapdvsr-125-x64_redhat_linux_6-yum/Packages/s/sas-boss-datavisor-version-build-date.build-ID.x86_64.rpm</td>
</tr>
<tr>
<td>GIACT</td>
<td>path-to-mirror-repository/repos/shipped/oadapgiat/125/oadapgiat-125-x64_redhat_linux_6-yum/Packages/s/sas-boss-giact-version-build-date.build-ID.x86_64.rpm</td>
</tr>
<tr>
<td>Intellicheck</td>
<td>path-to-mirror-repository/repos/shipped/oadapintx/125/oadapintx-125-x64_redhat_linux_6-yum/Packages/s/sas-boss-intellicheck-version-build-date.build-ID.x86_64.rpm</td>
</tr>
<tr>
<td>Iovation</td>
<td>path-to-mirror-repository/repos/shipped/oadapiovn/125/oadapiovn-125-x64_redhat_linux_6-yum/Packages/s/sas-boss-iovation-version-build-date.build-ID.x86_64.rpm</td>
</tr>
<tr>
<td>On-Demand Decision Engine</td>
<td>path-to-mirror-repository/repos/shipped/oadapode/125/oadapode-125-x64_redhat_linux_6-yum/Packages/s/sas-boss-ode-version-build-date.build-ID.x86_64.rpm</td>
</tr>
<tr>
<td>Payfone</td>
<td>path-to-mirror-repository/repos/shipped/oadappafn/125/oadappafn-125-x64_redhat_linux_6-yum/Packages/s/sas-boss-payfone-version-build-date.build-ID.x86_64.rpm</td>
</tr>
<tr>
<td>Socure</td>
<td>path-to-mirror-repository/repos/shipped/oadapsocr/125/oadapsocr-125-x64_redhat_linux_6-yum/Packages/s/sas-boss-socure-version-build-date.build-ID.x86_64.rpm</td>
</tr>
<tr>
<td>Threatmetrix</td>
<td>path-to-mirror-repository/repos/shipped/oadaptmx/125/oadaptmx-125-x64_redhat_linux_6-yum/Packages/s/sas-boss-threatmetrix-version-build-date.build-ID.x86_64.rpm</td>
</tr>
</tbody>
</table>

b Copy the appropriate RPM to the machine where you just installed the SAS Business Orchestration Services RPM.

c If you have not already logged on as a user who has root privileges from a secured shell such as SSH, do so now.
d Install the RPM file.

```
rpm -ivh RPM-name
```

e Repeat steps 5a-5d for each adapter that you want to install.

6 Repeat steps 2 through 5 on each machine where you want to install SAS Business Orchestration Services. Installing SAS Business Orchestration Services on more than one machine enables you to use High Availability (HA) functionality in your deployment.

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**Configure SAS Business Orchestration Services**


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**Verify SAS Business Orchestration Services**

After configuring your deployment, verify that SAS Business Orchestration Services is deployed correctly. Follow the steps at [Verify That SAS Business Orchestration Services Is Running](#) in *SAS Business Orchestration Services: User’s Guide*.
Completing the Deployment

Refer to Additional Documentation

- To perform initial administrative tasks, see SAS Viya Administration: Initial Tasks.
- To locate administration and additional documentation for solutions and offerings, go to the SAS Viya documentation page:
  
  http://support.sas.com/documentation/onlinedoc/viya/index.html

- To locate usage information, refer to the Help that is available from the SAS Viya product and administrative interfaces.
Managing Your Software

Overview

What Is an Add-On Product?

An add-on product is new software that you can order and then install with your currently deployed software. One example of an add-on product is SAS Orchestration Adapter for BioCatch. You will need a new order for an add-on product. Adding new software to your deployment also updates your currently deployed software.

Because an add-on product is added to the currently deployed software in an environment, you might need to expand your environment’s capacity before installing an add-on product.

For information about adding on a product, see “Adding Adapters to SAS Business Orchestration Services” on page 28.
Adding Adapters to SAS Business Orchestration Services

Overview

You need a new software order to add adapters to a SAS SAS Business Orchestration Services deployment.

Also, you must know the location of the directory on each machine where you stored deployment and maintenance files.

Synchronize the Mirror Repository

If you are using a mirror repository:

1  (Optional) To list the packages that are available, run the following command on the machine where the mirror repository is located:

   Note: Enter the command on a single line. Multiple lines are used here to improve readability.

   ```
   mirrormgr mirror diff --deployment-data path-to-SAS_Viya_deployment_data.zip --platform linux-distribution-value --path path-to-mirror-destination --latest
   ```

   For more information, see "Create a Mirror Repository" on page 13.

   Note: Without the `--platform` option, the command returns a list of the available packages for all supported platforms rather than only the specified platform. The `--platform` option filters out unwanted content from the output of the command.

2  Synchronize the deployment’s mirror repository with the SAS mirror repository. Use the same options to update the mirror repository that you used to create the mirror repository.

   To synchronize, run the following command on the machine where the connected mirror repository is located:

   Note: Enter the command on a single line. Multiple lines are used here to improve readability.

   ```
   mirrormgr mirror --deployment-data path-to-SAS_Viya_deployment_data.zip --path path-to-mirror-destination --latest
   ```
If your deployment does not have internet access, move the files from the machine where the connected mirror repository is located to the machine where the unconnected mirror repository is located.

---

Add an Adapter

To add an adapter to an existing SAS Business Orchestration Services deployment:

1. Log on as a user who has root privileges from a secured shell such as SSH.
2. To install an adapter, perform Step 5 on page 21.
3. Repeat step 2 on each machine where you have installed SAS Business Orchestration Services.
Uninstalling Your Software

Uninstall SAS Business Orchestration Services .................................................. 31
Uninstall a Mirror Repository ............................................................................. 31

Uninstall SAS Business Orchestration Services


Uninstall a Mirror Repository

If you want to remove your mirror repository, run a basic Linux command to do so. Because all the files of the mirror repository are contained in a single directory, use the following command to remove the mirror repository:

    sudo rm -rf path-to-mirror-repository

If you did not change the default location of the SAS Mirror Manager log when you deployed your software, you should also remove the log from ~/.local/share/mirrormgr in the home directory of the install user.