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# **SAS<sup>®</sup> Visual Analytics 7.1**

## **Installation and Configuration Guide**

### **(Distributed SAS<sup>®</sup> LASR<sup>™</sup>)**

**Also applies to SAS<sup>®</sup> Visual Statistics**

The correct bibliographic citation for this manual is as follows: SAS Institute Inc. 2014. *SAS® Visual Analytics 7.1: Installation and Configuration Guide (Distributed SAS® LASR™)*. Cary, NC: SAS Institute Inc.

**SAS® Visual Analytics 7.1: Installation and Configuration Guide (Distributed SAS® LASR™)**

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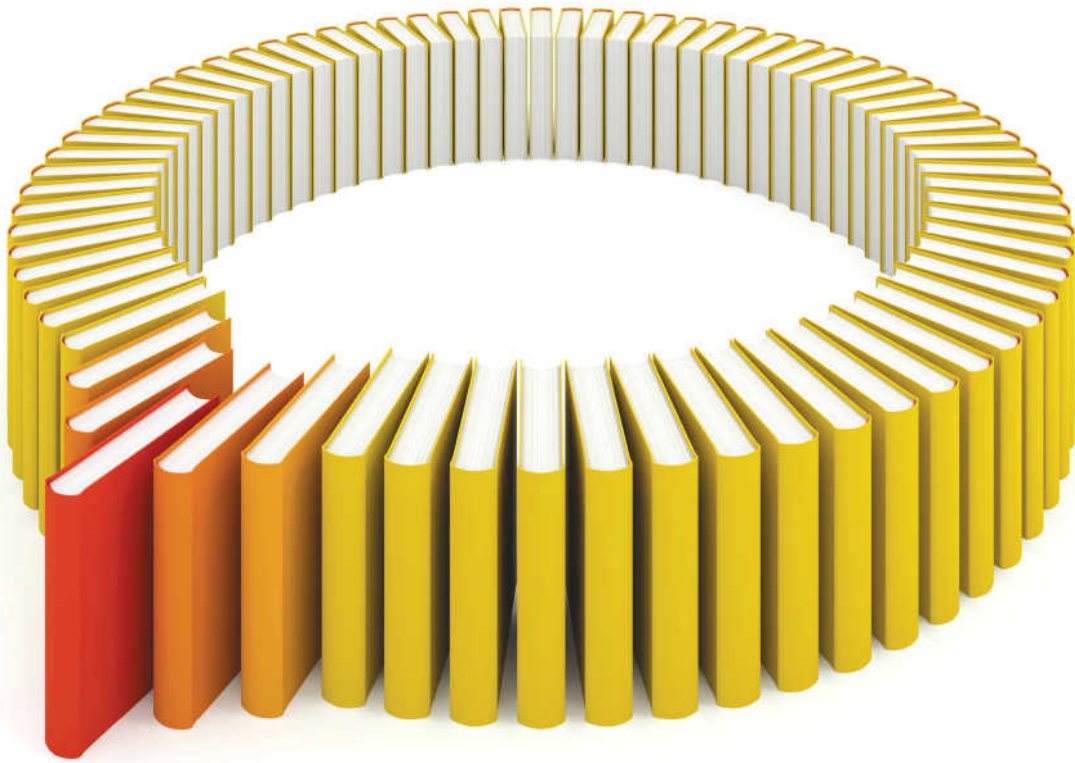
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# Using This Book

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## Audience

This book documents installation and initial configuration of SAS Visual Analytics for a distributed SAS LASR Analytic Server on an analytics cluster for traditional, on-premises deployments. For information about SAS Visual Analytics in the cloud, see SAS Cloud documentation, available at <http://support.sas.com/documentation/solutions/cloudgen/>.

For documentation about deploying SAS Visual Analytics for a non-distributed SAS LASR Analytic Server, see the *SAS Visual Analytics: Installation and Configuration Guide (Non-distributed SAS LASR)* available at <http://support.sas.com/documentation/solutions/va/index.html>.

This document covers tasks that are required after you and your SAS representative have decided what software you need and on what machines you will install the software. At this point, you can begin performing some pre-installation tasks, such as creating operating system user accounts and designating the ports that you will use during installation.

Unless you are deploying a non-distributed SAS LASR Analytic Server, you will also need to refer to *SAS High-Performance Analytics Infrastructure: Installation and Configuration Guide*, available at <http://support.sas.com/documentation/onlinedoc/va>.

---

## Documentation Conventions

### SAS Installation Directory

The phrase *SAS installation directory* refers to a host path. (The SAS installation directory is sometimes referred to as SAS Home.) For example, `C:\Program Files\SASHome`.

### SAS Configuration Directory

The phrase *SAS configuration directory* refers to a host path that includes a configuration name and level. For example, `C:\SAS\Config\Lev1`.

For more information, see the topic, “Overview of the Configuration Directory Structure,” in the *SAS Intelligence Platform: System Administration Guide*, available at <http://support.sas.com/documentation/cdl/en/bisag/67481/HTML/default/viewer.htm#n0v5rampodzajbn1w825qtg5lzi1.htm>.

## What's New

# What's New in Installation and Configuration for SAS Visual Analytics 7.1

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## Overview

The *SAS Visual Analytics: Installation and Configuration Guide (Distributed SAS LASR)* explains how to install and initially configure SAS Visual Analytics.

This document contains new material on the following enhancements and changes to the SAS Visual Analytics deployment tools:

- “Distributed SAS Visual Analytics Supported on Windows”
- “Server and Middle Tier Topology Constraint Removed”
- “Greenplum and Teradata Co-located Data Providers No Longer Supported”

---

## **Distributed SAS Visual Analytics Supported on Windows**

Starting with release 7.1, the SAS Visual Analytics server and middle tier running in distributed mode is supported on Windows server machines. The analytics cluster (on which the SAS High-Performance Analytics environment resides) must run on Linux.

For more information, see *System Requirements—SAS Visual Analytics (Distributed Mode)*, available at <http://support.sas.com/documentation/installcenter/en/ikvisanalytofrsr/68017/HTML/default/>.

---

## **Server and Middle Tier Topology Constraint Removed**

Starting with release 7.1, if the SAS Visual Analytics server and middle tier are deployed on separate machines, these machines are *no longer* required to use operating systems in the same operating system family.

For more information, see “[Server and Middle Tier Topology Constraint Removed in Release 7.1](#)” on page 134.

---

## **Greenplum and Teradata Co-located Data Providers No Longer Supported**

Starting with release 7.1, SAS Visual Analytics no longer supports deployments where the SAS High-Performance Analytics environment is co-located with a Greenplum Data Computing Appliance or a Teradata Managed Server Cabinet.

Sites that want to leverage their Greenplum and Teradata databases with SAS Visual Analytics have the option of a parallel connection using the SAS Embedded Process.

For more information, see the *SAS High-Performance Analytics Infrastructure: Installation and Configuration Guide*, available at <http://support.sas.com/documentation/solutions/hpainfrastructure/index.html>.



# Recommended Reading

Here is the recommended reading list for this title:

- *Configuration Guide for SAS Foundation for Microsoft Windows for x64*, available at <http://support.sas.com/documentation/installcenter/en/ikfdtnwx6cg/66385/PDF/default/config.pdf>.
- *Configuration Guide for SAS Foundation for UNIX Environments*, available at <http://support.sas.com/documentation/installcenter/en/ikfdtnunxcg/66380/PDF/default/config.pdf>.
- *SAS Deployment Wizard and SAS Deployment Manager: User's Guide*, available at <http://support.sas.com/documentation/installcenter/en/ikdeploywizug/66034/PDF/default/user.pdf>.
- *SAS Guide to Software Updates*, available at <http://support.sas.com/documentation/cdl/en/whatsdiff/66129/PDF/default/whatsdiff.pdf>.
- *SAS High-Performance Analytics Infrastructure: Installation and Configuration Guide*, available at <http://support.sas.com/documentation/solutions/hpainfrastructure/index.html>.
- *SAS High-Performance Computing Management Console: User's Guide*, available at <http://support.sas.com/documentation/solutions/hpainfrastructure/index.html>.
- *SAS Intelligence Platform: Installation and Configuration Guide*, available at <http://support.sas.com/documentation/cdl/en/biig/63852/PDF/default/biig.pdf>.
- *SAS Intelligence Platform: Security Administration Guide*, available at <http://support.sas.com/documentation/cdl/en/bisecag/67045/PDF/default/bisecag.pdf>.

- *SAS LASR Analytic Server: Reference Guide* available at <http://support.sas.com/documentation/cdl/en/inmsref/67597/PDF/default/inmsref.pdf>.
- *SAS Visual Analytics: Administration Guide* available at <http://support.sas.com/documentation/solutions/va/index.html>.
- *SAS Visual Analytics: User's Guide* available at <http://support.sas.com/documentation/cdl/en/vaug/67500/PDF/default/vaug.pdf>.
- Help and tutorials integrated into SAS Mobile BI.
- Usage Note 42197: A list of papers useful for troubleshooting system performance problems, available at <http://support.sas.com/kb/42/197.html>.
- SAS offers instructor-led training and self-paced e-learning courses to help you administer SAS Visual Analytics. For more information about the courses available, see [support.sas.com/admintraining](http://support.sas.com/admintraining).

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# Introduction to Deploying SAS Visual Analytics

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## What Is SAS Visual Analytics?

SAS Visual Analytics is an easy-to-use, web-based product that leverages SAS high-performance analytic technologies. SAS Visual Analytics empowers organizations to explore huge volumes of data very quickly to identify patterns and trends and to identify opportunities for further analysis.

SAS Visual Analytics includes the following:

- A non-distributed SAS LASR Analytic Server or a distributed SAS LASR Analytic Server with SAS High-Performance Analytics environment root node and worker nodes.
- One of the following supported co-located data providers:
  - SAS High-Performance Deployment of Hadoop cluster
  - Any supported Hadoop cluster
- A SAS Visual Analytics server tier consisting of the following:
  - SAS LASR Analytic Server Monitor (distributed)
  - SAS Visual Analytics High-Performance Configuration
  - SAS Information Retrieval Studio
  - SAS Workspace Servers
  - SAS Pooled Workspace Servers
  - SAS Stored Process Servers
  - SAS/ACCESS Interface to Hadoop
  - SAS High-Performance Computing Management Console (distributed)
- A SAS Visual Analytics middle tier consisting of the following:
  - SAS Visual Analytics Hub

- ❑ SAS Visual Analytics Explorer
- ❑ SAS Visual Analytics Designer
- ❑ SAS Visual Data Builder
- ❑ SAS Visual Analytics Graph Builder
- ❑ SAS Visual Analytics Report Viewer
- ❑ SAS Visual Analytics Administrator
- ❑ SAS LASR Authorization Service
- ❑ SAS Visual Analytics Transport Service
- ❑ Search Interface to SAS Content
- ❑ SAS Remote Services

When you license SAS Visual Analytics with the non-distributed SAS LASR Analytic Server, the SAS High-Performance Analytics environment and the co-located data provider are not provided.

For more information about SAS Visual Analytics, see the following documents:

- [SAS LASR Analytic Server: Reference Guide](#)
- [SAS Visual Analytics: Administration Guide](#)
- [SAS Visual Analytics: User's Guide](#)
- Help and tutorials integrated into SAS Mobile BI

---

## **SAS Visual Statistics Installation Instructions**

If SAS Visual Statistics is part of your order, then when you perform the steps in this document for installing and configuring SAS Visual Analytics, you are also installing and configuring SAS Visual Statistics.

---

## Where Do I Locate My Analytics Cluster?

### Overview of Locating Your Analytics Cluster

If you are planning to use a distributed SAS LASR Analytic Server, then you need to establish an *analytics cluster*. An analytics cluster is a high-performance environment that is characterized by massively parallel processing (MPP) used to perform analytic tasks on big data residing in a distributed data storage appliance or in a Hadoop cluster.

You have two options for where you locate your SAS analytics cluster:

- It can be co-located with your data store.
- It can be remote from your data store.

When the SAS analytics cluster is separated (remote) from your data store, you have two options for data transfer:

- You can perform a serial data transfer using SAS/ACCESS Interface to Hadoop.
- You can perform a parallel data transfer using SAS/ACCESS Interface to Hadoop with SAS Embedded Process.

The topics in this section contain basic diagrams that describe each option for analytics cluster location:

- co-located with your data store
  - [SAS High-Performance Deployment of Hadoop cluster](#)
  - [any supported Hadoop cluster](#)
- remote from your data store
  - [SAS High-Performance Deployment of Hadoop \(serial\)](#)
  - [any supported Hadoop \(serial\)](#)
  - [SAS High-Performance Deployment of Hadoop \(parallel\)](#)

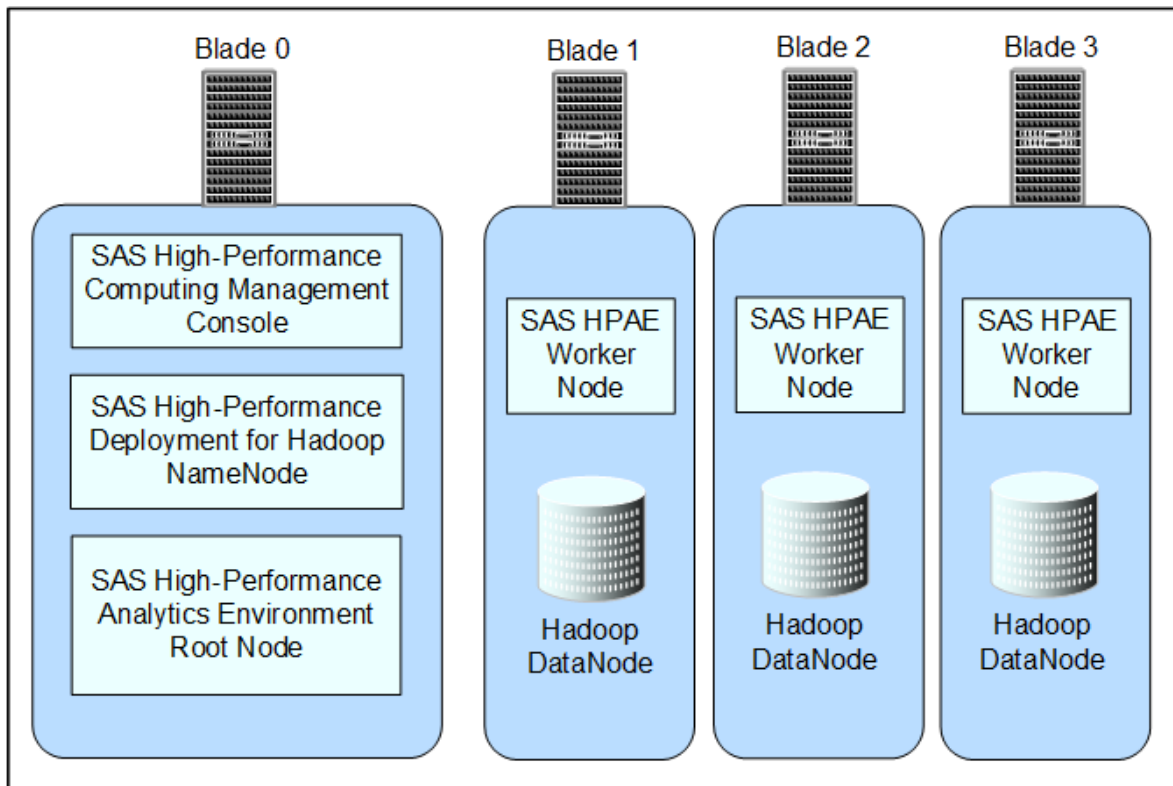
- any supported Hadoop (parallel)

Where you locate your analytics cluster depends on a number of criteria. Your SAS representative will know the latest supported configurations and can help you determine which cluster location works best for your site.

## Co-located with Your Data Store

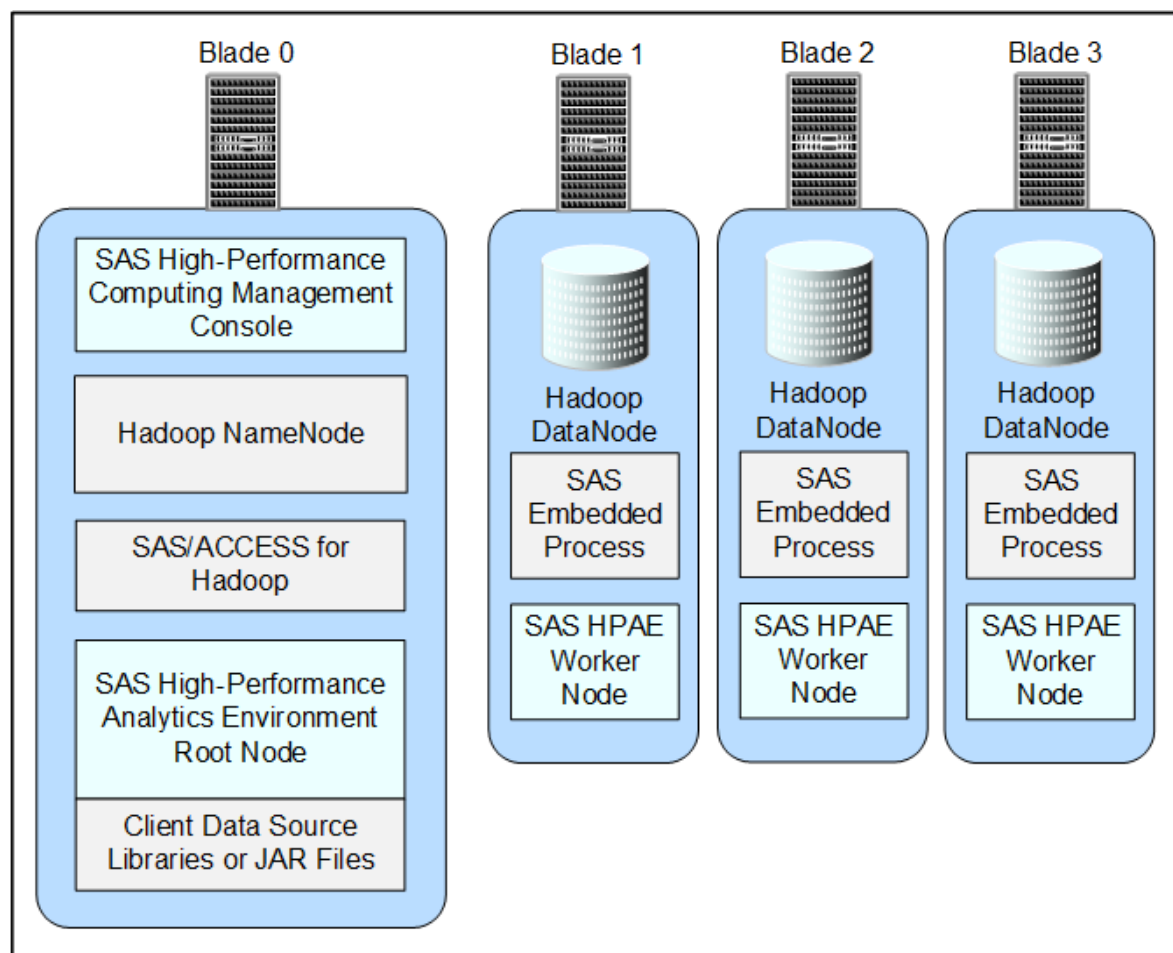
The following figure shows the analytics cluster co-located on your SAS High-Performance Deployment of Hadoop cluster:

**Figure 1.1** Analytics Cluster Co-located on Your SAS High-Performance Deployment of Hadoop Cluster



The following figure shows the analytics cluster co-located on a supported Hadoop cluster:

**Figure 1.2** Analytics Cluster Co-located on a Supported Hadoop Cluster



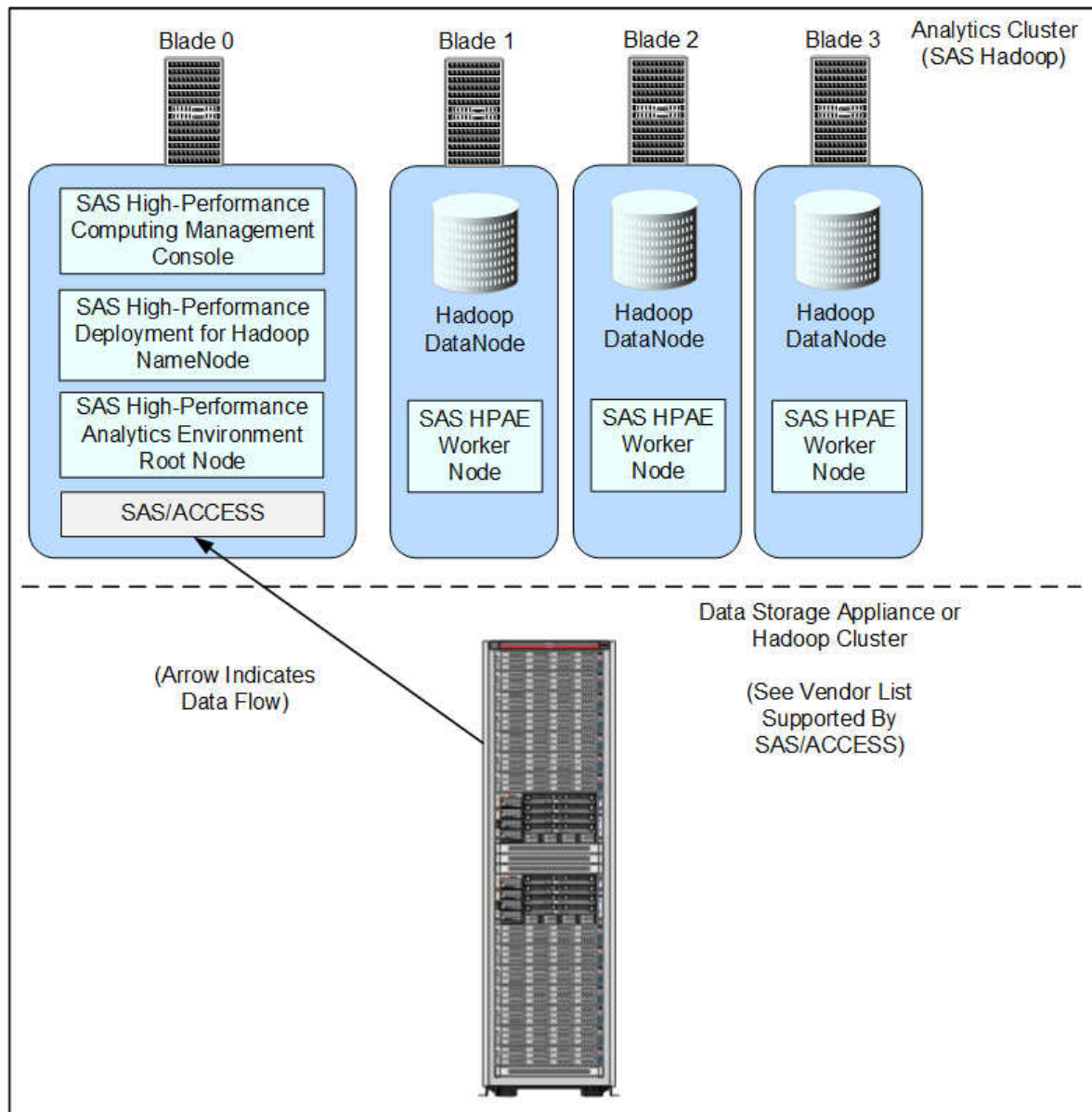
**Note:** For deployments that access SASHDAT tables exclusively, SAS/ACCESS Interface to Hadoop and the SAS Embedded Process are not required.

## **Remote from Your Data Store (Serial Connection)**

The serial connection between the analytics cluster and your data store is achieved by using SAS/ACCESS Interface to Hadoop. SAS/ACCESS Interface to Hadoop is orderable in a deployment package that is specific for your data source. For more information, see [SAS/ACCESS for Relational Databases: Reference](#).

The following figure shows the analytics cluster running the SAS High-Performance Deployment of Hadoop using a serial connection to your remote data store:

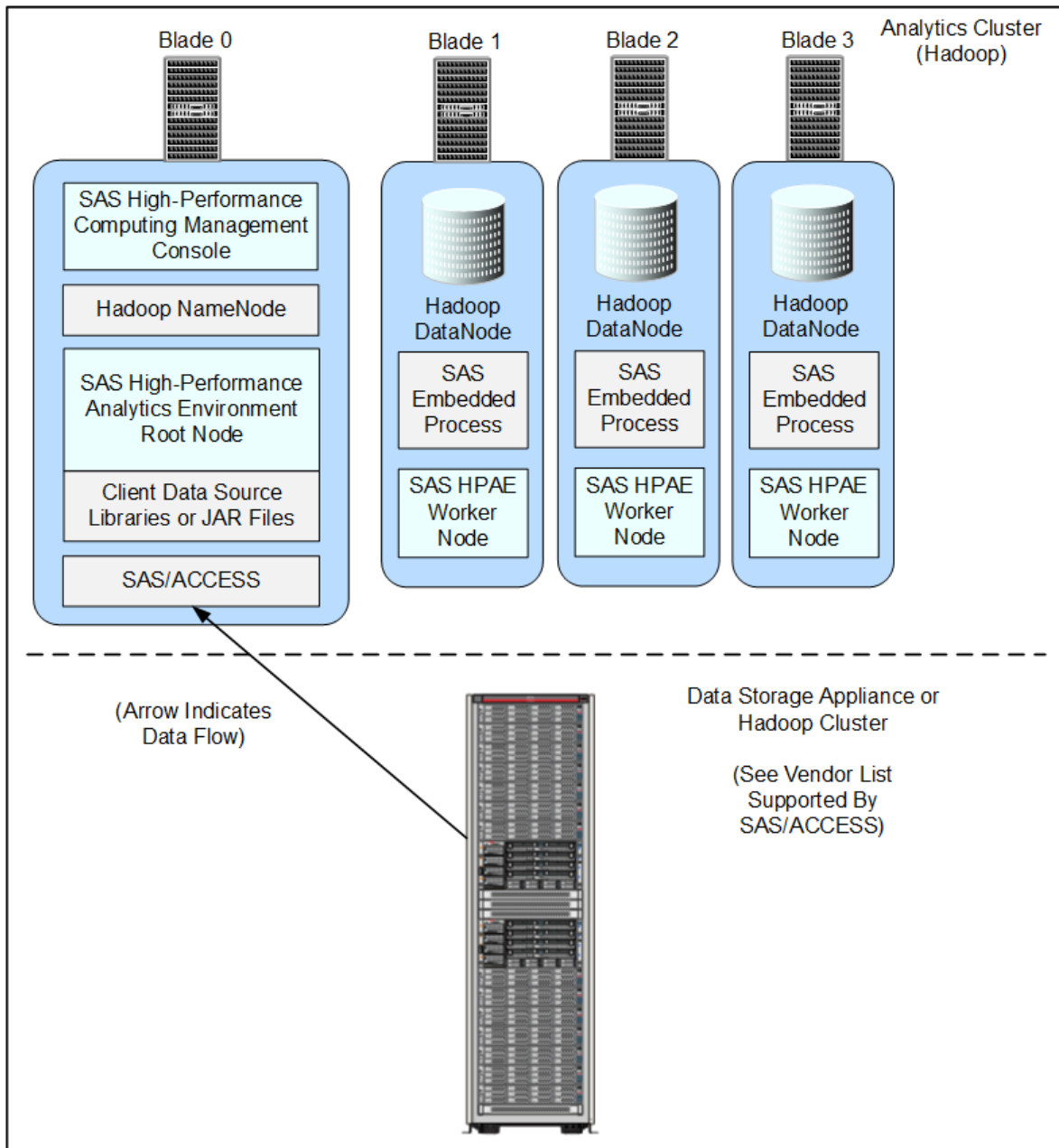
**Figure 1.3** Analytics Cluster (SAS High-Performance Deployment of Hadoop) Remote from Your Data Store (Serial Connection)





The following figure shows the analytics cluster running on a supported Hadoop cluster using a serial connection to your remote data store:

**Figure 1.4** Analytics Cluster (Hadoop) Remote from Your Data Store (Serial Connection)

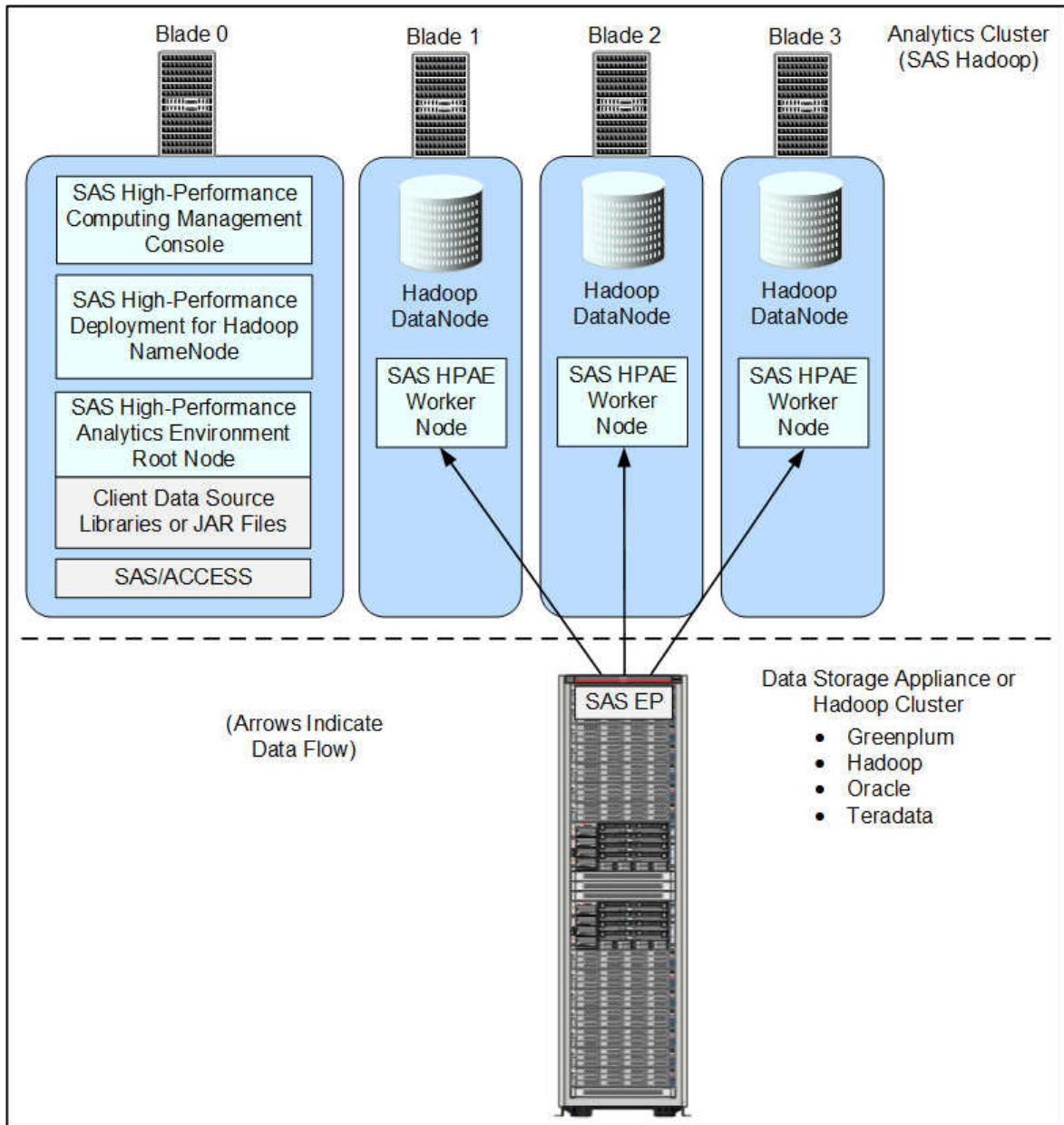


## **Remote from Your Data Store (Parallel Connection)**

Together, SAS/ACCESS Interface and SAS Embedded Process provide a high-speed parallel connection that delivers data from your data source to the SAS High-Performance Analytics environment on the analytics cluster. These products are in a deployment package that is specific for your data source. For more information, see [SAS In-Database Products: Administrator's Guide](#).

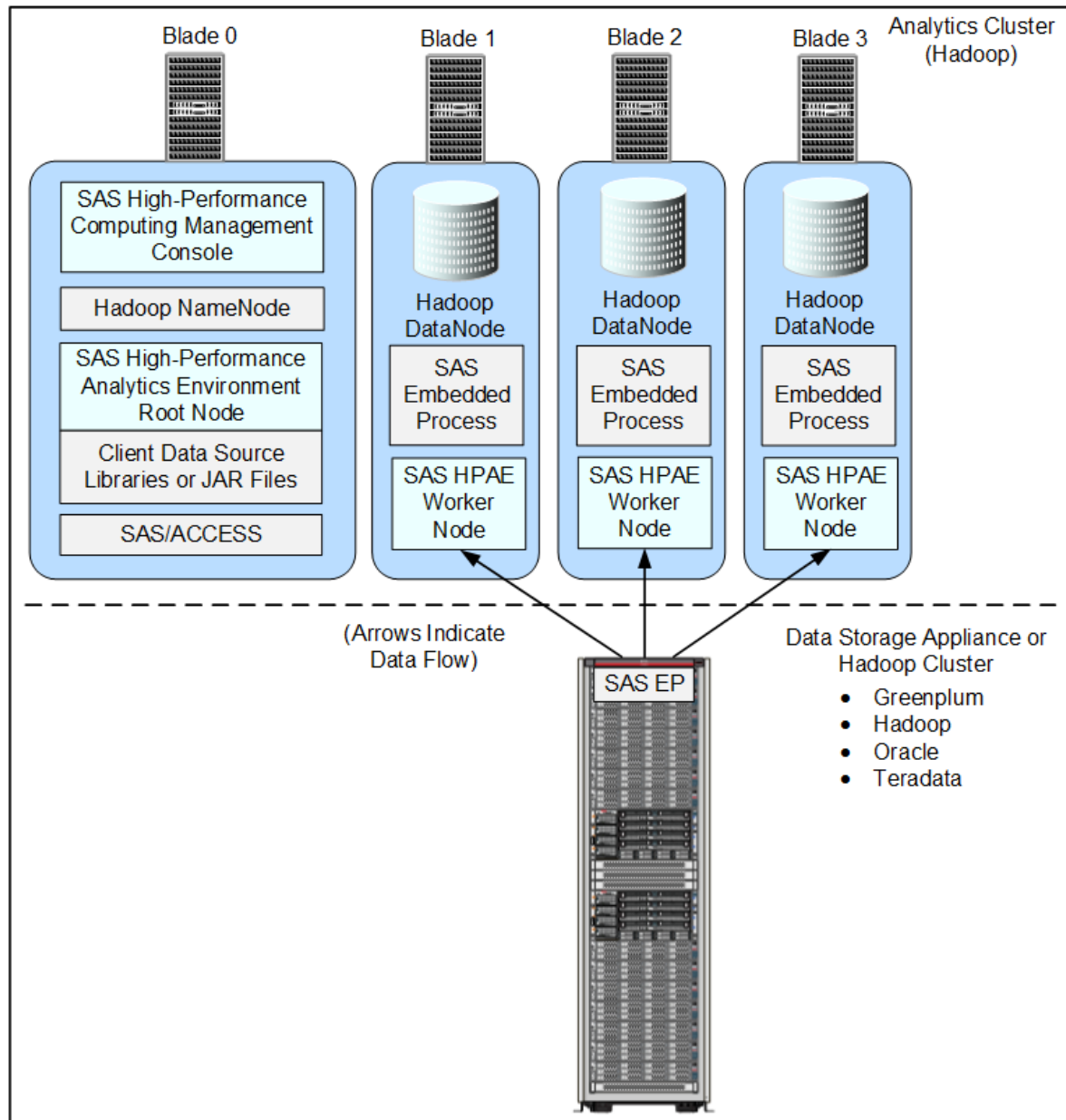
The following figure shows the analytics cluster running the SAS High-Performance Deployment of Hadoop using a parallel connection to your remote data store:

**Figure 1.5** Analytics Cluster (SAS High-Performance Deployment of Hadoop) Remote from Your Data Store (Parallel Connection)



The following figure shows the analytics cluster running on a supported Hadoop cluster using a parallel connection to your remote data store:

**Figure 1.6** Analytics Cluster (Hadoop) Remote from Your Data Store (Parallel Connection)



---

# Deploying SAS Visual Analytics

## Overview of Deploying SAS Visual Analytics

The following list summarizes the steps required to install and configure SAS Visual Analytics:

1. Create a SAS Software Depot.
2. Check for documentation updates.
3. (Optional) Deploy the SAS High-Performance Analytics infrastructure.
4. Create operating system users and groups and designate ports.
5. (Optional) Set up certificates.
6. Deploy required third-party software.
7. Deploy the servers and middle-tier.

The following sections provide a brief description of each of these steps. Subsequent chapters in the guide provide the step-by-step instructions that you will need to perform them.

### Step 1: Create a SAS Software Depot

Create a SAS Software Depot, which enables you to install SAS software over your site's network rather than from the installation media.

**Note:** If you chose to receive SAS through Electronic Software Delivery, a SAS Software Depot is automatically created for you.

For more information, see [Chapter 2, "Pre-Installation: Creating a SAS Software Depot," on page 17.](#)

## Step 2: Check for Documentation Updates

It is very important to check for late-breaking installation information in SAS Notes and to review the system requirements for your SAS software.

- [Samples & SAS Notes](#)
- system requirements
  - *System Requirements—SAS Visual Analytics (Distributed Mode)*, available at <http://support.sas.com/documentation/installcenter/en/ikvisanalytofrsr/68017/HTML/default/>.

## Step 3: (Optional) Deploy the SAS High-Performance Analytics Infrastructure

**Note:** SAS Visual Analytics 7.1 requires that you use SAS High-Performance Analytics environment 2.9 or higher.

The SAS High-Performance Analytics infrastructure consists of the following:

- SAS High-Performance Analytics environment
  - is the foundation for SAS LASR Analytic Server. A root node is deployed on the grid host and worker nodes are deployed on each remaining machine in the Hadoop cluster.
- SAS High-Performance Computing Management Console
  - is a web application tool that eases the administrative burden on multiple machines in a distributed computing environment.
- SAS High-Performance Deployment of Hadoop (optional)
  - is a co-located data provider. SAS High-Performance Deployment of Hadoop is based on Apache and is shipped with SAS. The name node is deployed on the grid host and data nodes are deployed on each remaining machine in the Hadoop cluster.

**Note:** Use of SAS High-Performance Deployment of Hadoop is optional. Other supported Hadoop clusters can be used.

For information about deploying the SAS High-Performance Analytics infrastructure, see [SAS High-Performance Analytics Infrastructure](#).

## Step 4: Create Operating System Users and Groups and Designate Ports

Create a set of operating system users and groups that will be required during the installation and configuration of your system. Designate a set of ports to use.

SAS Visual Analytics users must have an operating system account. For distributed environments, they must have passwordless SSH on all machines in the cluster or on blades across the appliance. SAS High-Performance Computing Management Console enables you to perform these two tasks from one location.

For more information, see [Chapter 3, “Pre-Installation: Setting Up Users, Groups, and Ports,”](#) on page 73.

## Step 5: (Optional) Set Up Certificates

Decide whether to use certificates to authenticate user and machine identities to secure communication between SAS web applications.

For more information, see [Chapter 4, “Pre-Installation: Setting Up Certificates,”](#) on page 93.

## Step 6: Deploy Required Third-Party Software

Install any required third-party products, such as Python. These products are identified in your deployment plan.

For more information, see *System Requirements—SAS Visual Analytics (Distributed Mode)*, available at <http://support.sas.com/documentation/installcenter/en/ikvisanlytofrsr/68017/HTML/default/>.

If you need Python, you can download it from [Third-Party Software for SAS 9.4](#).

## **Step 7: Deploy the Servers and Middle-Tier**

Install and configure your SAS LASR Analytic Server, SAS Visual Analytics server, and SAS Visual Analytics middle-tier software using the SAS Deployment Wizard. The wizard is an installation and configuration tool that is supplied by SAS.

For more information, see [Chapter 5, “Deploying the SAS Visual Analytics Server and Middle Tier,”](#) on page 125.



# 2

## Pre-Installation: Creating a SAS Software Depot

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## Deployment Process Overview: Step One

One prerequisite for deploying SAS is to create a special file system of SAS product and order data—a SAS Software Depot—that the SAS Deployment Wizard then uses to install and configure SAS.

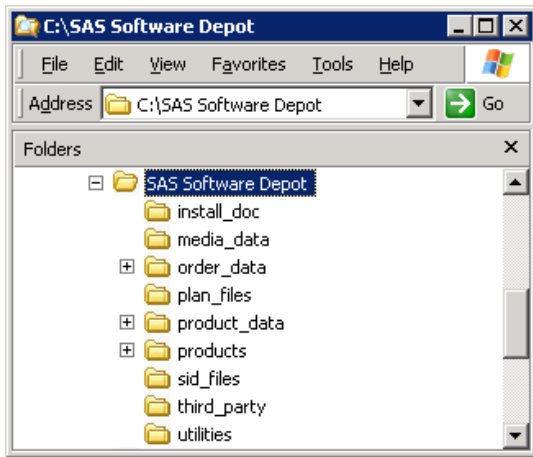
Creating a SAS Software Depot is the first of seven steps required to install and configure SAS Visual analytics:

- **1. Create a SAS Software Depot.**
- 2. Check for documentation updates.
- 3. (Optional) Deploy the SAS High-Performance Analytics infrastructure.
- 4. Create operating system users and groups and designate ports.
- 5. (Optional) Set up certificates.
- 6. Deploy required third-party software.
- 7. Deploy the servers and middle tier.

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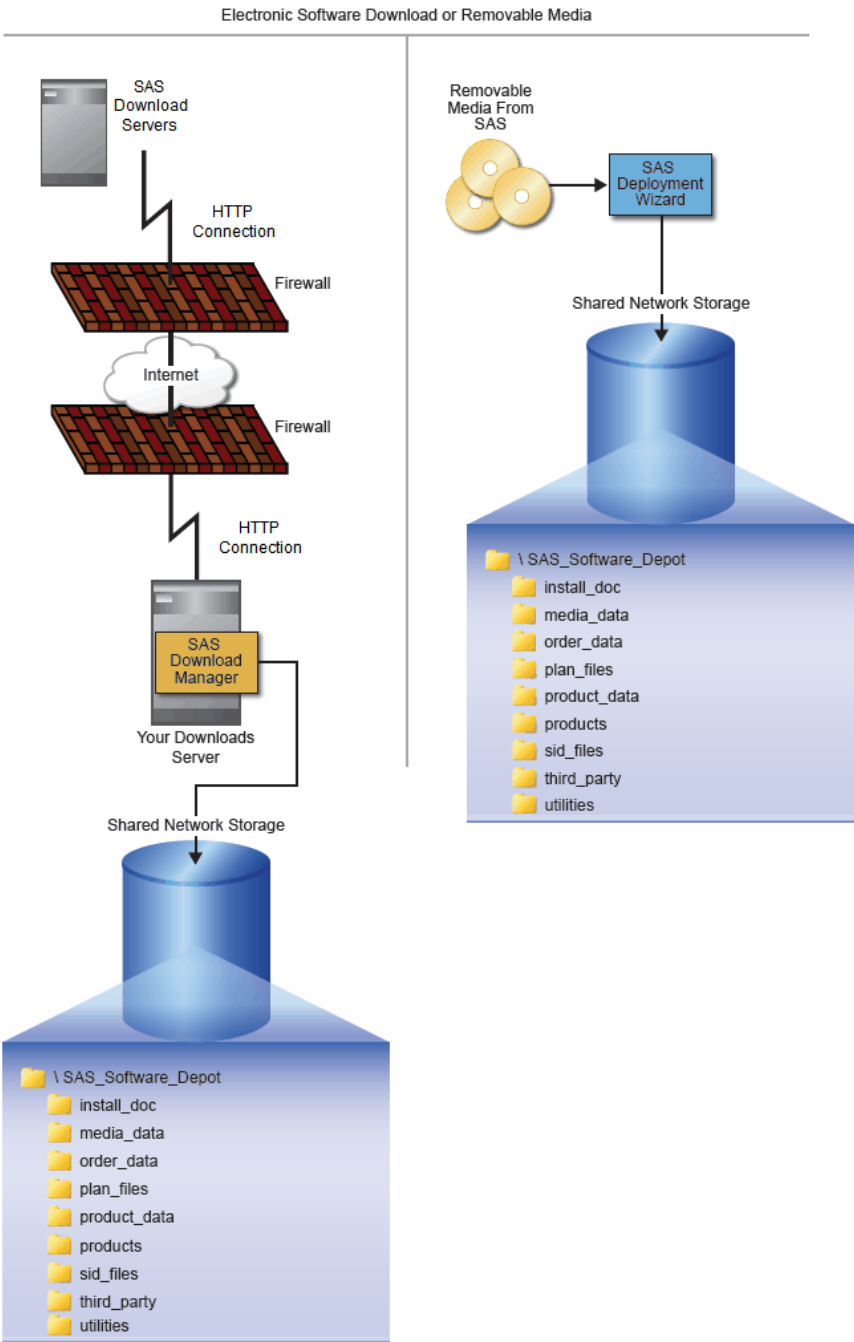
## About SAS Software Depots

A *SAS Software Depot* is a file system that consists of a collection of SAS installation files that represents one or more orders. The depot is organized in a specific format that is meaningful to the SAS Deployment Wizard, which is the tool that is used to install and initially configure SAS. The depot contains the SAS Deployment Wizard executable, one or more deployment plans, a SAS installation data file per order, order data, and product data.

**Figure 2.1** SAS Software Depot File Structure

Before you can install SAS, you must first have a software depot to install from. During a SAS software download, the SAS Download Manager downloads your order, verifies it, and automatically creates a SAS Software Depot. If you receive your SAS order in the form of physical media, then you create a depot using the SAS Deployment Wizard.

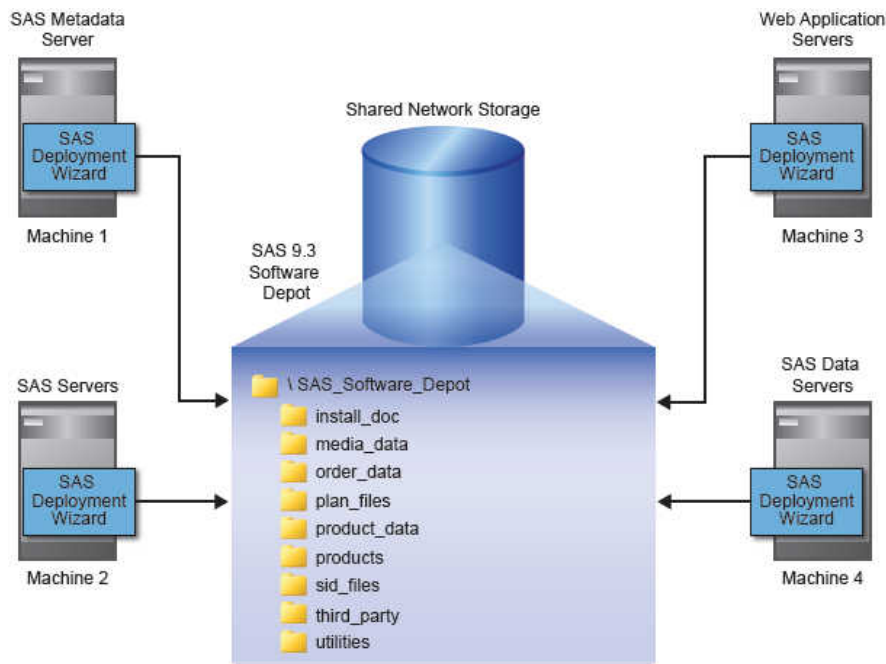
Figure 2.2 Methods for SAS Software Depot Creation



## Benefits of a SAS Software Depot

The main advantage of a SAS Software Depot is realized when it resides on the network at a location that you can share access to. When it is shared, a depot provides a faster and more reliable means of installation compared to traditional removable media (cartridges, CDs, DVDs, and so on).

**Figure 2.3** Shared SAS Software Depot Model



If you have remote sites running SAS without access to the network on which your depot resides, you can use the SAS Deployment Wizard to create your own SAS media image to write to the removable media of your choice.

Here are some other benefits of using a SAS Software Depot:

- centralizes SAS orders.

The depot enables you to place multiple SAS orders in one location to simplify initial SAS deployment and future maintenance.

- makes applying maintenance and upgrades easier.

You need only to download the changed depot files instead of having to download an entire SAS order.

- saves disk space.

Storing multiple orders in a single depot saves disk space, as any content shared between orders is not duplicated, but rather shared, in the depot.

A single depot in SAS 9.4 can store SAS software installation files for more than one operating system, making the single, multi-system SAS 9.4 depot cumulatively smaller than the multiple, single-system depots in older versions of SAS.

- saves download time.

Because there is a shared copy of common files, the SAS 9.4 single, multi-operating system depot requires smaller amounts to download.

- organizes license keys (also known as SAS installation data files).

The depot enables you to place SAS installation data files in a standard location to better associate license keys with their corresponding orders. (These files are stored in the `sid_files` directory, directly under the depot's root.)

- identifies multiple orders.

The depot supports the SAS Deployment Wizard's feature that enables you to customize order descriptions and enter notes to better identify multiple orders residing in a single depot.

Because depots contain your personal SAS software order, it is important to use the following best practices for securing and backing up your depot.

---

## Best Practices for SAS Software Depots

For customers who download SAS, their SAS Software Depot is the only copy of their SAS order. The depot contains the files from which SAS is initially installed. For this reason, it is important to use these best practices when managing your depot:

- Keep your depot.

When you keep your SAS 9.4 depot, applying maintenance and upgrades becomes easier because you need only to download the changed depot files instead of having to download an entire SAS order.

- Locate in an empty directory.

Create or download your depot into an empty directory that will not be the future location of the SAS installation directory (SASHOME).

- Perform routine backups.

As with your SAS production system, it is important to routinely back up your SAS Software Depot and verify the integrity of these backups.

**Note:** Another important reason for securing and backing up your SAS Software Depot is that there are limits on the number of times that you can download your order from SAS.

- Secure the depot location.

Problems such as data loss, virus infection, and file corruption can compromise your investment in SAS. It is thus imperative that you have a comprehensive security policy in place to protect your depot.

- Store SAS installation data files with your depot.

The SAS installation data file for your orders contains information that is integral to successfully deploying SAS. As you get these renewal data files from SAS—such as the file that contains your permanent SAS license key—it is important that you store them with your depot in the `sid_files` directory.

**CAUTION!** Be careful to use the correct installation data file that contains the SAS products that you are planning to install. Using an incorrect file can cause installation failure for SAS add-on products or other errors later when attempting to run SAS.

- Create a depot administrator.

Consider designating one or a few users to serve as SAS Software Depot administrators. Persons needing to deploy SAS software or to apply future SAS software maintenance require depot Read and Execute privileges. Depot administration tasks such as initially creating the depot, storing SAS installation data files, and updating order details require depot Write privileges. Separating depot administration from routine depot usage is a best practice that will further protect your SAS Software Depot.

---

## Creating SAS Software Depots

### Overview of Creating SAS Software Depots

There are two ways that you can create a SAS Software Depot:

- Download SAS software.

When you download a SAS order, the SAS Download Manager automatically creates a SAS Software Depot on your system.

- Run the SAS Deployment Wizard.

Creating SAS Software Depots is an option on one of the wizard pages.

Before creating a depot, make sure that you have met the necessary requirements described in the following section.

The topics contained in this section are:

- [“Overview of Creating SAS Software Depots” on page 24](#)
- [“Prerequisites for Creating a SAS Software Depot” on page 25](#)



- “Create a Depot By Using the SAS Download Manager” on page 26
- “Create a Depot By Using the SAS Deployment Wizard” on page 34

## Prerequisites for Creating a SAS Software Depot

Before you start creating a SAS Software Depot, make sure that you have met the following prerequisites:

- Choose a machine that has the following:

- ☐ Internet access.

If you are downloading your SAS order, you will need a machine that can access the SAS download website. Also, ideally this machine should be networked so that you can perform deployments directly from the machine, without having to physically relocate the depot to another machine.

- ☐ a Windowing environment.

If you want to run the download manager and the deployment wizard using a traditional graphical user interface, then on Linux, make sure that a windowing environment such as the Common Desktop Environment or X11 is installed.

To run the deployment wizard on operating systems that do not have windowing systems, see the *SAS Deployment Wizard and SAS Deployment Manager User's Guide*, available at: <http://support.sas.com/documentation/installcenter/en/ikdeploywizug/66034/PDF/default/user.pdf>.

- ☐ certain Linux packages and libraries.

- The SAS Download Manager on some 64-bit distributions of Linux might require the compat-libstdc++ RPM.
- The SAS Download Manager on Red Hat Enterprise Linux version 5 or later requires both the 32-bit and 64-bit versions of the library, libXp.so, to be installed.

For more information, see the SAS Download Manager README file.

- Designate a target directory.

Decide where you will create the SAS Software Depot. It is helpful if this directory can be shared on a network and accessible to all of the machines on which you will be installing software from the depot.

**Note:** SAS recommends that you not copy a depot from one location to another. Choose a permanent location before you create the depot.

- Grant required access permissions.

The SAS installer user must have Write access on the depot target directory.

Windows requires that you run the SAS Download Manager installation program using administrator privileges.

- Check disk space requirements.

Make sure you have enough free disk space available on the target directory.

Finally, just before creating a depot, the SAS Deployment Wizard and the SAS Download Manager both present you with an estimate for required disk space.

## Create a Depot By Using the SAS Download Manager

A SAS Software Depot contains SAS order data, an initial SAS installation data file, one or more deployment plan files, order data, and product data. The depot also contains the SAS Deployment Wizard executable—the tool required to install and initially configure SAS.

**Note:** There is no expiration date for downloading your SAS order. However, if the time period for your initial SAS installation data file has expired, you will have to obtain a current SAS installation data file before you can run the SAS Deployment Wizard.

Before you can create a depot by using the SAS Download Manager, you must first download it. Therefore, the following procedure actually consists of two logical sections:

- 1 downloading and running the SAS Download Manager
- 2 downloading a SAS order and creating a software depot using the SAS Download Manager

Although these sections flow one after the other, at the end of each section, you can stop and resume the process later.

Follow these steps to download a SAS software order and automatically create a depot by using the SAS Download Manager:

- 1 Locate your software order e-mail (SOE) sent by SAS. In this e-mail, find the URL for the SAS website from where you will download the SAS Download Manager.

**Note:** It is very important that you locate your original software order e-mail for the correct order and SAS installation key to download the software. You *cannot* use a renewal order number. The renewal order is a license update and it cannot be used to download software. If you cannot locate your original software order e-mail, contact your SAS Installation Representative or SAS Contracts at the following URLs:

- <http://support.sas.com/adminservices/contact.html>
- <http://support.sas.com/techsup/license>

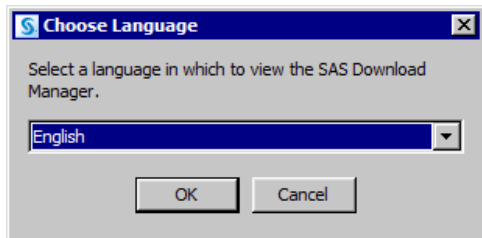
- 2 Ensure that you have fulfilled the necessary requirements described in “Prerequisites for Creating a SAS Software Depot” on page 25.
- 3 Log on to the machine as a SAS Software Depot administrator or a user with depot Read, Write, and Execute privileges.

**Note:** Consider designating one or a few users to serve as SAS Software Depot administrators. Persons needing to deploy SAS software or to apply future SAS software maintenance require depot Read and Execute privileges. Depot administration tasks such as initially creating the depot, storing SAS installation data files, and updating order details require depot Write privileges. Windows Vista and later requires that you run the SAS Download Manager installation program using administrator privileges.

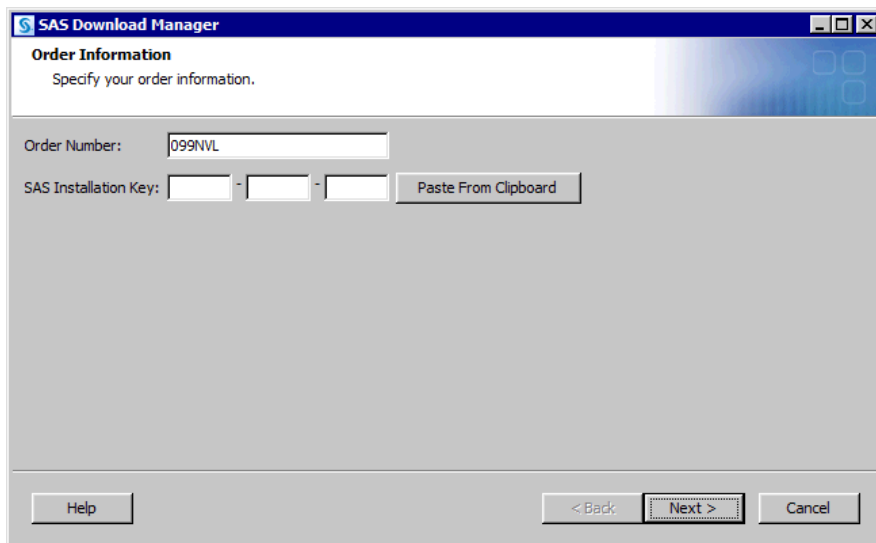
- 4 Launch a web browser and navigate to the URL specified in your software order e-mail.
- 5 At the prompt in the dialog box, select the option that enables you to save the file to disk.

- 6 Choose a path accessible to the machine to save the download and save the file.  
Your download begins.

- 7 When your browser has finished downloading the SAS Download Manager, run it and choose the language in which the SAS Download Manager will display messages and prompts.



- 8 At some sites, you might see the page that prompts for proxy information. If so, supply the necessary proxy server settings for the SAS Download Manager to access the Internet. If needed, contact your site's system administrator for help with these settings.
- 9 When prompted, enter your order number and SAS installation key.



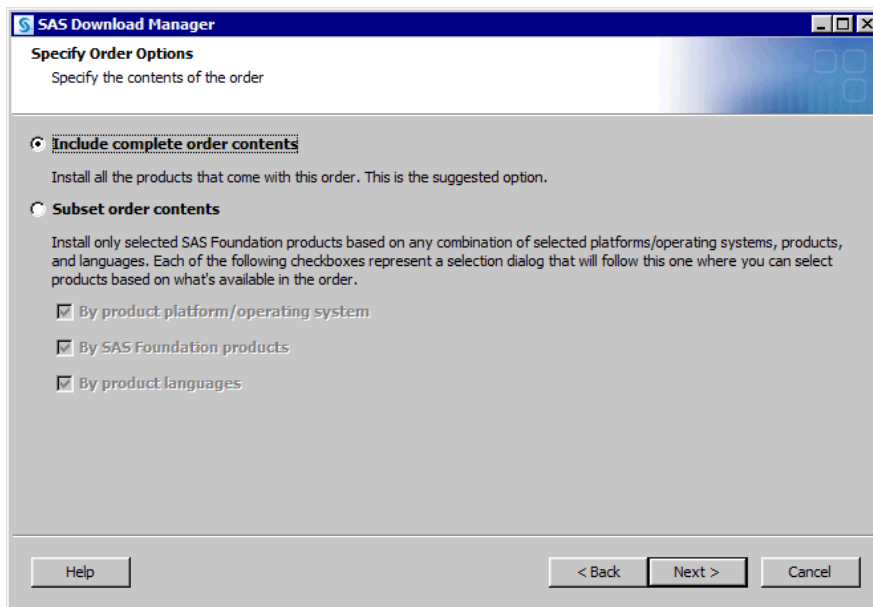
- 10 Confirm the list of SAS offerings contained in your order. We recommend that you add a product description from your SOE (for example, "TS1M0, Rev. 940\_11w29")

to distinguish it from other SAS orders. The SAS Deployment Wizard will display this order information during the SAS installation.

The screenshot shows the 'SAS Download Manager' window with the 'Specify Order Details' tab selected. The window has a blue title bar and a light gray background. Below the title bar, there is a section titled 'Specify Order Details' with a subtitle 'Edit the description and add notes for this order to aid with future tracking.' Below this, a paragraph of text explains that the user must install software from a SAS Software Depot and that this is the first step in creating a depot or adding software to one. Below the text are three input fields: 'Order number:' with the value '099NNVL', 'Description:' with the value 'TS1M0, Rev. 930\_11w29', and 'Notes:' which is empty. Below the 'Notes' field is a blue hyperlink: 'Click to see the contents of your order that correspond with the SAS Products to Install below'. Below the hyperlink is a section titled 'SAS Products to Install:' which contains a list of four items: '1. Base SAS', '2. DATA Step to DS2 Translator', '3. International Component for Unicode', and '4. Report Fonts for Clients'. At the bottom of the window are three buttons: 'Help', '< Back', and 'Next >', and a 'Cancel' button.

**Note:** At any time after the download, you can run the SAS Deployment Wizard to add or modify SAS order information details. For more information, see [“Change Order Details”](#) on page 58.

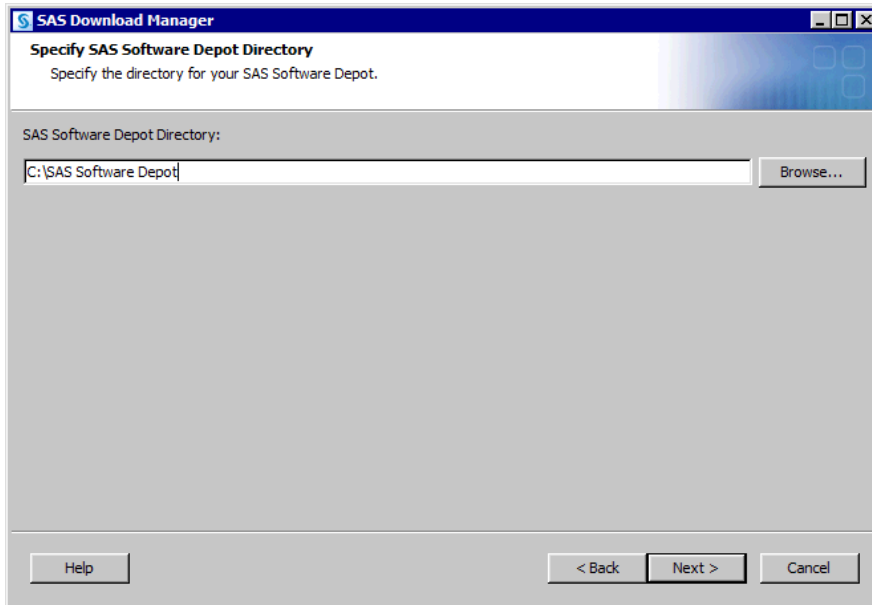
- 11** Select **Include complete order contents** if you do not want to subset your order. This selection will cause the SAS Download Manager to include all the software in the order. For more information, see [“Subsetting SAS Software Orders”](#) on page 44.



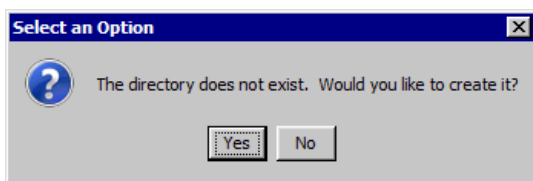
**12** Specify a location where you want to download SAS and build the SAS Software Depot.

We recommend that this directory be empty of any content. The exception is if this location also contains other SAS Software Depots for the same SAS major release as the order.

For more information, see [“Prerequisites for Creating a SAS Software Depot” on page 25.](#)



- 13** If the directory that you specify does not exist, the wizard prompts you. If you want it to create the directory for you, click **Yes**.

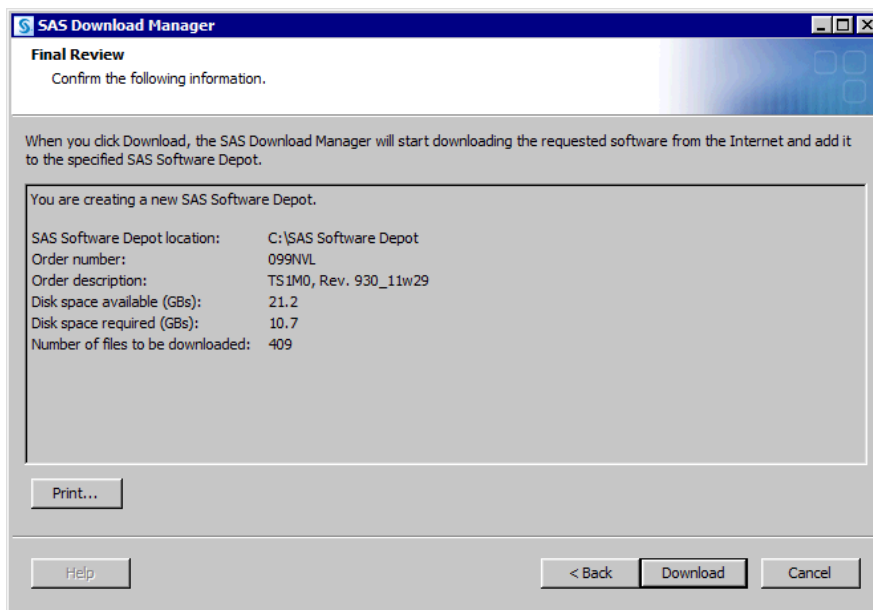


- 14** The SAS Download Manager has finished collecting order input. This is your last opportunity to change any information before downloading the SAS order and writing files to the target directory.

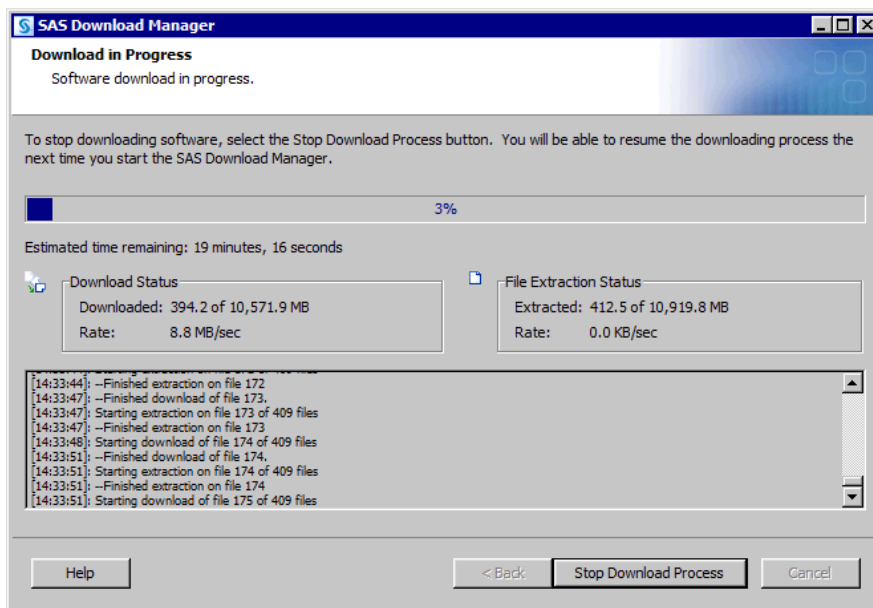
Make one of the following choices:

- Click **Download** to begin downloading the SAS order and writing files in the target directory.
- Click **Back** to navigate to earlier pages to change order information previously entered.
- Click **Cancel** to terminate the SAS Download Manager session. Note that you will lose the information previously entered.

**Note:** SAS tracks downloads and counts only a *complete* download toward your download limit.

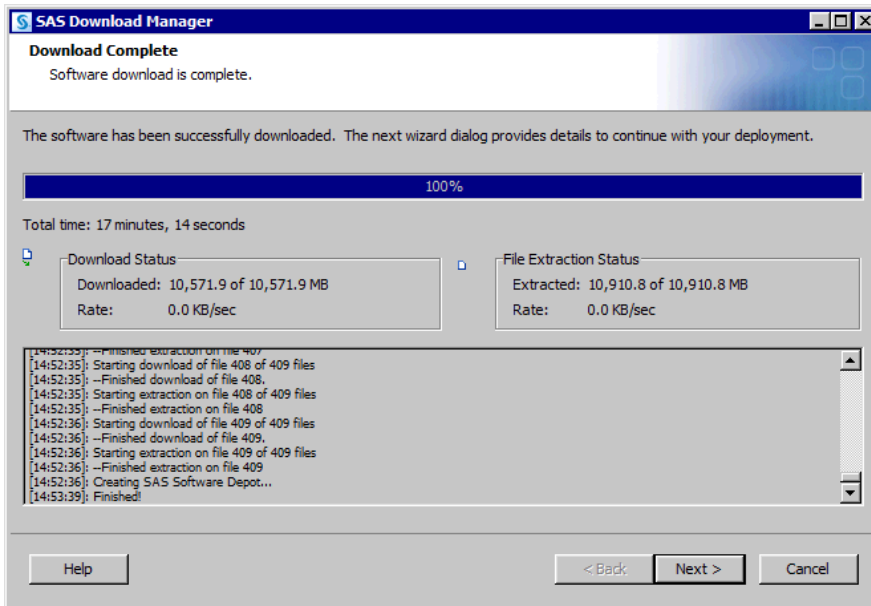


The SAS Download Manager begins downloading, uncompressing, and creating a depot of your SAS order.

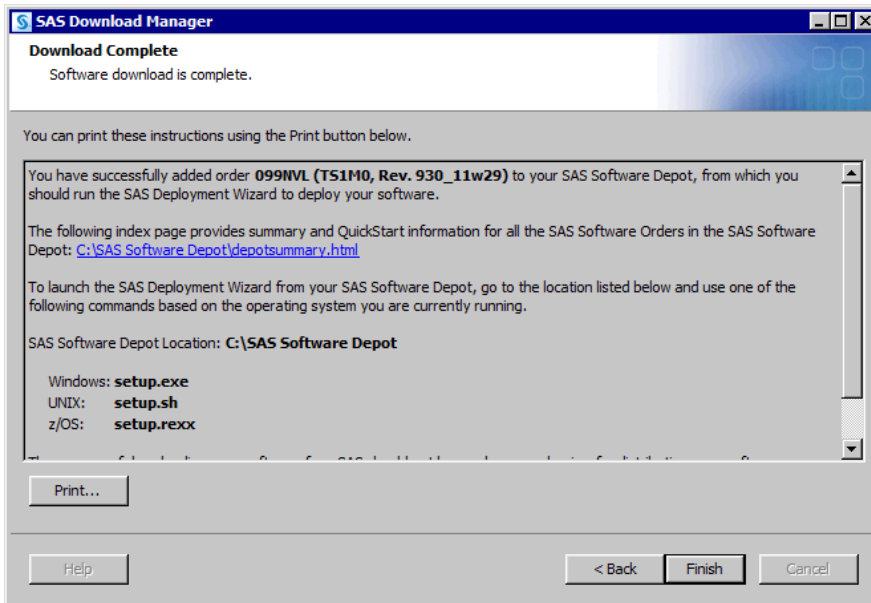




When you see a page similar to the following with the progress indicator at 100%, the SAS Download Manager is finished:



**15** Click **Next** to go to the final page, which describes post-download instructions.



**16** Click **Finish** to close the SAS Download Manager.

- 17 To continue with the software installation, proceed to Chapter 4, “Installing Third-Party Products,” in *SAS Intelligence Platform: Installation and Configuration Guide*.

After you finish your SAS 9.4 deployment, be sure to keep your depot, as this will make applying maintenance and future upgrades easier.

## Create a Depot By Using the SAS Deployment Wizard

You can use the SAS Deployment Wizard to create a copy (or subset) of your SAS Software Depot in another directory. If the new depot location is a remote directory on another machine, the directory must be on a shared network drive accessible from the machine running the wizard.

To create a depot on a machine that does not have shared network storage, you must use another mechanism such as SFTP or SCP to copy the depot. (For more information about these programs, refer to your operating system documentation.)

To create a SAS Software Depot by using the SAS Deployment Wizard, follow these steps:

- 1 Log on to the machine that will contain the depot as a SAS Software Depot administrator or a user with depot Read, Write, and Execute privileges.

**Note:** Consider designating one or a few users to serve as SAS Software Depot administrators. Persons needing to deploy SAS software or to apply future SAS software maintenance require depot Read and Execute privileges. Depot administration tasks such as initially creating the depot, storing SAS installation data files, and updating order details require depot Write privileges.

- 2 Ensure that you have fulfilled the necessary requirements described in [“Prerequisites for Creating a SAS Software Depot” on page 25](#).
- 3 Start the SAS Deployment Wizard, using one of two methods:
  - If you are starting the wizard from removable media, proceed as follows, depending on your operating system:

- Windows:

The `setup.exe` program starts automatically when the media is inserted into the drive.

**Note:** If the SAS Deployment Wizard does not start automatically, open Windows Explorer, navigate to the root of the DVD, and double-click `setup.exe`.

- Linux:

Navigate to the media's root directory, and enter `./setup.sh` at a command prompt.

- If you are starting the wizard from an existing SAS Software Depot, proceed as follows:

Navigate to the depot's root directory and do one of the following, depending on your operating system:

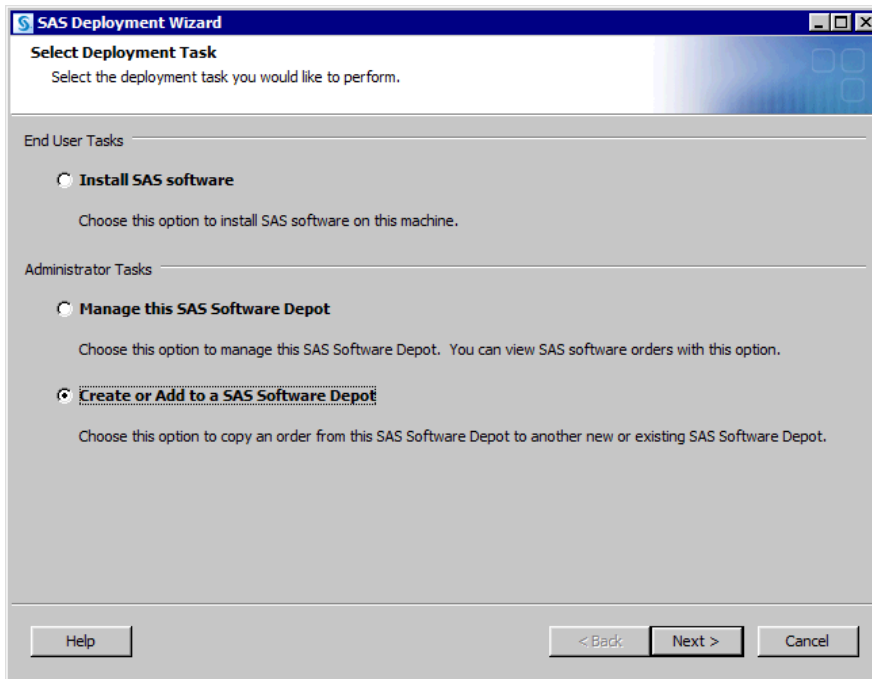
- Windows:

Double-click `setup.exe`.

- Linux:

Enter `./setup.sh` at a command prompt.

- 4 Choose the language in which the SAS Deployment Wizard will display messages and prompts.
- 5 Select **Create or Add to a New SAS Software Depot**. Do *not* Install SAS Software.



6 Confirm the list of SAS offerings contained in your order.

We recommend that you update the description for your order and include any notes to distinguish it from other SAS orders. The SAS Deployment Wizard will display this order information during the SAS installation.

**SAS Deployment Wizard**

**Specify Order Details**  
Edit the description and add notes for this order to aid with future tracking.

Review the contents of the order you are working with. You can create a custom description and notes to differentiate this order from others in your SAS Software Depot.

Order number: 012265

Description: EBI+Platform Suite for SAS

Notes:

[Click to see the contents of your order that correspond with the SAS Products to Install below](#)

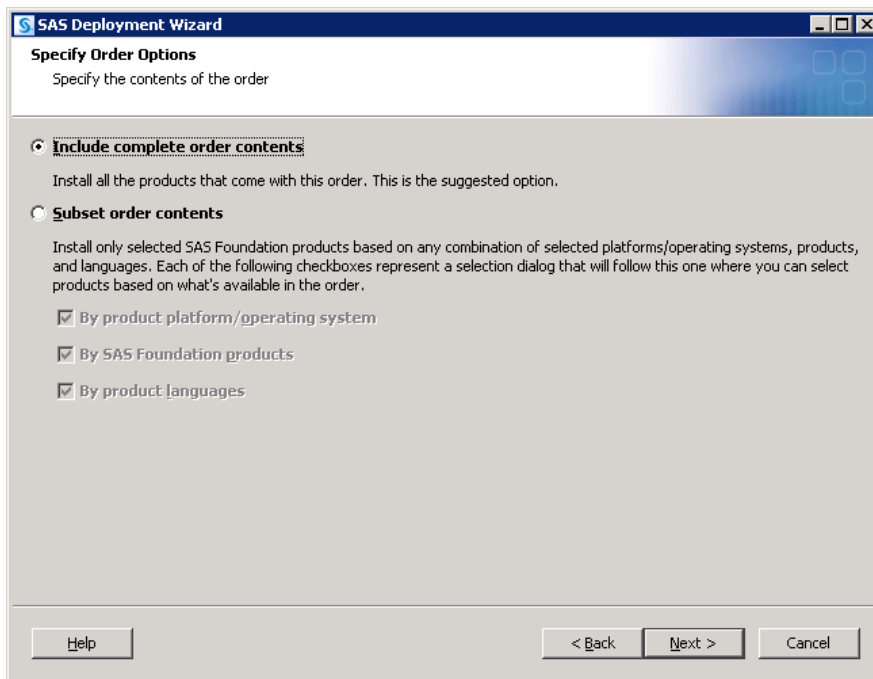
SAS Products to Install:

1. SAS Foundation
2. Report Fonts for Clients
3. SAS Add-in for Microsoft Office
4. SAS BI Dashboard
5. SAS BI Dashboard Help and Documentation
6. SAS BI Report Services
7. SAS BI Web Services for .NET

Help      < Back      Next >      Cancel

**Note:** At any time after the download, you can rerun the SAS Deployment Wizard to add or modify SAS order information details. For more information, see [“Change Order Details” on page 58](#).

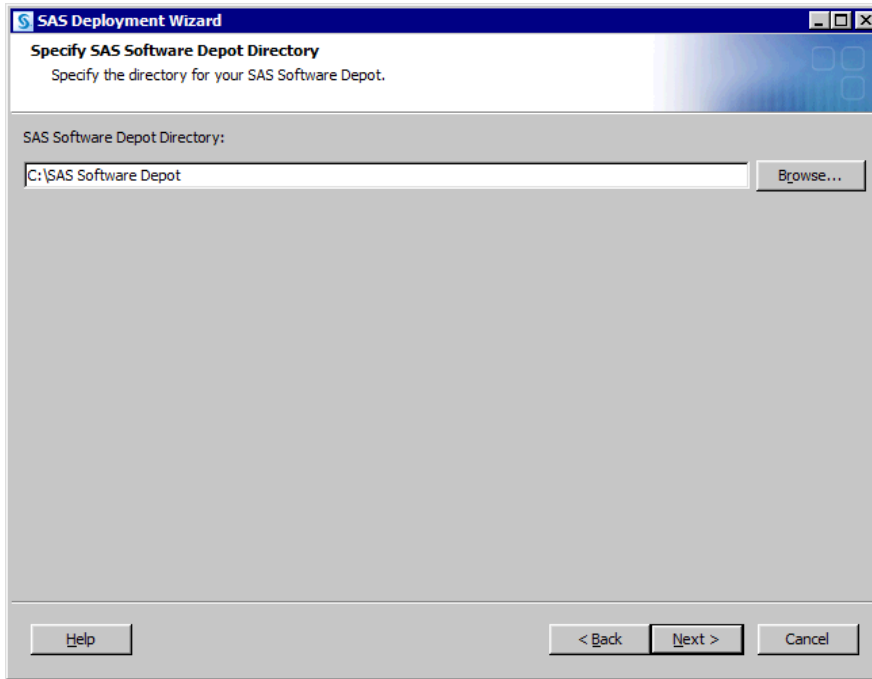
- 7 If you have multiple orders in your depot, you must select the order for which you want to create a new depot. (Creating unique order descriptions helps you choose the correct order with which to create a new depot.)
- 8 Select **Include complete order contents** if you do not want to subset your order. This selection will cause the SAS Deployment Wizard to include all the software in the order. For more information, see [“Subsetting SAS Software Orders” on page 44](#).



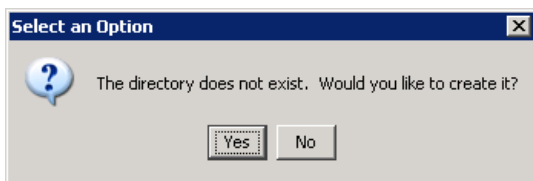
- 9 Specify a location where you want to download SAS and build the software depot. (This location can be shared storage that physically resides on another machine.)

We recommend that this directory be empty of any content. The exception is if this location also contains other SAS Software Depots for the same SAS major release as the order.

For more information, see [“Prerequisites for Creating a SAS Software Depot” on page 25](#).



- 10** If the directory that you specify does not exist, the wizard prompts you. If you want it to create the directory for you, click **Yes**.

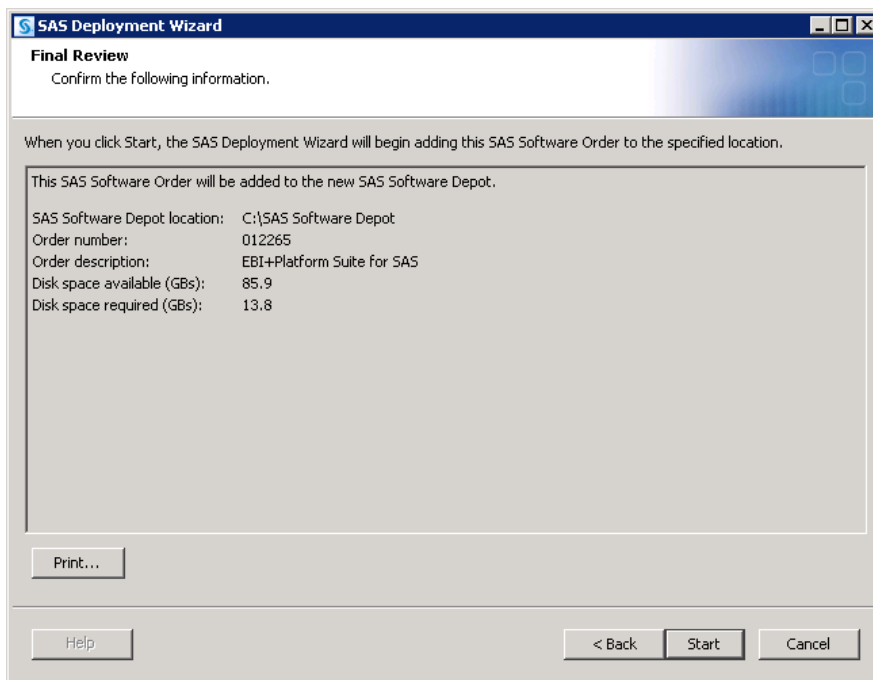


- 11** The SAS Deployment Wizard has finished collecting order input. This is your last opportunity to change any information that you have provided before the wizard begins writing files to the target directory.

Make one of the following choices:

- Click **Start** to begin creating the depot in the target directory.
- Click **Back** to navigate to earlier wizard pages to change order information previously entered.

- Click **Cancel** to terminate the wizard session. Note that you will lose order information previously entered.

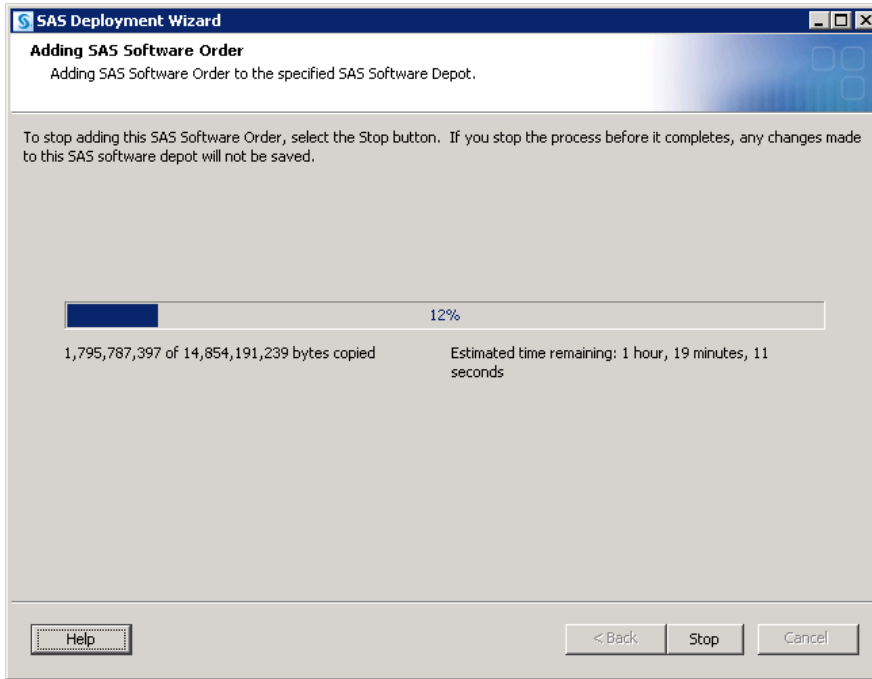


- 12** If you are running the SAS Deployment Wizard from removable media, the SAS Deployment Wizard prompts you for a DVD. Continue to supply discs as prompted.

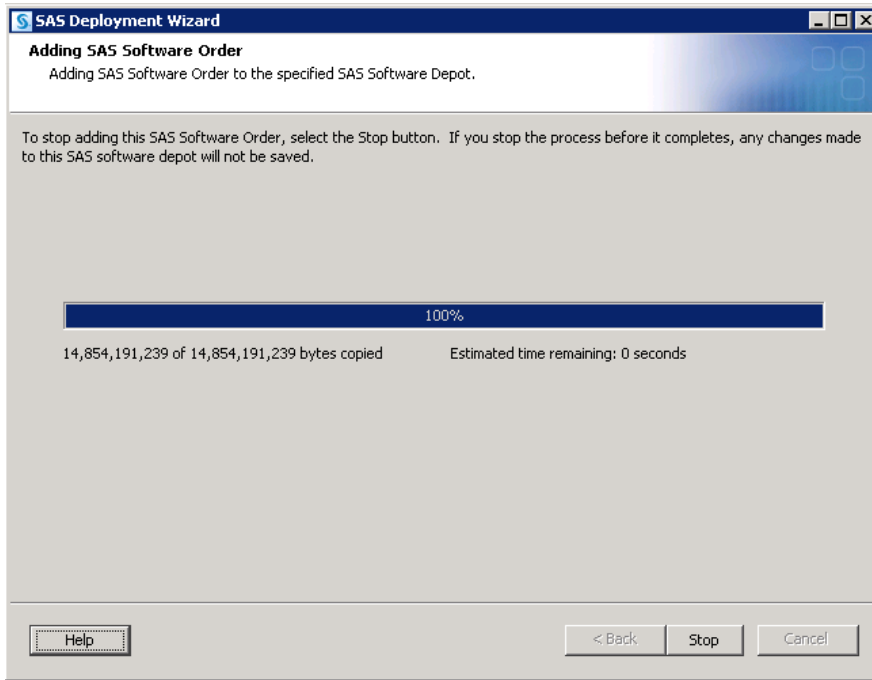
**Note:** If you are working on a Linux system without an automounter, mount the DVD drive. For information about the privileges required to mount a device and the syntax of the `mount` command for your system, see the *SAS Deployment Wizard and SAS Deployment Manager User's Guide* available at: <http://support.sas.com/documentation/installcenter/en/ikdeploywizug/66034/PDF/default/user.pdf>.

The SAS Deployment Wizard begins creating a depot of your SAS order.

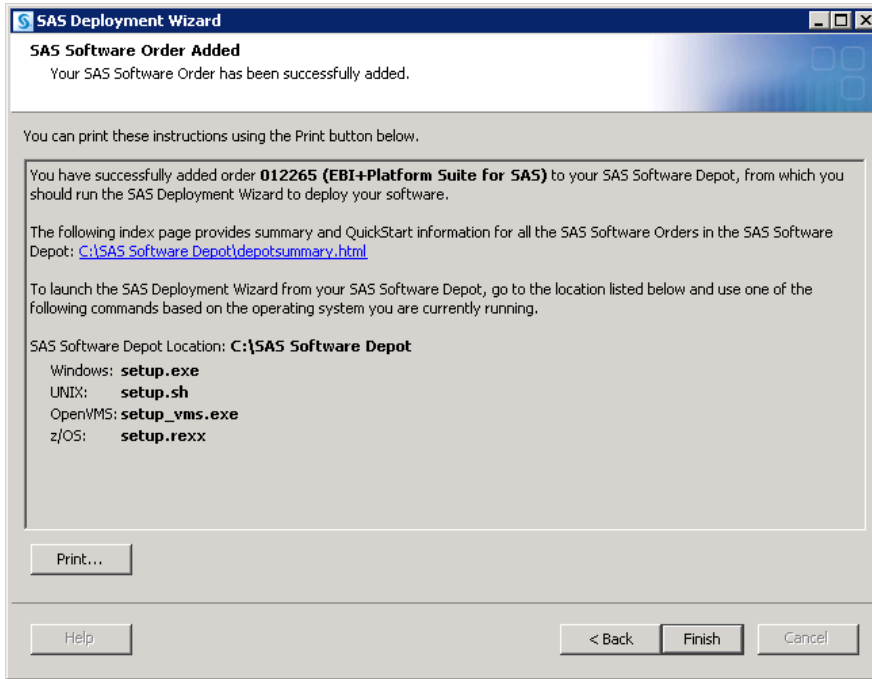




- 13** When you see a page similar to the following with the progress indicator at 100%, the SAS Deployment Wizard is finished:



- 14** Click **Next** to go to the final page, which contains instructions for what to do after creation of the software depot.
- 15** Click the `depotsummary.html` link on the page to review the SAS QuickStart Guide.



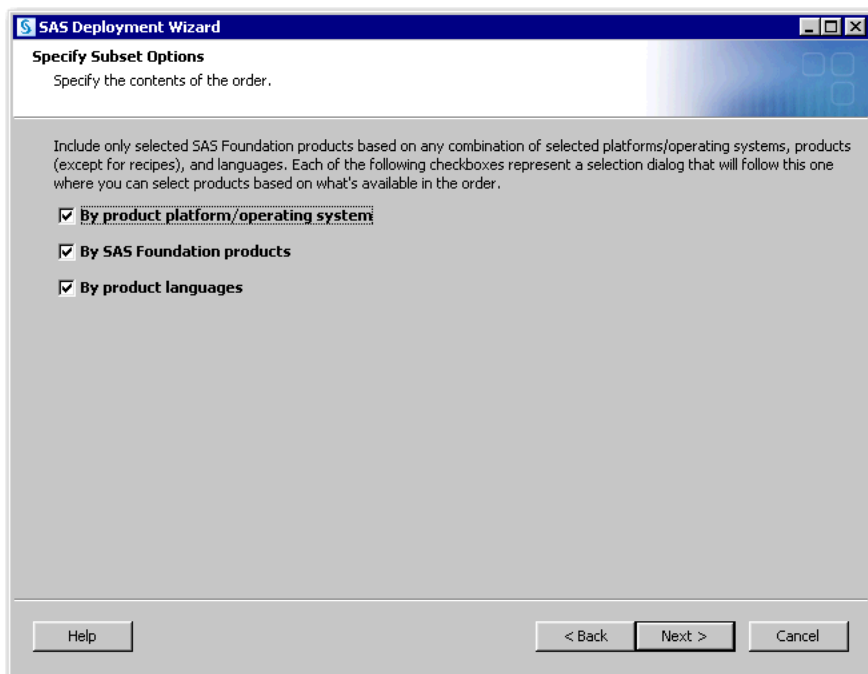
- 16 Click **Finish** to close the SAS Deployment Wizard.
- 17 If you are using removable media on a Linux system where an automounter is being used, use the `eject` command to remove the DVD. On a Linux system without an automounter, you must unmount the drive by using the `umount` command and then manually opening the drive. For information about the `umount` command that is needed to unmount a device on your system, see the *SAS Deployment Wizard and SAS Deployment Manager User's Guide*, available at <http://support.sas.com/documentation/installcenter/en/ikdeploywizug/66034/PDF/default/user.pdf>.
- 18 To continue with the software installation, proceed to Chapter 4, "Installing Third-Party Products," in *SAS Intelligence Platform: Installation and Configuration Guide*. After you finish your SAS 9.4 deployment, be sure to keep your depot, as this will make applying maintenance and future upgrades easier.

## Subsetting SAS Software Orders

### Overview of Subsetting SAS Software Orders

The SAS Deployment Wizard enables you to break up—or subset—your SAS software order. Subsetting your order makes it easier to provision individual SAS clients and conserves download time and disk space.

#### Display 2.1 Specify Subset Options Page



You have two options for subsetting your order:

- Use a pre-defined *recipe* to determine your order subset.
- Choose the products to subset your order manually.

You can use the following characteristics to manually subset your order:

- ☐ product operating system

- ❑ SAS Foundation products
- ❑ product language

In addition, you can choose to subset manually by the following products:

- ❑ SAS client products that are not configurable (for example, SAS Enterprise Guide and SAS Add-in for Microsoft Office).
- ❑ SAS client products that are not configurable and include products from SAS Foundation.

The deployment wizard also enables you to create a listing of the contents for subsetting orders. For more information, see [“List Contents of Subsetting Orders” on page 56](#).

## Subset a SAS Software Order Using a Recipe

The SAS Deployment Wizard enables you to subset your SAS order using recipes. A *subset recipe* is an XML file that contains a formula that the wizard uses to assemble pieces of the SAS Software Depot to subset your order for a particular SAS product or group of products (for example, SAS Enterprise Guide or SAS Add-in for Microsoft Office). The recipe has built-in intelligence and is able to determine the various software dependencies that particular SAS products rely on.

**Note:** Because of its large size, the `utilities` subdirectory is *not* included in a depot created using a recipe.

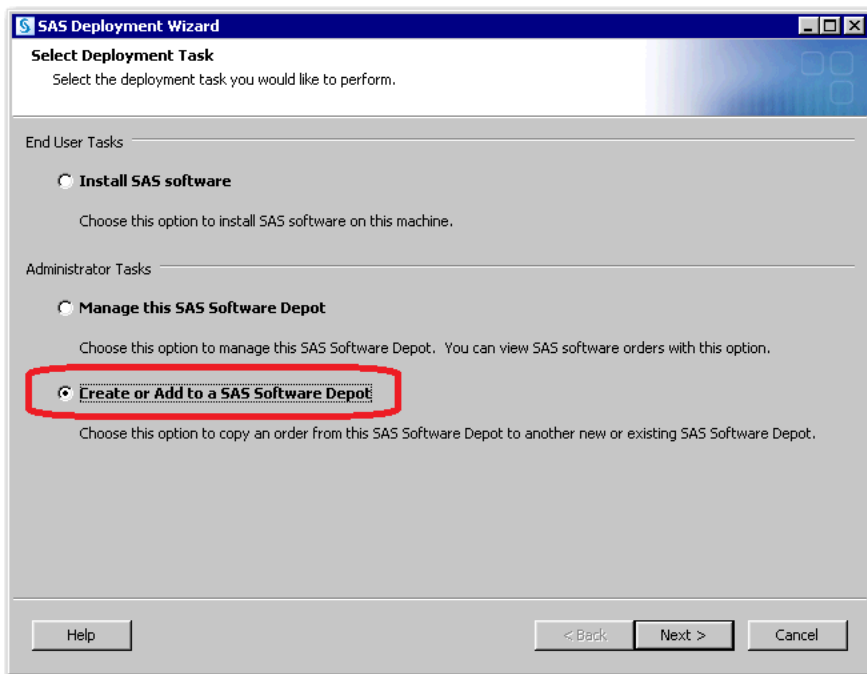
The alternative to subsetting your depot with a recipe is to subset manually. For more information, see [“Subset a SAS Software Order Manually” on page 51](#).

To subset a SAS software order using a recipe, follow these steps:

- 1 Log on to the depot machine as a SAS Software Depot administrator or a user with depot Read, Write, and Execute privileges.

**Note:** Consider designating one or a few users to serve as SAS Software Depot administrators. Persons needing to deploy SAS software or to apply future SAS software maintenance require depot Read and Execute privileges. Depot administration tasks such as initially creating the depot, storing SAS installation data files, and updating order details require depot Write privileges.

- 2 Start the SAS Deployment Wizard. Navigate to the SAS Software Depot's root directory and, depending on your operating system, do the following:
  - Windows:  
Double-click `setup.exe`.
  - Linux:  
Enter `./setup.sh` at a command prompt.
- 3 Choose the language in which the SAS Deployment Wizard will display messages and prompts.
- 4 Select **Create or Add to a SAS Software Depot**.



- 5 If you have more than one order, choose the order that you want to subset, and then select **Next**.
- 6 We strongly recommend that you update the description for your order and include any notes about your order that might help you distinguish it from any other SAS

orders. The SAS Deployment Wizard will display this order information during the SAS installation.

**SAS Deployment Wizard**

**Specify Order Details**

Edit the description and add notes for this order to aid with future tracking.

Review the contents of the order you are working with. You can create a custom description and notes to differentiate this order from others in your SAS Software Depot.

Order number: D9CWM6

Description: EBI/EG/DMA - 13w26 - Windows x64 Workstn + Server

Notes:

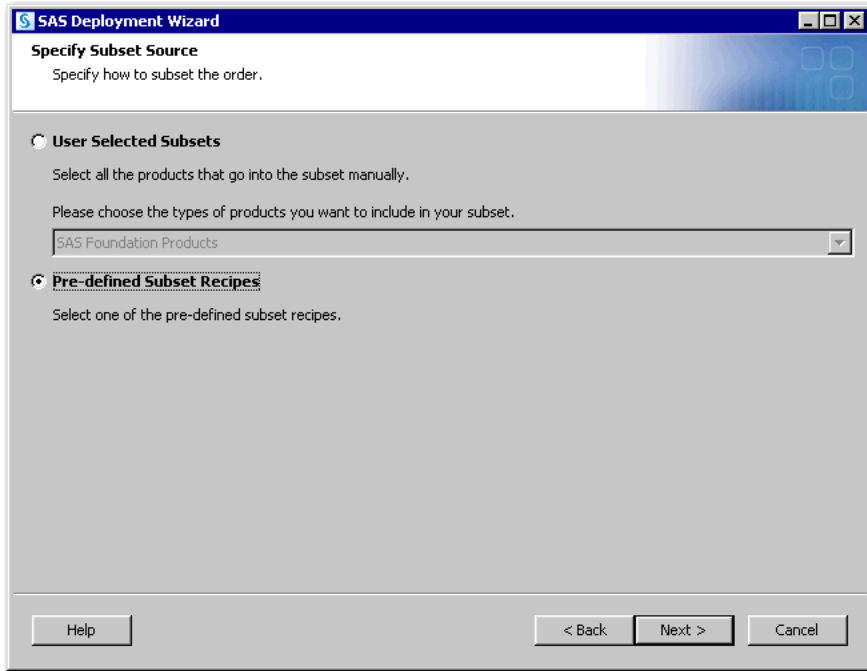
[Click to see the contents of your order that correspond with the SAS Products to Include below](#)

SAS Products to Include in the SAS Software Depot:

1. BASE Infrastructure to support Hadoop
2. Base SAS
3. DataFlux API for Hadoop
4. International Component for Unicode
5. Report Fonts for Clients
6. SAS Add-in for Microsoft Office
7. SAS BI Dashboard

Help < Back Next > Cancel

- 7 When you are finished adding order details, select **Next**.
- 8 Select **Subset order contents** and select **Next**.
- 9 Select **Pre-defined Subset Recipes** and select **Next**.



**10** Specify the type of subset recipe that you are using:

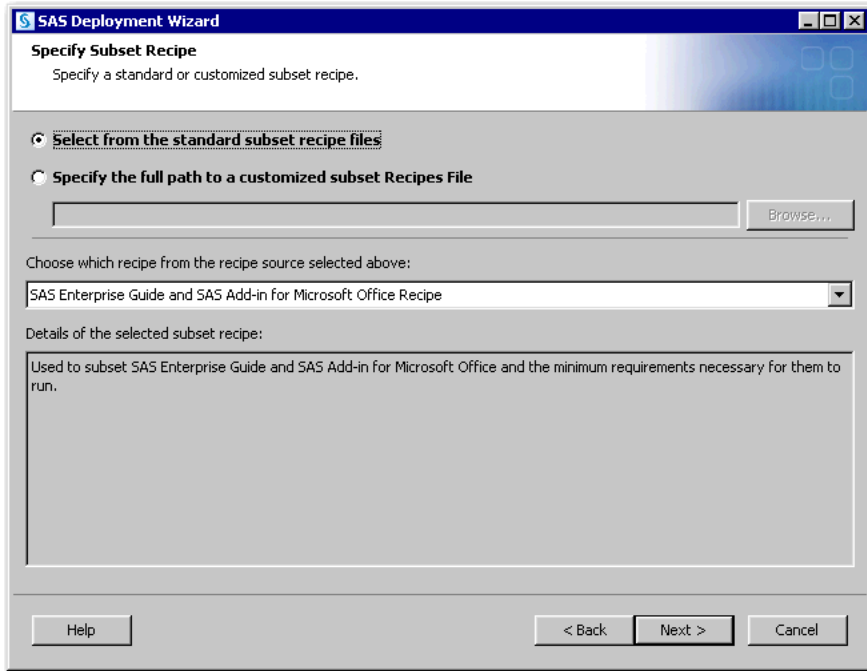
- standard subset recipe

Choose **Select from the standard subset recipe files**, and then choose the appropriate plan in the drop-down list.

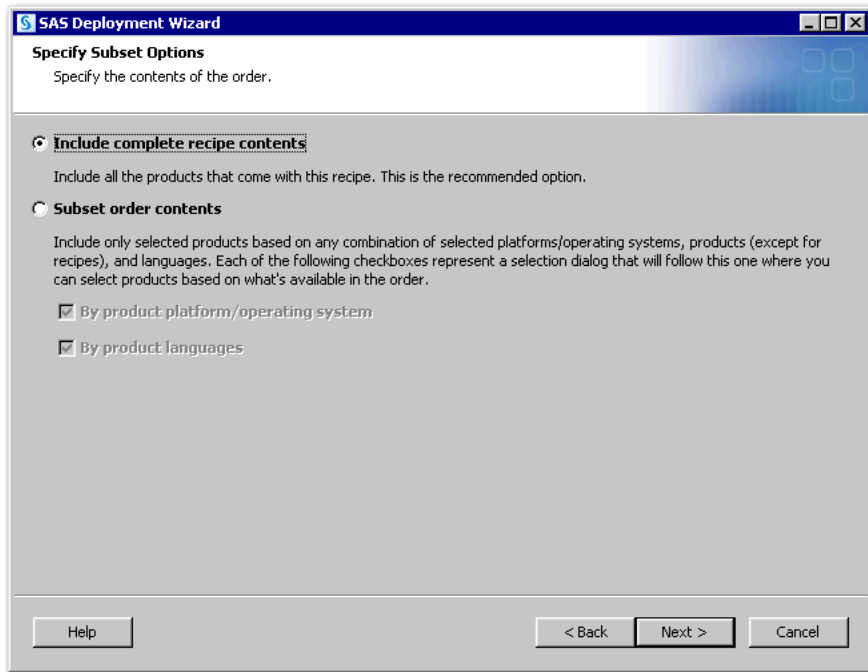
- customized subset recipe

Choose **Specify the full path to a customized subset recipe file**, and then click **Browse** to navigate to the recipe file (*recipe-name.xml*).

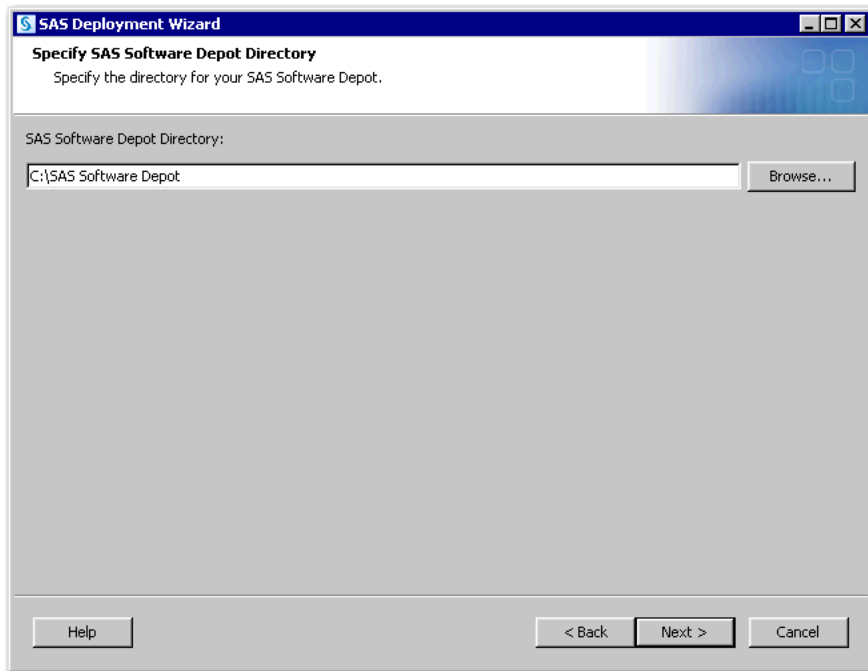




- 11** On the next page, you can further refine the subset recipe (by operating system and language) or include the complete recipe in your product subset. Make your selection, and select **Next**.



**12** Specify a new directory where the deployment wizard will create your new depot and select **Next**.



- 13** Review the Final Review page. If you are satisfied, select **Start**. Otherwise, select **Back** and make the necessary changes.
- 14** When the new depot has been created, select **Finish** to close the SAS Deployment Wizard.

## Subset a SAS Software Order Manually

Using the SAS Deployment Wizard, you can break up or subset your SAS software order according to operating system, language, SAS Foundation, and other groupings.

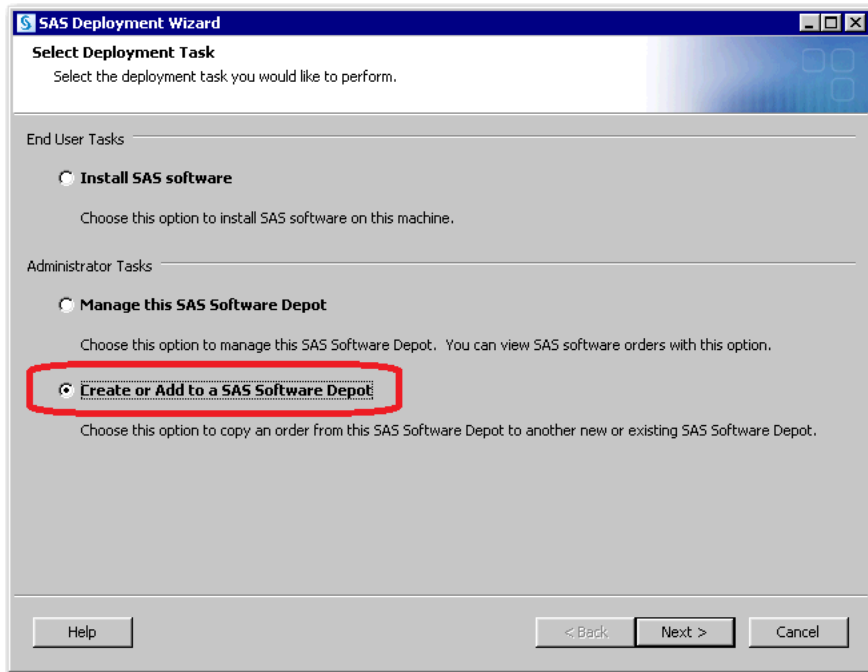
The alternative to manually subsetting your order is to use a subset recipe. For more information, see [“Subset a SAS Software Order Using a Recipe” on page 45](#).

To subset your order manually, follow these steps:

- 1** Log on to the depot machine as a SAS Software Depot administrator or a user with depot Read, Write, and Execute privileges.

**Note:** Consider designating one or a few users to serve as SAS Software Depot administrators. Persons needing to deploy SAS software or to apply future SAS software maintenance require depot Read and Execute privileges. Depot administration tasks such as initially creating the depot, storing SAS installation data files, and updating order details require depot Write privileges.

- 2** Start the SAS Deployment Wizard. Navigate to the SAS Software Depot's root directory and, depending on your operating system, do the following:
  - Windows:  
Double-click `setup.exe`.
  - Linux:  
Enter `./setup.sh` at a command prompt.
- 3** Choose the language in which the SAS Deployment Wizard will display messages and prompts.
- 4** Select **Create or Add to a SAS Software Depot**.



- 5 If you have more than one order, choose the order that you want to subset, and then select **Next**.
- 6 We strongly recommend that you update the description for your order and include any notes about your order that might help you distinguish it from any other SAS orders. The SAS Deployment Wizard will display this order information during the SAS installation.

**SAS Deployment Wizard**

**Specify Order Details**  
Edit the description and add notes for this order to aid with future tracking.

Review the contents of the order you are working with. You can create a custom description and notes to differentiate this order from others in your SAS Software Depot.

Order number: 09CWM6

Description: EBI/EG/DMA - 13w26 - Windows x64 Workstn + Server

Notes:

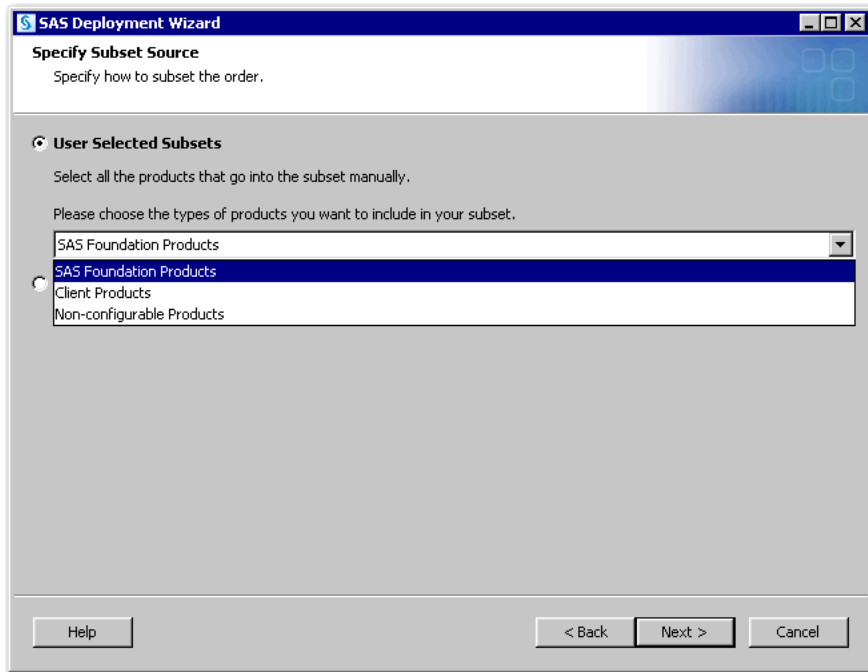
[Click to see the contents of your order that correspond with the SAS Products to Include below](#)

SAS Products to Include in the SAS Software Depot:

1. BASE Infrastructure to support Hadoop
2. Base SAS
3. DataFlux API for Hadoop
4. International Component for Unicode
5. Report Fonts for Clients
6. SAS Add-in for Microsoft Office
7. SAS BI Dashboard

Help < Back Next > Cancel

- 7 When you are finished adding order details, select **Next**.
- 8 Select **Subset order contents** and select **Next**.
- 9 Select **User Selected Subsets** and further refine your new depot by one of the following characteristics:
  - **SAS Foundation Products**  
SAS products that are installed with Base SAS.
  - **Client Products**  
SAS products that can be installed on client machines.
  - **Non-configurable Products**  
SAS products for which the SAS Deployment Wizard does not prompt for configuration options.



**10** Further refine your order subset, by selecting or deselecting one or more of the following options:

- **By product platform/operating system**

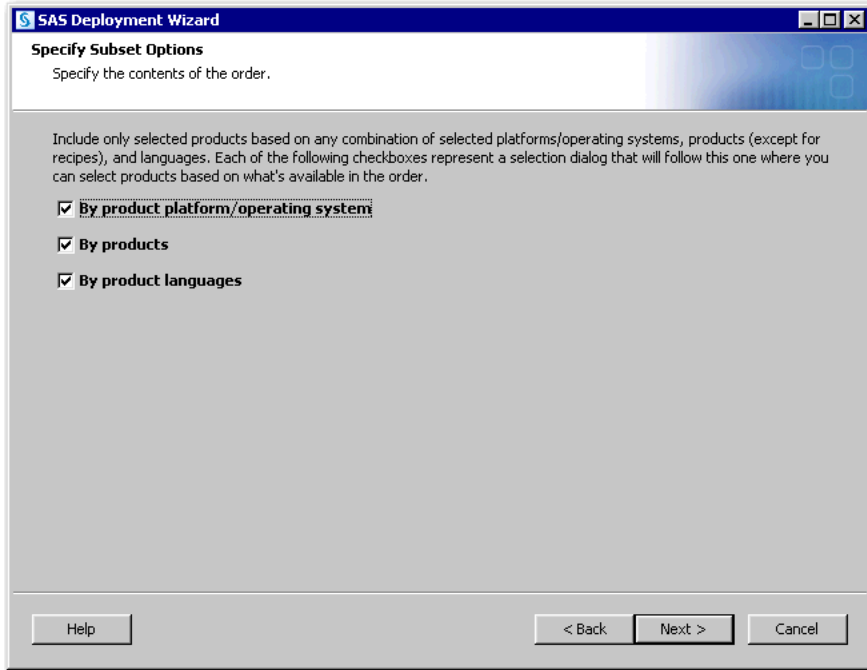
Choose products based on the operating systems on which they run.

- **By SAS Foundation products or By products**

Choose non-configurable SAS products by name. Depending on your earlier selection, this list also includes SAS Foundation products.

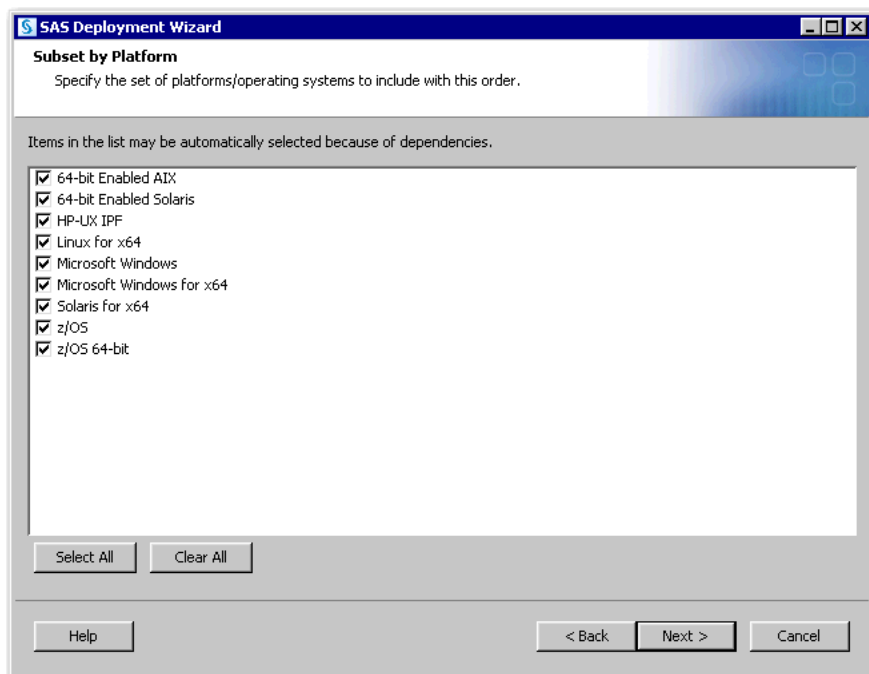
- **By product language**

Choose SAS products by the language that they will be installed with.



**11** Depending on which characteristics you have chosen to subset your order on, you see various wizard pages where you can refine your depot further. Make your selections and select **Next**.

In this example, SAS products are being subsetting based on the operating systems on which they run.



- 12** Specify a new directory where the deployment wizard will create your new depot and select **Next**.
- 13** Review the Final Review page. If you are satisfied, select **Start**. Otherwise, select **Back** and make the necessary changes.
- 14** When the new depot has been created, select **Finish** to close the SAS Deployment Wizard.

## List Contents of Subsetted Orders

It is helpful to know exactly which SAS products are contained in an order that has been subsetted. The SAS Deployment Wizard provides a method to enable you to create a listing of all SAS products contained in an order. You generate this listing by using a command-line switch when you invoke the wizard:

- Windows

```
setup.exe -listdepot output-pathname
```



■ Linux:

```
setup.sh -listdepot output-pathname
```

For example, a command on Linux might resemble the following:

```
./setup.sh -listdepot /mydata/order_contents.txt
```

The deployment wizard executable resides in the root of your SAS Software Depot.

The listing resembles the following:

```
Date: 2013 Dec 12 10:02:56
Depot: /nfs/mymachine/vol/vol7/sas_software_depot

Order: 099SPS
+ Base SAS [base__94ts1m0__mvs__ne__sp0__1]
+ Base SAS [base__94ts1m0__mvs__w0__sp0__1]
+ Base SAS Help and Documentation [basedoc__94110__prt__xx__sp0__1]
+ Base SAS JAR Files [basejars__94110__prt__xx__sp0__1]
<...>

Order: 099SQ2_2011-12-01-12.27.01
+ Advanced Analytics Common Components [aacomp__94110__wx6__en__sp0__1]
+ DATA Step to DS2 Translator [accelmva__94160__wx6__en__sp0__1]
+ Microsoft Office Access Database Engine 2010 [ace__94112__prt__xx__sp0__1]
- SAS/GRAPH ActiveX Control [activexgraph__94230__win__de__sp0__1]
+ SAS/GRAPH ActiveX Control [activexgraph__94230__win__en__sp0__1]
- SAS/GRAPH ActiveX Control [activexgraph__94230__win__es__sp0__1]
```

The following list describes the how to interpret the output.

A line beginning with a:

- colon (:) indicates that the order number being listed.
- plus sign (+) indicates that the product is in the order.
- minus sign (-) indicates that the product is in the depot but is not in the specified order.

For more information, see the *SAS Deployment Wizard and SAS Deployment Manager User's Guide*, available at: <http://support.sas.com/documentation/installcenter/en/ikdeploywizug/66034/PDF/default/user.pdf>.

---

## Managing SAS Orders

### Overview of Managing SAS Orders

Using the SAS Deployment Wizard, you can do the following with your SAS order:

- [“Change Order Details” on page 58](#)
- [“Delete an Order” on page 61](#)
- [“Create a Disc Image of Your Order” on page 63](#)

### Change Order Details

Being able to identify a SAS order is important, especially when your SAS Software Depot contains multiple orders. To change the details of a SAS order, follow these steps:

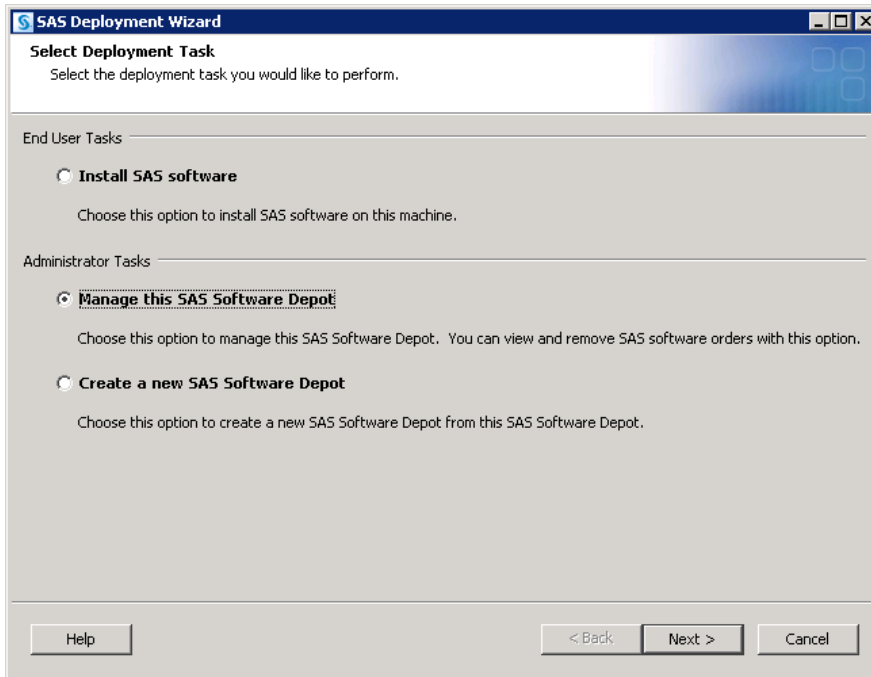
- 1 Log on to the depot machine as a SAS Software Depot administrator or a user with depot Read, Write, and Execute privileges.

**Note:** Consider designating one or a few users to serve as SAS Software Depot administrators. Persons needing to deploy SAS software or to apply future SAS software maintenance require depot Read and Execute privileges. Depot administration tasks such as initially creating the depot, storing SAS installation data files, and updating order details require depot Write privileges.

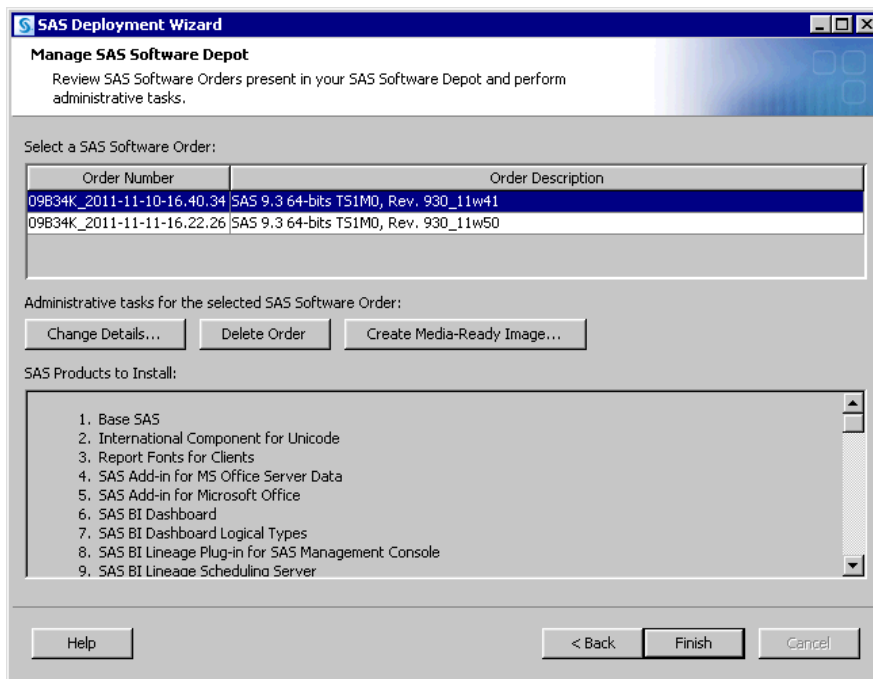
- 2 Start the SAS Deployment Wizard. Navigate to the SAS Software Depot's root directory and, depending on your operating system, do the following:

- Windows:  
Double-click `setup.exe`.
- Linux:  
Enter `./setup.sh` at a command prompt.

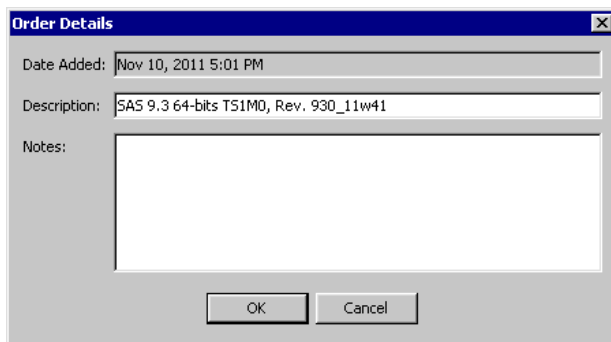
- 3 Choose the language in which the SAS Deployment Wizard will display messages and prompts.
- 4 Select **Manage this SAS Software Depot**.



- 5 Choose the order for which you want to change details, and then select **Change Details**.



- 6 Update the description for your order and include any notes about your order that might help you distinguish it from any other SAS orders. The SAS Deployment Wizard will display this order information during the SAS installation.



- 7 When you are finished adding order details, select **OK**.
- 8 Select **Finish** to close the SAS Deployment Wizard.

## Delete an Order

To delete a SAS order, follow these steps:

**CAUTION!** It is a best practice to always make sure that you have backed up the SAS Software Depot before deleting an order. Keep in mind that there are limits on the number of times that you can download an order from SAS.

- 1 Log on to the depot machine as a SAS Software Depot administrator or a user with depot Read, Write, and Execute privileges.

**Note:** Consider designating one or a few users to serve as SAS Software Depot administrators. Persons needing to deploy SAS software or to apply future SAS software maintenance require depot Read and Execute privileges. Depot administration tasks such as initially creating the depot, storing SAS installation data files, and updating order details require depot Write privileges.

- 2 Start the SAS Deployment Wizard. Navigate to the SAS Software Depot's root directory, and, depending on your operating system, do the following:

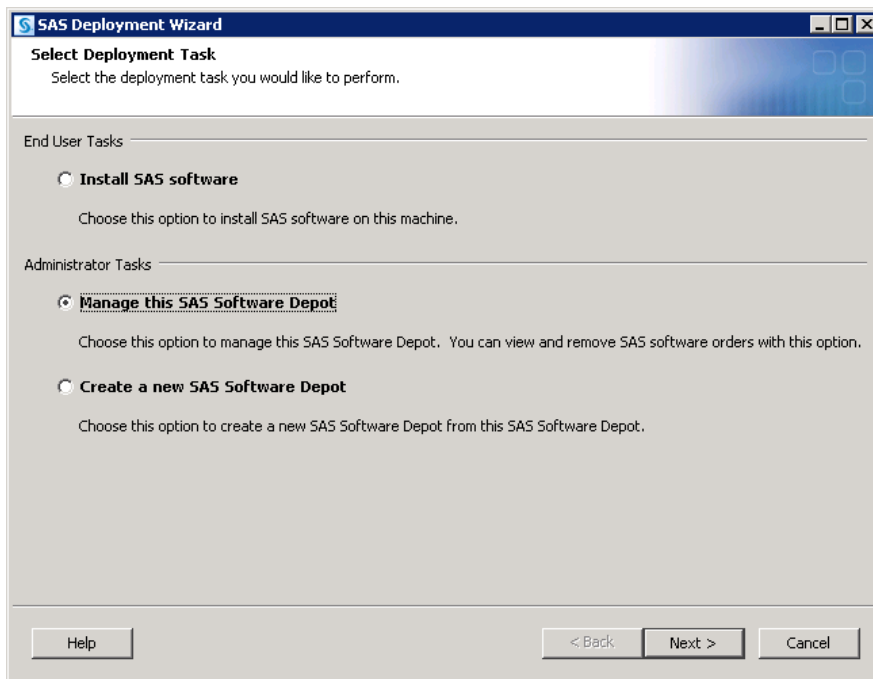
- Windows:

Double-click `setup.exe`.

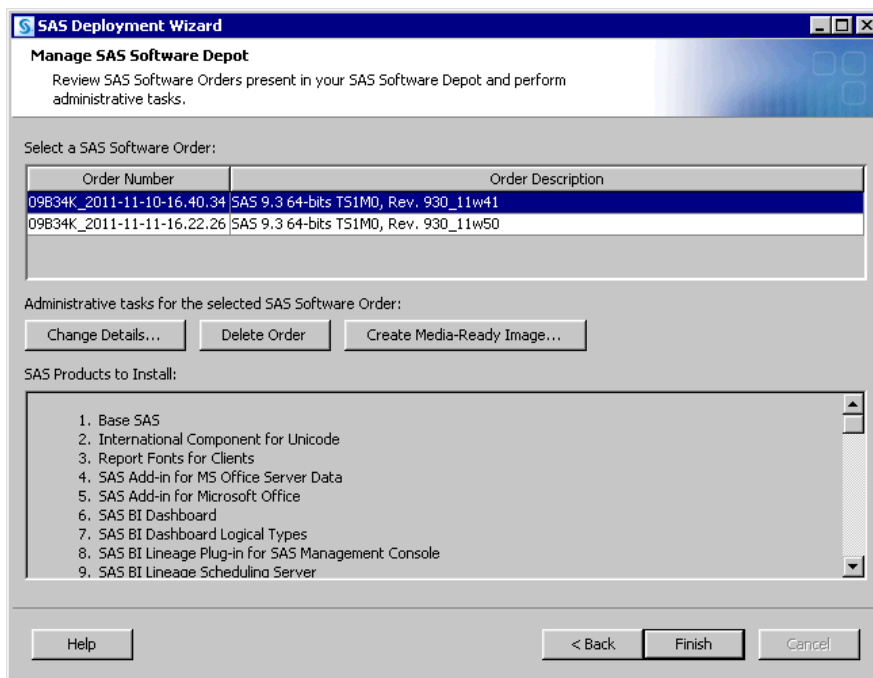
- Linux:

Enter `./setup.sh` at a command prompt.

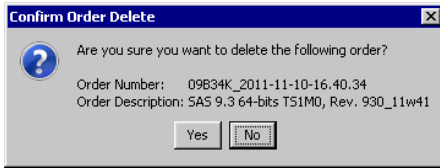
- 3 Choose the language in which the SAS Deployment Wizard will display messages and prompts.
- 4 Select **Manage this SAS Software Depot**.



5 Choose the order that you want to delete, and then select **Delete Order**.



- 6 Confirm that you want to delete the order by selecting **Yes**.



The SAS Deployment Wizard begins to delete your order. When all the order's files have been removed, the Manage SAS Software Depot page appears again, without the deleted order listed.

- 7 Select **Finish** to close the SAS Deployment Wizard.

## Create a Disc Image of Your Order

If you have SAS running on remote sites that do not have access to the network on which your SAS Software Depot resides, you can use the SAS Deployment Wizard to create an ISO image of your SAS software order. Then, using a media creation tool of your choice, you can write the image to the removable media format that you specify: either CDs or DVDs.

You can create a disc image on a per order basis only. If your SAS Software Depot consists of more than one order, then you have to make multiple disc images.

To create a disc image of your SAS order, follow these steps:

- 1 Log on to the depot machine as a SAS Software Depot administrator or a user with depot Read, Write, and Execute privileges.

**Note:** Consider designating one or a few users to serve as SAS Software Depot administrators. Persons needing to deploy SAS software or to apply future SAS software maintenance require depot Read and Execute privileges. Depot administration tasks such as initially creating the depot, storing SAS installation data files, and updating order details require depot Write privileges.

- 2 Start the SAS Deployment Wizard. Navigate to the SAS Software Depot's root directory, and, depending on your operating system, do the following:

- Windows:

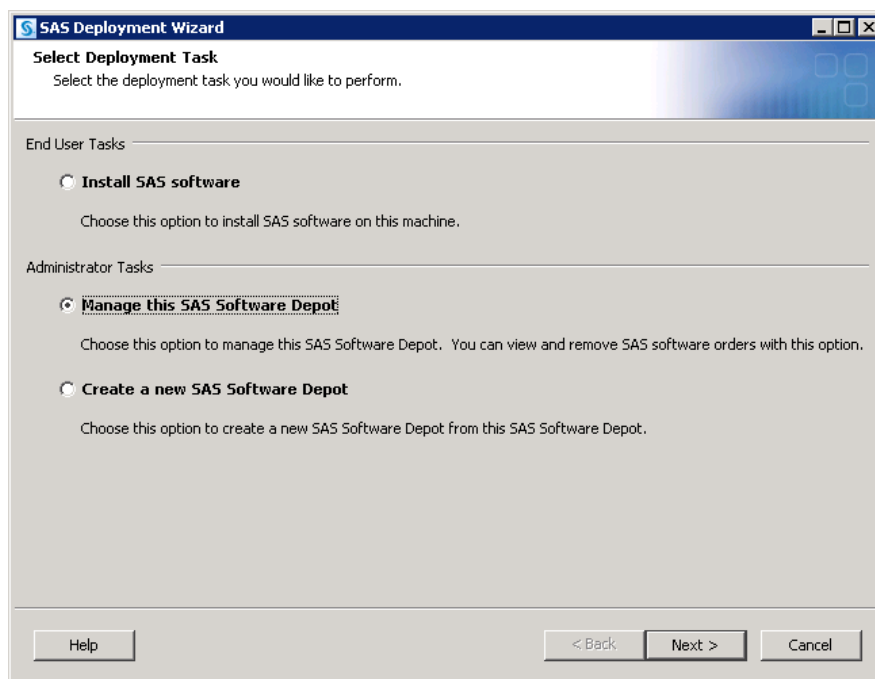
Double-click `setup.exe`.

- Linux:

Enter `./setup.sh` at a command prompt.

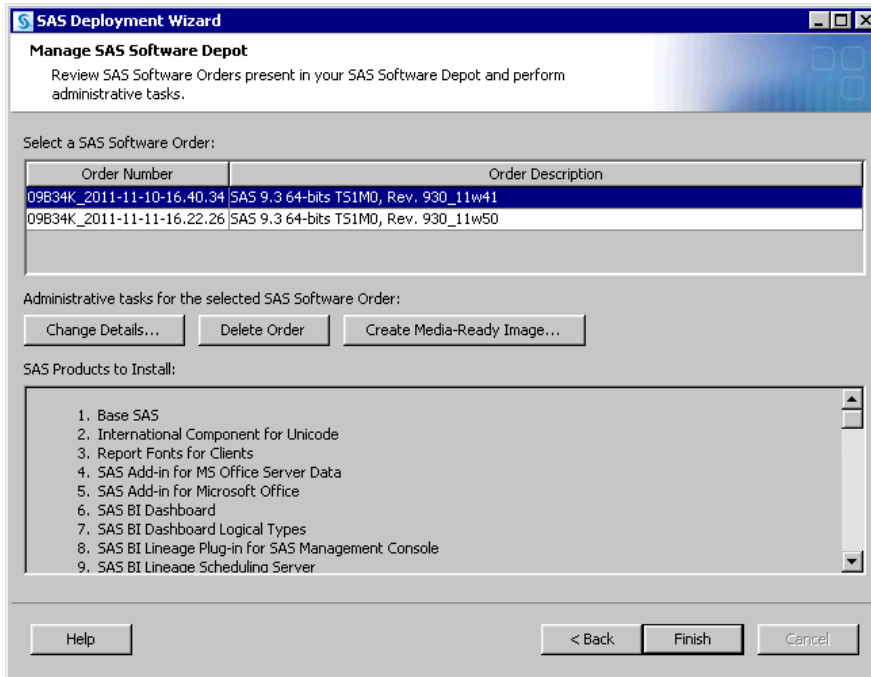
3 Choose the language in which the SAS Deployment Wizard will display messages and prompts.

4 Select **Manage this SAS Software Depot**.

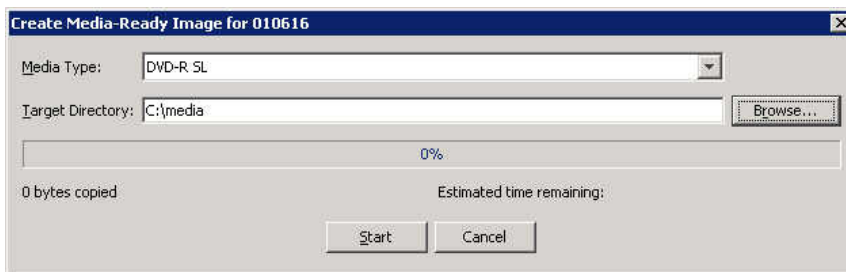


5 Choose the order for which you want to create a disc image, and then select **Create Media-Ready Image**.



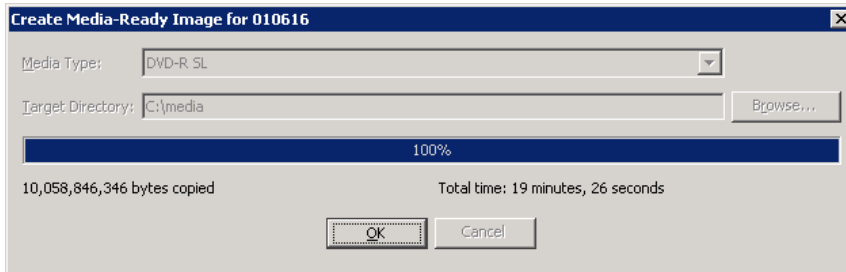


- 6 Choose the type of media (CDs or DVDs) for which you want to create an image of your SAS software order. Also, provide the path where you want the SAS Deployment Wizard to write this image. When you are ready, select **Start**.



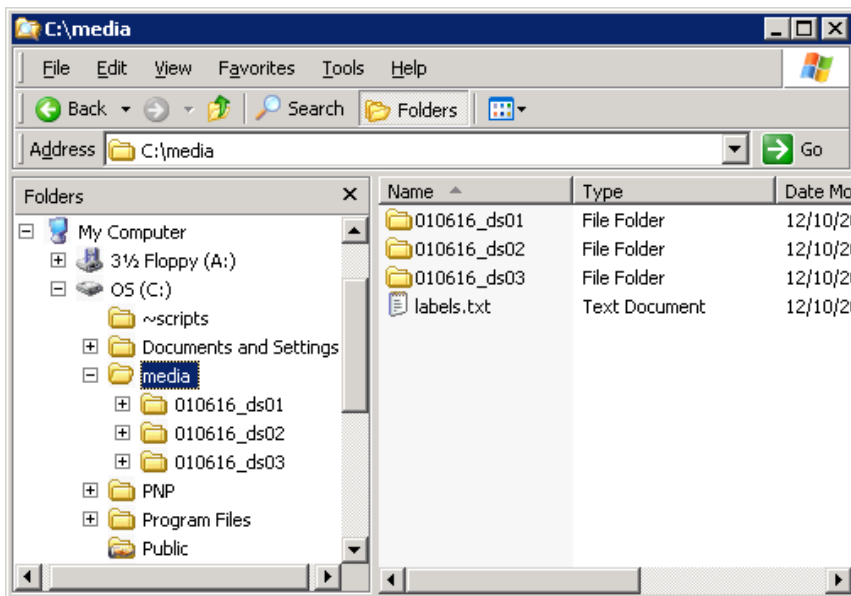
The SAS Deployment Wizard begins writing SAS order files to the target directory.

- 7 When the progress indicator displays 100%, the image is complete and you can select **OK**.



- 8 Select **Finish** to close the SAS Deployment Wizard.

The file system that the SAS Deployment Wizard has created is an ISO image of your SAS order that is logically arranged into directories that map to either CD-ROM or DVD disc. Each directory also contains a summary to enable you to maintain media labels.



- 9 Using a media creation tool of your choice, you can now write the installable image of your SAS order to the type of removable media that you specified earlier: either CDs or DVDs.

---

# Checking Your SAS Software Depot

## Overview of Checking Your SAS Software Depot

SAS provides a utility with which you can verify the integrity of your SAS Software Depot. The SAS Software Depot Check Utility walks through your depot and assembles a list of the files contained in the depot. The utility identifies any missing files. For each file that it locates, the utility attempts to validate its size, checksum, and date-and-time stamp.

The depot check utility generates a text file report in which it lists the results of its various validation tests in the file `sas_depot_check.out`. The utility also attempts to fix any problems that it encounters. Any fixes that it makes are written in a second output file, `sas_depot_check.update`.

The following is the content of `sas_depot_check.out` from a depot check run on Linux:

```
SAS Software Depot Check Utility version 4.3

Missing File(s)
  No files are missing.

Wrong Size File(s)
  All files had the correct size.

Wrong Checksum File(s)
  All files had the correct checksum.

Wrong Owner File(s) (Execute /home/sas/sas_depot_check.update for fix)
  All files had the correct owner.

Wrong Group File(s) (Execute /home/sas/sas_depot_check.update for fix)
  All files had the correct group.

Wrong Permission File(s) (Execute /home/sas/sas_depot_check.update for fix)
  /sas_software_depot/order_data/09B9WN/order.xml
  /sas_software_depot/cd.id

Missing volsters in cd.id that have been corrected
```

```
All volsters were listed in cd.id.
```

The following is the content of `sas_depot_check.update` performed on Linux:

```
chmod 755 "/sas_software_depot/order_data/09B9WN/order.xml"  
chmod 755 "/sas_software_depot/cd.id"
```

You run the utility as a command with various options on Windows and Linux systems only. On Windows, a graphical user interface is also available.

For more information, see the following:

- “Check Your SAS Software Depot on Windows” on page 68
- “Check Your SAS Software Depot on Linux” on page 70
- The *SAS Deployment Wizard and SAS Deployment Manager User's Guide*, available at <http://support.sas.com/documentation/installcenter/en/ikdeploywizug/66034/PDF/default/user.pdf>.

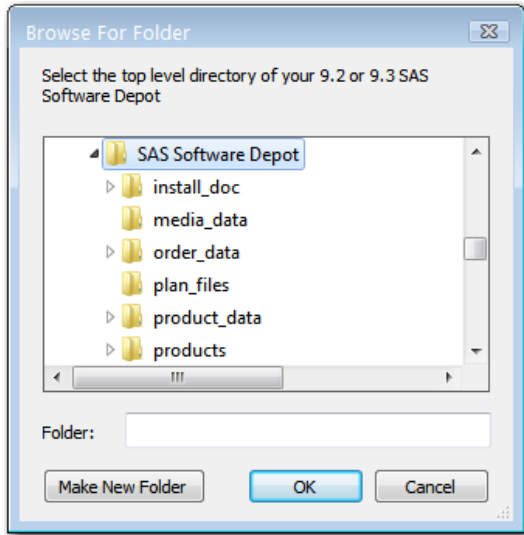
## Check Your SAS Software Depot on Windows

SAS provides a utility with which you can verify the integrity of your SAS Software Depot. For more information see, “Checking Your SAS Software Depot” on page 67.

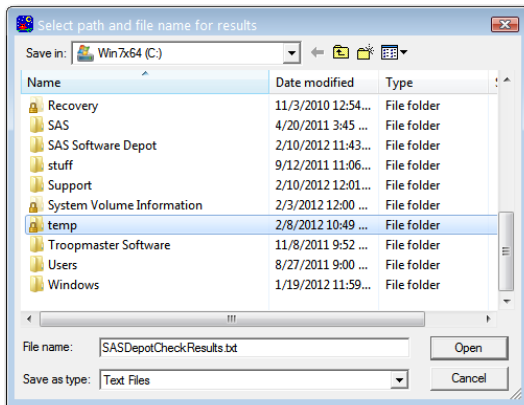
To run the SAS Software Depot Check Utility on Windows, follow these steps:

**Note:** It is recommended that you use the same Windows user account with which the SAS Software Depot was created to run the SAS Software Depot Check Utility.

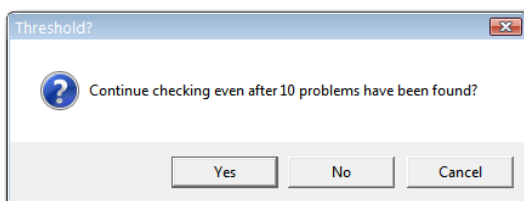
- 1** Locate the `utilities\depotchecker` directory under your SAS Software Depot directory, and click **OK**.
- 2** Double-click `SASDepotCheck.exe`.
- 3** In the dialog box that appears, navigate to the top level directory of your depot.



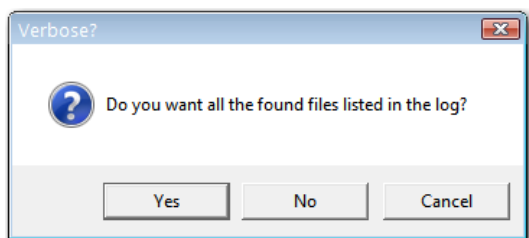
- 4 In the dialog box that appears, navigate to the directory where you want the utility to write its output and click **Open**. (This output will be in the form of one or more text files.)



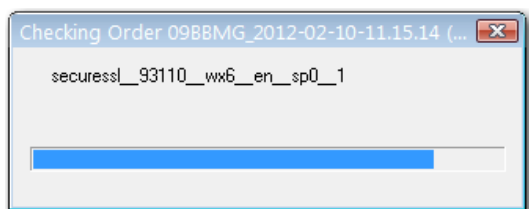
- 5 The utility asks whether you want it to continue checking your depot if it finds more than 10 problems. Click **Yes**.



- 6 The utility asks whether you want it to list all of the files that it examines in its output report file. Click **Yes**.



The utility begins sweeping your depot. The time required to complete the sweep depends on the size of your depot.



- 7 When the utility has finished executing, its output should automatically open in your default text editor.

If this does not happen, navigate to the output directory that you specified earlier, and open SASDepotCheckResults.txt.

## Check Your SAS Software Depot on Linux

SAS provides a utility with which you can verify the integrity of your SAS Software Depot. For more information see, [“Checking Your SAS Software Depot” on page 67](#).

To run the SAS Software Depot Check Utility on Linux, follow these steps:

**Note:** It is recommended that you use the same Linux user account with which the SAS Software Depot was created to run the SAS Software Depot Check Utility.

- 1 Navigate to the `utilities/depotchecker` directory under your SAS Software Depot directory.

## 2 Enter the following command:

```
./sas_depot_check.sh -i depot_root_directory -o output_file_path
```

- *depot\_root\_directory* (required) is the top level directory of your SAS Software Depot.
- *output\_file\_path* (required) the absolute directory path for where the utility writes its output (one or more text files).

You can also specify these options:

-t

(Optional) causes the utility to stop checking the depot if it finds more than 10 problems.

-v

(Optional) writes all the found depot files in the text file that the utility outputs.





# 3

## Pre-Installation: Setting Up Users, Groups, and Ports

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## Deployment Process Overview: Step Four

Before you begin installing and configuring your software, you must create a set of required users and groups at the operating-system level, and you must designate a set of TCP/IP ports for the servers to use. This is the fourth of seven tasks required to install and configure SAS Visual Analytics.

1. Create a SAS Software Depot.
2. Check for documentation updates.
3. (Optional) Deploy the SAS High-Performance Analytics infrastructure.
- ▶ **4. Create operating system users and groups and designate ports.**
5. (Optional) Set up certificates.
6. Deploy required third-party software.
7. Deploy the servers and middle tier.

---

## Defining User Accounts

### Overview of Defining User Accounts

There are two types of user accounts to understand when deploying SAS:

- *Internal user accounts* are accounts known only to SAS and are created and authenticated internally in metadata rather than externally.
- *External user accounts* are user accounts defined outside of SAS metadata. These accounts are local to a machine or are defined in a network directory service of which the machine is a member, such as LDAP.

The following sections describe the user accounts that SAS and third-party software require, and provide information to help you answer these questions:

- What are internal and external user accounts?
- What user rights or to what groups must each account be assigned?
- Should I create local or network directory service accounts?
- What password policies should I enforce?

## Controlling User Access to Hosts

SAS Visual Analytics uses passwordless secure shell (SSH) for access to the machines in the cluster. The following list identifies some of the requirements for configuring passwordless SSH to enable access:

- Data administrators must configure their user accounts for passwordless SSH to start and stop SAS LASR Analytic Server instances. It is also needed for loading and unloading tables to server instances. For more information, see *SAS High-Performance Analytics Infrastructure: Installation and Configuration Guide*, available at <http://support.sas.com/documentation/solutions/hpainfrastructure/index.html>.
- User accounts that are used as shared logins for group access to data must be configured for passwordless SSH. For more information, see *SAS High-Performance Analytics Infrastructure: Installation and Configuration Guide*, available at <http://support.sas.com/documentation/solutions/hpainfrastructure/index.html>.

To reduce the number of operating system (external) accounts, it can be convenient to use the SAS installer account for running SAS LASR Analytic Server Monitor. Although not required, it is useful to create a first user (sasdemo) account to do a simple validation of your deployment after installation and initial configuration.

## Internal User Accounts

*Internal user accounts* are accounts known only to SAS and are created and authenticated internally in metadata rather than externally. SAS identifies internal accounts by appending a special string to the user ID. This string begins with an at sign (@) and contains *sas*pw: @saspw. For two of the required user accounts, the SAS

Administrator and the SAS Trusted User, the SAS Deployment Wizard prompts you by default to create *internal* user accounts.

The following table shows the default internal user accounts required by SAS. (SAS internal accounts are authenticated on the metadata server.)

**Table 3.1** SAS Internal User Accounts

Description	User ID
SAS Administrator The user account that has privileges associated with the SAS Metadata Unrestricted Users role.	sasadm@saspw
SAS Trusted User The user account that can impersonate other users on connections to the metadata server. Some SAS processes use this account to communicate with the metadata server on a client's behalf.	sastrust@saspw
SAS Environment Manager service account The user account that the SAS Environment Manager and its agent uses to communicate while monitoring the processes in your SAS deployment. This internal SAS account has unrestricted administrative access rights to the metadata server. For more information, see “SAS Environment Manager and SAS Metadata Users” in Chapter 9 of <i>SAS Environment Manager: User's Guide</i> .	sasevs@saspw
SAS Anonymous Web User An optional user account that is used to grant clients access to applicable SAS Web Infrastructure Platform components. When web clients request access to web services, they are not prompted for credentials but instead are granted access under this user account.	webanon@saspw

For more information about SAS internal user accounts and their purposes, see Chapter 2, “Understanding the State of Your System,” in *SAS Intelligence Platform: System Administration Guide*.

Here are some benefits of internal accounts:

- less maintenance.

The account is defined only once in SAS, and you do *not* define this account externally using the authentication provider.

- isolation from the host machine security policy.

The SAS Administrator and the SAS Trusted User credentials are referenced in many locations within SAS. For example, forcing a recurring password change (a common security policy) might make unnecessary work for the person administering SAS.

- independence from IT.

You can create additional SAS unrestricted user and administrative user accounts for metadata management without involvement of your IT department.

- reduced “headless” external user accounts.

The SAS Trusted User is an account used for SAS inter-process communication, and it will not be mistaken for a human user.

- minimal security exposure to your enterprise.

The SAS Administrator and the SAS Trusted User are highly privileged accounts and only provide access to SAS—not to operating system resources.

## Required External User Accounts for SAS

*External user accounts* are user accounts defined outside of SAS metadata. These accounts are local to a machine or are defined in a network directory service of which the machine is a member, such as LDAP. SAS requires certain *external* user accounts for two purposes: installing and running certain SAS server processes.

During installation and configuration, the SAS Deployment Wizard must run under an external account with the necessary privileges on the target machine to write SAS program and log files. To run servers such as the SAS Stored Process Server and the SAS Pooled Workspace Server, SAS requires an external user account to be the server process owner. For more information about external user accounts and their purposes, see the *SAS Intelligence Platform: System Administration Guide*.

Although it is not required, you might find it helpful to create a *SAS First User account* with which to test a typical user’s ability to access various SAS applications and to

validate your deployment. (A SAS First User account is sometimes referred to as the SAS Demo account.) The SAS Deployment Wizard asks you if you want to create a SAS First User account in SAS metadata, and you must have an external operating system account available for this purpose. After the wizard finishes, remember that you must add this SAS user to the Visual Analytics Data Administrators Group. For more information, see [“Create SAS Users and Groups” on page 211](#).

As you set up external accounts, remember to use different external accounts for the SAS First User and the SAS Spawned Servers accounts. Otherwise, your configuration will generate errors and the SAS Pooled Workspace Server will not be functional.

As you create these external user accounts, record information about them in [“Pre-installation Checklist for External User Accounts for SAS Visual Analytics” on page 80](#). You will need this information when you run the SAS Deployment Wizard later.

The following table shows external user accounts required for SAS and the machines on which they are authenticated.

**Table 3.2** Required External User Accounts for SAS

Description	Recommended User ID	Machine Where Authenticated
SAS Installer Used to install SAS and start the SAS LASR Analytic Server Monitor.	sas	Every machine
SAS Hadoop User Starts Hadoop on the machines in the cluster. (Created by the SAS Visual Analytics Hadoop configuration script—the <code>hdpsetup</code> command.)	hadoop	
SAS Spawned Servers The process owner for SAS Stored Process Servers and SAS Pooled Workspace Servers.	sassrv	SAS Stored Process Server SAS Pooled Workspace Server

**Note:**

- For information about the user rights that each external account requires, see “Rights Required by External User Accounts for SAS” on page 79.
- The SAS installer generally overrides the default configuration directory with the site’s preferred location (for example, `/opt/sas/config`). The installer must have Write permission on this path.
- Do not use root for the SAS installer user ID.

**TIP** To understand the user accounts required by the SAS analytics cluster, see “Preparing Your System to Deploy the SAS High-Performance Analytics Infrastructure” in *SAS High-Performance Analytics Infrastructure: Installation and Configuration Guide*, available at <http://support.sas.com/documentation/solutions/hpainfrastructure/index.html>.

## Rights Required by External User Accounts for SAS

Operating systems require that you assign certain rights to the external user accounts used to deploy and to run SAS.

The following table describes the user rights needed by the required external user accounts to deploy and run SAS.

**Table 3.3** *Rights Required by External User Accounts for SAS*

External User Account	User Rights Needed
SAS Installer	The group that you designate as the <i>primary</i> group for the SAS installer must contain the SAS Spawnd Servers account.
SAS Spawnd Servers	Member of a group that is the <i>primary</i> group for the SAS installer. (This group does <i>not</i> have to be the primary group for the SAS Spawnd Servers account.)

## Password Policies

**Note:** In this section, we are talking only about the passwords for the few external user accounts SAS requires, not the passwords for regular users of the system.

When you set up passwords for your SAS system accounts, we *highly recommend* that these passwords do not have to be reset when a user first logs on. If, for some reason, it is required that you create passwords that have to be reset, you will have to log on using each account and change the password before you install and configure your software. And, of course, you will need to know the changed password for each account.

By default, passwords for internal accounts are set not to expire. When passwords for system accounts change, you must use SAS Deployment Manager to update a set of configuration files and some metadata objects. SAS provides instructions for updating these files and metadata objects. However, you can save yourself some time if the passwords do not expire. For more information see “Update a Managed Password” in Chapter 4 of *SAS Intelligence Platform: Security Administration Guide*.

## Pre-installation Checklist for External User Accounts for SAS Visual Analytics

Use the following pre-installation checklist to create the necessary external user accounts to deploy and run SAS Visual Analytics.

**Note:** These checklists are superseded by more complete and up-to-date checklists that can be found at <http://support.sas.com/installcenter/plans>. This website also contains a corresponding deployment plan and an architectural diagram.

**Table 3.4** Pre-installation Checklist for External User Accounts for SAS Visual Analytics

Account	Recommended User ID	Actual User ID
SAS Installer	sas	
SAS Spawned Servers	sassrv	



**CAUTION! Do not use root as the installer account.**

Note these important items:

- For information about the user rights that each external account requires, see “Rights Required by External User Accounts for SAS” on page 79.
- The SAS Deployment Wizard prompts you for the SAS installer account and the SAS Spawned Servers account information, and you cannot complete the installation without supplying it.
- Prior to configuration, the SAS Deployment Wizard prompts you for the root (or sudo) password. Certain SAS products and features use functionality that requires SAS to check user ID authentication and file access authorizations. This, in turn, necessitates that certain files within your SAS installation have setuid permissions and be owned by root.
- If your system uses an authentication method other than `/etc/passwd` or `/etc/shadow`, then you must configure authentication before you begin your SAS software deployment or SAS Visual Analytics will not function properly. For more information, see the *Configuration Guide for SAS 9.4 Foundation for UNIX Environments*, available at <http://support.sas.com/documentation/installcenter/en/ikfdtnunxgcg/66380/PDF/default/config.pdf>.

---

## Defining Groups

### Define the sas Group

To deploy SAS Visual Analytics, you should create an operating system group called `sas` and make this the primary group for the SAS installer user. The SAS Spawned Servers account should also be made a member of the `sas` group. (Members of this group are given access to certain directories and files created by the SAS Deployment Wizard.)

For information about creating groups and adding user accounts, see your Linux documentation.

# Pre-installation Checklist for Groups for SAS Visual Analytics

Use the following pre-installation checklist to make sure that you have created the necessary groups to deploy and run SAS:

**Note:** These checklists are superseded by more complete and up-to-date checklists that can be found at <http://support.sas.com/installcenter/plans>. This website also contains a corresponding deployment plan and an architectural diagram.

Table 3.5 Pre-installation Checklist for Groups for SAS Visual Analytics

			Actual Group Name
			This col is used for readers to enter <i>*their*</i> value for the group name
Recommended Group Name	Group Members	Purpose	
sas*	SAS Installer	Primary group for the SAS installer user. Enables the SAS Deployment Wizard to create the necessary log and configuration directories required by SAS.	
	SAS Spawnd Servers	Through group membership, grants Write permissions to the SAS Spawnd Servers account for modifying specific SAS log and configuration directories.	
	Data Admin user SAS First User Any other users	Owner of the LASRMonitor process. Enables data admin user to load data (create server signature files in <code>/opt/VADP/var</code> ).	

\* Limit membership because this privileged group has operating system access to certain configuration files.

## Pre-installation Checklist for Groups for Third-Party Software

Use the following pre-installation checklist to create the necessary groups to deploy and run third-party software.

**Note:** These checklists are superseded by more complete and up-to-date checklists that can be found at <http://support.sas.com/installcenter/plans>. This website also contains a corresponding deployment plan and an architectural diagram.

**Table 3.6** *Pre-installation Checklist for Groups for Third-Party Software*

Recommended Group Name	Group Members	Operating System and Purpose	Actual Group Name
sas	SAS Installer (sas)	Suggested method for assigning required permissions to write to certain installation directories.	

## Configuring Machine Access

For the SAS LASR Analytic Server Monitor process to be able to show the tables that are in-memory on a server instance, network name resolution might need to be modified on the machine that runs the SAS Visual Analytics middle-tier machine.

For deployments that use SAS High-Performance Deployment of Hadoop as a co-located data provider, the middle-tier machine typically has network name resolution without additional configuration. However, if the machines in the cluster use multiple network interfaces, then make sure that network name resolution works. For `/etc/hosts` on the SAS middle-tier machine, make sure that your machine names resolve. For example:

```
255.255.255.255 gridhost01 gridhost01.example.com hdfs0
# hdfs0 is not normally public
```

---

## Designating Ports and Multicast Addresses

### About Ports and Multicast Addresses

While you are creating operating system user accounts and groups, you need to review the set of ports that the SAS servers, third-party servers, and spawners in your system will use by default. If any of these ports are unavailable, select an alternate port and record the new port on the following ports pre-installation checklist:

- [“Multicast Address Considerations” on page 84](#)
- [“Pre-installation Checklist for Ports for SAS” on page 86](#)

You also need to plan for designating Internet Protocol (IP) multicast addresses for all the machines in your SAS deployment. Multicasting simplifies the ongoing management and deployment of SAS web applications by providing the flexibility to customize the SAS middle tier and to distribute SAS web components to implement load balancing.

### Multicast Address Considerations

The SAS Deployment Wizard prompts you to supply a multicast address for inter-machine communication. The wizard supplies you with a default multicast address that it generates based on the machine's IP address and the admin local scope that is recommended in RFC 3171 (IPv4) or RFC 4291 (IPv6).

A multicast group communications protocol is used to communicate among middle-tier SAS applications in a single SAS deployment (the set of applications connected to the same SAS Metadata Server). The combination of multicast IP address and multicast UDP port should be different for each SAS deployment and also different from those used by other multicast applications at your site.

The multicast group communication includes all information needed to bootstrap SAS middle-tier applications. Because this includes sending the SAS environment credentials (such as the sasadm account name and its password), scoping and

encryption options are provided. The defaults are most appropriate for deployments in a firewall, isolated data center environment.

The IP multicast address must be valid for IP multicasting and should be in the range 224.0.0.0 to 239.255.255.255 for IPv4 or have the prefix ff00::/8 for IPv6. Typically, the chosen address will be in the admin-local scoped block which corresponds to 239/8 for IPv4 and ff14::/8 for IPv6. The sample address provided during configuration by the SAS Deployment Wizard conforms to these standards. The address should be unique to SAS applications for the subnet that they are installed on.

The IP Multicast UDP port should be open and usable on any machine a middle-tier application is to be installed. This is a UDP port and does not conflict with any previous TCP port definitions such as the metadata server. The multicast group communication is intended to be used only within your data center environment. Many sites keep their data center network separated from end users via a firewall that will automatically isolate the multicast protocol. Alternatively, the time to live (TTL) parameter can be used to restrict the scope of multicast communication. Your network administrator can suggest a TTL setting to limit the scope of the multicast. The TTL option and the authentication token option both have security implications.

The multicast TTL property (default = 1, range = 0–255) affects the number of network hops a multicast packet will take before being dropped. This TTL value must be greater than or equal to the largest number of hops between any two servers containing SAS products. In addition, some network router documentation recommends that multicast datagrams with initial TTL=0 are restricted to the same host, multicast datagrams with initial TTL=1 are restricted to the same subnet, and multicast datagrams with initial TTL=32 are restricted to the same site. Consult your network router documentation or your network administration staff to determine the correct values for your environment.

**Note:** You must make sure that all of the machines in your SAS 9.4 deployment are members of the same subnet or be sure to set the default TTL value to a number higher than 1. The deployment wizard gives you the opportunity to set the TTL value during SAS 9.4 deployment. For information about how to change these options after deployment, see Appendix 2, “Administering Multicast Options,” in *SAS Intelligence Platform: Middle-Tier Administration Guide*.

Because the multicast protocol conveys credentials, it is protected via encryption. By default, group communication is protected only with a fixed encryption key that is built into the software. If your middle-tier is not running in an environment that is well-isolated from end-user access, then you might want better protection against eavesdroppers and unauthorized group participants. For such situations, choose a multicast authentication token known only to your SAS middle-tier administrative staff. The authentication token is a password-like string needed to connect to the group and create a site-specific encryption key.

The deployment wizard default simplifies configuration using the authentication token that is built into the software. This option is best used in development and other low-security environments. It might also be appropriate in higher-security environments where the multicast group communication is isolated from the end-user community, either via firewall or TTL option, and where all data center administrative and operations staff have sufficient security approval.

If your multicast group communication is not contained within an isolated data center environment, or if the security procedures at your site require protections among administrative and operational staff in various roles, you should specify an authentication token that is known only to the administrators of the SAS environment. The same token string must be supplied on each tier in the configuration.

By default, there is a code level authentication token shared between all SAS middle-tier applications to prevent access to the multicast group from unauthorized listeners. If you choose to use a customized authentication token, use the deployment wizard to enter an authentication token value that meets your organization's security guidelines. The authentication token can be any password-like string. In a multi-tier configuration, this prompt appears on each tier that has an application participating in the SAS multicast groups. You must provide the same authentication token string to each tier in the same SAS deployment (that is, each tier associated with the same metadata server).

## **Pre-installation Checklist for Ports for SAS**

The following checklist indicates what ports are used for SAS by default and gives you a place to enter the port numbers that you actually use.

**Note:** The SAS Deployment Wizard prompts you for this information, and you cannot complete the installation without it.

The last digit of the default port number reflects the configuration level that you select in the SAS Deployment Wizard. For example, when you select **Lev1**, the default port for the metadata server is 8561. If you select another level, such as **Lev2**, the wizard changes the default port to 8562.

**Note:** These checklists are superseded by more complete and up-to-date checklists that can be found at <http://support.sas.com/installcenter/plans>. This website also contains a corresponding deployment plan and an architectural diagram. Consult the pre-installation checklist provided by your SAS representative for a complete list of ports that you must designate.

**Table 3.7** Pre-installation Checklist for Ports (SAS)

Server or Spawner	Default Port	Data Direction	Actual Port
E-mail server	25	Outbound	
HTTP server	80	Inbound and outbound	
HTTP server (secure port)	443	Inbound and outbound	
SAS Remote Services application	5091	Inbound	
SAS OLAP Server	5451	Inbound and outbound	
SAS Deployment Agent	5660	Inbound and outbound	
Event Broker administration	6051	Inbound	
SAS Web Application Server JMX Port	6969	Inbound	
SAS Environment Manager	7080	Inbound and outbound	

Server or Spawner	Default Port	Data Direction	Actual Port
SAS Environment Manager (secured)	7443	Inbound and outbound	
SAS/CONNECT server and spawner	7551	Inbound and outbound	
SAS Web Report Studio In-Process Scheduling UDP Port 1	7570	Inbound and outbound	
SAS Web Report Studio In-Process Scheduling UDP Port 2	7571	Inbound and outbound	
SAS Web Report Studio In-Process Scheduling UDP Port 3	7572	Inbound and outbound	
Event Broker HTTP	8111	Inbound	
Operating System Services scheduler	8451	Inbound	
SAS/SHARE server	8551	Inbound	
Multicast (UDP port)	8561	Inbound and outbound	
SAS Metadata Server	8561	Inbound and outbound	
SAS Object Spawner: operator port	8581	Inbound	
SAS Workspace Server	8591	Inbound	
SAS Stored Process Server: bridge connection	8601	Inbound	
SAS Stored Process Server: load balancing connection 1 (MultiBridge)	8611	Inbound	
SAS Stored Process Server: load balancing connection 2 (MultiBridge)	8621	Inbound	



Server or Spawner	Default Port	Data Direction	Actual Port
SAS Stored Process Server: load balancing connection 3 (MultiBridge)	8631	Inbound	
SAS Pooled Workspace Server	8701	Inbound	
SAS Object Spawner: SAS Pooled Workspace Server port bank 1	8801	Inbound	
SAS Object Spawner: SAS Pooled Workspace Server port bank 2	8811	Inbound	
SAS Object Spawner: SAS Pooled Workspace Server port bank 3	8821	Inbound	
SAS Stored Process Server: load balancing connection 3 (MultiBridge)	8631	Inbound	
SAS Pooled Workspace Server	8701	Inbound	
SAS Object Spawner: SAS Pooled Workspace Server port bank 1	8801	Inbound	
SAS Object Spawner: SAS Pooled Workspace Server port bank 2	8811	Inbound	
SAS Object Spawner: SAS Pooled Workspace Server port bank 3	8821	Inbound	
SAS Web Infrastructure Platform Database Server	9432	Inbound and outbound	
SAS LASR Analytic Server Monitor RMI port	9971	Inbound and outbound	
SAS High-Performance Analytics environment port	10010	Inbound	
SAS High-Performance Computing Management Console server	10020	Inbound	
SAS Deployment Tester server	10021	Inbound	

Server or Spawner	Default Port	Data Direction	Actual Port
SAS Visual Analytics (AutoLoad)	10031	Inbound	
SAS Information Retrieval Studio	10651	Inbound	
SAS Information Retrieval Studio proxy server	10661	Inbound	
SAS Information Retrieval Studio proxy server admin	10671	Inbound	
SAS Information Retrieval Studio proxy server web admin	10681	Inbound	
SAS Information Retrieval Studio pipeline server	10691	Inbound	
SAS Information Retrieval Studio pipeline server admin	10701	Inbound	
SAS Information Retrieval Studio pipeline server web admin	10711	Inbound	
SAS Information Retrieval Studio index builder	10721	Inbound	
SAS Information Retrieval Studio query server	10731	Inbound	
SAS Information Retrieval Studio query statistics server	10741	Inbound	
SAS Information Retrieval Studio query statistics server UDP	10741	Inbound	
SAS Information Retrieval Studio crawler admin	10751	Inbound	

Server or Spawner	Default Port	Data Direction	Actual Port
SAS Information Retrieval Studio web query server	10761	Inbound	
TCP port for middle-tier cache communications*	0–65535	Inbound and outbound	
Hadoop Service on the Name Node	15452	Inbound	
Hadoop Service on the Data Node	15453	Inbound	
Cache Locator port	41415	Inbound and outbound	
Cache Locator membership port range** (TCP/UDP port range)	1024–65535	Inbound and outbound	
Hadoop Data Node address	50010	Inbound	
Hadoop Data Node IPC address	50020	Inbound	
SAS High-Performance Computing Management Console server	10020	Inbound	
Hadoop TaskTracker	50060	Inbound	
Hadoop Name Node web interface	50070	Inbound	
Hadoop Data Node HTTP address	50075	Inbound	
Hadoop secondary Name Node	50090	Inbound	
Hadoop Name Node backup address	50100	Inbound	
Hadoop Name Node backup HTTP address	50105	Inbound	
Hadoop Name Node HTTPS address	50470	Inbound	
Hadoop Data Node HTTPS address	50475	Inbound	

Server or Spawner	Default Port	Data Direction	Actual Port
SAS High-Performance Deployment of Hadoop	54310	Inbound	
JMS Server Port	61616	Inbound and outbound	

- \* If the default port is set to zero, the operating system selects an available port. Each process on a machine must have its own TCP port. Some operating systems restrict the range of ports usable by non-privileged users, and using restricted port numbers can cause run-time errors in GemFire start-up.
- \*\* The range of ephemeral ports available for unicast UDP messaging and for TCP failure detection in the peer-to-peer distributed system. These ephemeral ports are created from available ports in a system.

# 4

## Pre-Installation: Setting Up Certificates

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## Deployment Process Overview: Step Five

A decision that you must make when deploying SAS Visual Analytics is whether to use certificates. If you choose to secure communication between SAS web applications, then setting up certificates is the fifth of seven tasks required to install and configure SAS Visual Analytics.

1. Create a SAS Software Depot.
2. Check for documentation updates.
3. (Optional) Deploy the SAS High-Performance Analytics infrastructure.
4. Create operating system users and groups and designate ports.
- **5. (Optional) Set up certificates.**
6. Deploy required third-party software.
7. Deploy the servers and middle tier.

This section discusses the different types of certificates and what is involved in setting them up.

---

## What Are Certificates?

Transport Layer Security (TLS) and its predecessor, Secure Sockets Layer (SSL), are cryptographic protocols that are designed to provide communication security over the Internet. TLS and SSL are protocols that provide network data privacy, data integrity, and authentication.

**Note:** All discussion of TLS is applicable to the predecessor protocol, SSL.

TLS uses X.509 digital certificates and hence asymmetric cryptography to authenticate entities—whether that entity is a server process or a human user.

When messages are exchanged between entities, there is a risk that the message can be intercepted and that a process or a user can become impersonated. Certificate authorities (CAs) are trusted parties that provide confidence that a public key truly belongs to an entity.

You request that the CA issue a certificate that contains your public key. The entity that receives your message acknowledges that your certificate is issued by a CA that it recognizes and is able to substantiate your identity.

Authenticating entities is accomplished through certificates issued by three types of CAs:

- third-party-signed.

You go to a commercial third-party certificate authority, such as VeriSign, to purchase a certificate.

- site-signed.

You go to the IT department at your site to obtain a certificate.

- self-signed.

You serve as your own certificate authority and obtain a certificate using the certificate management tool on your machine.

The remainder of this section discusses how to prepare and deploy SAS using certificates. For more information about TLS, see “Providers of Encryption” in Chapter 1 of *Encryption in SAS*, available at <http://support.sas.com/documentation/cdl/en/secref/67436/HTML/default/viewer.htm#n0gzdro5ac3enznl8qbmaqy4liz3.htm>.

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## Some SAS Entities That Use Certificates

These SAS entities can be secured with TLS certificates:

- SAS Deployment Agent

The SAS Deployment Agent and its remote client perform configuration management operations for clustering and backups. There is one deployment agent and its remote client per machine in the deployment.

During installation, the SAS Deployment Wizard can automatically create self-signed certificates for you. However, you can specify your own site or third-party signed certificates instead.

For more information, see [“How SAS Deployment Agent Uses Certificates” on page 97](#).

#### ■ SAS Environment Manager Server and Agent

SAS Environment Manager is an operational monitoring and management system for SAS deployments. SAS Environment Manager incorporates Hyperic technology from VMware to offer enterprise-class operational features.

During installation, the SAS Deployment Wizard can automatically create self-signed certificates for you. However, you can specify your own site or third-party signed certificates instead.

Proceed to the topic [“Overview of Implementing Certificates”](#)

#### ■ SAS Information Retrieval Studio

SAS Information Retrieval Studio combines several key technologies to provide a comprehensive solution to data collection, indexing, searching, and so on. These technologies are bundled into one customizable product.

To secure SAS Information Retrieval Studio, there is a setup task and a post-deployment task that you must complete.

Proceed to the topic [“Overview of Implementing Certificates”](#)

#### ■ SAS Web Server

SAS Web Server is an HTTP server based on Pivotal Web Server.

A native application built with OpenSSL, the SAS Web Server does not use Java Keystores. The web server requires the following:

- an RSA private key, not protected with a passphrase
- an X509-signed certificate containing the public key in PEM-encoded format



Proceed to the topic “[Overview of Implementing Certificates](#)”

---

## How SAS Deployment Agent Uses Certificates

The SAS Deployment Wizard configures communication between the SAS Deployment Agent and its remote client using two-way client authentication. Therefore, the deployment agent and its remote client each has to have access to a keystore and truststore. When multiple machines are involved, having a single keystore and truststore is necessary so that *all* of the remote clients can communicate with *all* of the deployment agents.

These credentials are generated during the deployment of the SAS Metadata Server, and these credentials are retrieved from the metadata server during configuration of other SAS servers. If there are multiple metadata servers in a deployment, there is a mechanism in the SAS Deployment Manager that enables you to upload a set of credentials to additional metadata servers. For more information, see “Manage SAS Deployment Agent Service” in the *SAS Deployment Wizard and SAS Deployment Manager: User's Guide*, available at <http://support.sas.com/documentation/installcenter/en/ikdeploywizug/66034/PDF/default/user.pdf>.

By default, the wizard generates self-signed certificates to secure both the agent and the client. We recommend that customers unfamiliar with security setup use the default. If your site requires the use of a site-signed or third-party-signed certificate, then you must supply paths to both the agent and client keystores and truststores and their respective passwords when prompted by the wizard. For more information, see “[Certificates for SAS Deployment Agent](#)” on page 99.

If you want to use site-signed or third-party-signed certificates, but you are not ready to deploy them, you can initially configure the deployment agent with no security, and then go back and add them later with the SAS Deployment Manager.

You might want to use the same certificate (cacerts) for the deployment agent that the SAS Web Server uses. In this case, configure the deployment agent with no security,

and then after you finish deploying SAS, use the deployment manager to configure the deployment agent to use cacerts.

For more information about configuring the deployment agent later, see the *SAS Deployment Wizard and SAS Deployment Manager: User's Guide*.

Proceed to the topic [“Overview of Implementing Certificates”](#)

---

## Overview of Implementing Certificates

This topic describes the overall process for implementing certificates in SAS 9.4. Cross-references are provided for specific directions on how to perform the tasks identified in this topic.

**Note:** For SAS Deployment Agent and SAS Environment Manager Server and Agent, the SAS Deployment Wizard can automatically create self-signed certificates for you. In this case, you do not need to perform the steps in this topic. However, if you want to use site-signed or third-party-signed certificates for these products, perform the steps that follow.

- 1 Decide on which type of certificate signing authority to use at your site:
  - site CA
  - third-party CA
- 2 If you are using site-signed or self-signed certificates, be aware of the special deployment process required for SAS web applications. For more information, see [“Configure Clients to Trust SAS Web Server with Site-Signed and Self-Signed Certificates”](#).
- 3 Create a certificate signing request, and submit it to the certificate signing authority.  
For more information, go to the link appropriate for your operating system:
  - On Windows, see “TLS on Windows: Setting Up Digital Certificates ” in Chapter 8 of *Encryption in SAS*, available at <http://support.sas.com/documentation/cdl/en/secref/67436/HTML/default/viewer.htm#p1g2v5c010q6gyn1fi8f17r7pdi3.htm>.

- On Linux, see “TLS on UNIX: Setting Up Digital Certificates” in Chapter 7 of *Encryption in SAS*, available at <http://support.sas.com/documentation/cdl/en/secref/67436/HTML/default/viewer.htm#p0gy97oedcx0finln83srxchqpk.htm>.
- 4 Follow the applicable steps in “Implementing Certificates” on page 99.
  - 5 Perform the applicable post-deployment tasks described in “Post-Deployment Steps for Certificates” on page 116.

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## Implementing Certificates

### Certificates for SAS Deployment Agent

#### Overview of Certificates for SAS Deployment Agent

The SAS Deployment Wizard configures communication between the SAS Deployment Agent and its remote client using two-way client authentication. Therefore, the deployment agent and its remote client each has to have access to a keystore and truststore. When multiple machines are involved, having a single keystore and truststore is necessary so that *all* of the remote clients can communicate with *all* of the deployment agents.

By default, during installation, the deployment wizard generates self-signed certificates to secure communication between the SAS Deployment Agent and its remote clients. There is one deployment agent and its remote client per machine in the deployment. We recommend that customers unfamiliar with security setup use the default.

Make one of the following choices:

- If you choose to use this default, then no preparation is required before running the deployment wizard.

When you are finished, proceed to the topic, “Implement Certificates for SAS Deployment Agent” on page 101.

- If your site requires the use of pre-existing self-signed certificates or site-signed or third-party-signed certificates, then you must supply paths to both the agent and

client keystores and truststores and their respective passwords when prompted by the deployment wizard.

Proceed to the topic [“Pre-install Checklist for Certificates for SAS Deployment Agent”](#)

**Pre-install Checklist for Certificates for SAS Deployment Agent**

If you plan to supply a pre-existing self-signed certificate or a site-signed or third-party-signed certificate, record their respective keystore and truststore locations and passwords in the following table.

Your keystores and truststores must be in either JKS or PKCS12 format. The SAS Deployment Wizard encodes the passwords that you supply into SAS Proprietary (SAS002) format.

The SAS Deployment Wizard prompts you for this information during SAS installation and configuration.

When you are finished, proceed to the topic, [“Implement Certificates for SAS Deployment Agent”](#) on page 101.

**Table 4.1** *Pre-installation Checklist for SAS Deployment Agent and Client Keystore and Truststore Values*

Keystore and Truststore Properties	Actual Value
SAS Deployment Agent keystore path	
SAS Deployment Agent keystore password	
SAS Deployment Agent truststore path	
SAS Deployment Agent truststore password	
Remote SAS Deployment Agent Client keystore path	

Keystore and Truststore Properties	Actual Value
Remote SAS Deployment Agent Client keystore password	
Remote SAS Deployment Agent Client truststore path	
Remote SAS Deployment Agent Client truststore password	

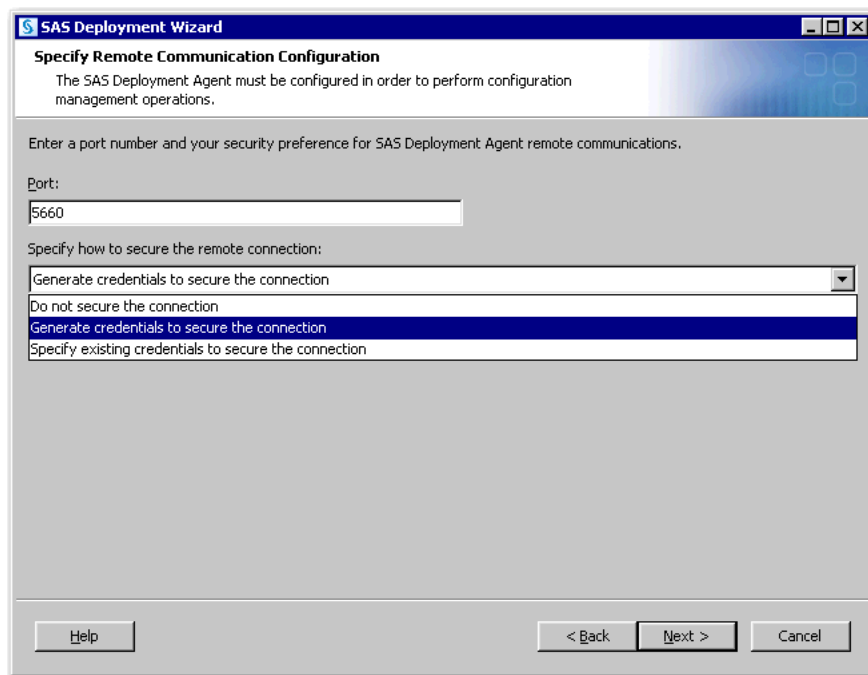
## Implement Certificates for SAS Deployment Agent

During installation, the SAS Deployment Wizard gives you two options for configuring secure communication between the SAS Deployment Agent and its remote clients:

- The deployment wizard creates self-signed certificates for you.
- You provide pre-existing self-signed certificates or site-signed or third-party-signed certificates.

If you want the deployment wizard to create self-signed certificates for you, then when prompted, choose **Generate credentials to secure the connection**.

**Figure 4.1** SAS Deployment Agent Keystore Prompts



If you are providing pre-existing self-signed certificates or site-signed or third-party-signed certificates, then choose **Specify existing credentials to secure the connection**.

**Figure 4.2** SAS Deployment Agent Keystore Prompts

The screenshot shows a Windows-style dialog box titled "SAS Deployment Wizard". The main heading is "Specify Remote Communication Configuration". Below this, a message states: "The SAS Deployment Agent must be configured in order to perform configuration management operations." The instruction "Enter a port number and your security preference for SAS Deployment Agent remote communications." is followed by a "Port:" label and a text input field containing "5660". Below the port field, the text "Specify how to secure the remote connection:" is followed by a list box with three options: "Specify existing credentials to secure the connection" (which is selected and highlighted in blue), "Do not secure the connection", and "Generate credentials to secure the connection". At the bottom of the dialog, there are three buttons: "Help", "< Back", and "Next >", with a "Cancel" button to the right of "Next >".

After clicking **Next**, the deployment wizard prompts you on a later page for the SAS Deployment Agent keystore location and password.

**Figure 4.3** SAS Deployment Agent Keystore Path Configuration Prompts

The screenshot shows a Windows-style dialog box titled "SAS Deployment Wizard". The main heading is "Specify SAS Deployment Agent Keystore Credentials", with a sub-instruction: "Specify keystore credentials for communications going out from your machine." Below this, a text prompt says "Enter your agent keystore file location (path and file name).". There is a label "Agent Keystore Location:" followed by a text input field and a "Browse..." button. A note states: "The password you use for the keystore must match the password that was set when you created the keystore using the Java keytool command." Below this are labels for "Agent Keystore Password:" and "Confirm Agent Keystore Password:", each followed by a text input field. At the bottom, there are four buttons: "Help", "< Back", "Next >", and "Cancel".

Next, you are prompted for the deployment agent truststore location and password.



**Figure 4.4** SAS Deployment Agent Truststore Path Configuration Prompts

The screenshot shows a window titled "SAS Deployment Wizard" with a blue header bar. Below the header, the title "Specify SAS Deployment Agent Truststore Credentials" is displayed in bold, followed by the instruction "Specify truststore credentials for communications coming in to your machine." The main area of the window is light gray and contains the following elements:

- A text prompt: "Enter your agent truststore file location (path and file name)."
- A label "Agent Truststore Location:" followed by a text input field and a "Browse..." button.
- A note: "The password you use for the truststore must match the password that was set when you created the truststore using the Java keytool command."
- A label "Agent Truststore Password:" followed by a text input field.
- A label "Confirm Agent Truststore Password:" followed by a text input field.
- A large empty gray rectangular area below the password fields.
- A footer bar containing four buttons: "Help", "< Back", "Next >", and "Cancel".

Because the deployment wizard configures deployment agent communication as two-way client authentication, the wizard prompts you for the path to the remote client keystore location and password.

**Figure 4.5** SAS Remote Deployment Agent Client Keystore Path Configuration Prompts

The screenshot shows a Windows-style dialog box titled "SAS Deployment Wizard". The main heading is "Specify SAS Remote Deployment Agent Client Keystore Credentials", with a subtitle "Specify keystore credentials for communications going out from your machine." Below this, a text prompt says "Enter your remote client keystore file location (path and file name).". There is a label "Remote Client Keystore Location:" followed by a text input field and a "Browse..." button. A note states: "The password you use for the keystore must match the password that was set when you created the keystore using the Java keytool command." Below this are labels for "Remote Client Keystore Password:" and "Confirm Remote Client Keystore Password:", each followed by a text input field. At the bottom, there are three buttons: "Help", "< Back", and "Next >", and a "Cancel" button.

You are prompted for the remote client truststore location and password.

**Figure 4.6** SAS Remote Deployment Agent Client Truststore Path Configuration Prompts

**SAS Deployment Wizard**

**Specify SAS Remote Deployment Agent Client Truststore Credentials**  
Specify truststore credentials for communications coming in to your machine.

Enter your remote client truststore file location (path and file name).

Remote Client Truststore Location:

The password you use for the truststore must match the password that was set when you created the truststore using the Java keytool command.

Remote Client Truststore Password:

Confirm Remote Client Truststore Password:

Proceed to the topic [“Certificates for SAS Environment Manager”](#)

## Certificates for SAS Environment Manager

### Overview of Certificates for SAS Environment Manager

By default, during installation, the SAS Deployment Wizard generates a self-signed certificate to secure communication between the SAS Environment Manager server and its agent. Site-signed or third-party-signed certificates enable secure communication for SAS Environment Manager users that connect using a web browser.

We recommend that customers unfamiliar with security setup use the default.

Make one of the following choices:

- If you choose to use this default, then no preparation is required before running the deployment wizard.

Proceed to the topic [“Implement Certificates for SAS Environment Manager”](#) on page 109

- If your site requires the use of a pre-existing self-signed certificate or a site-signed or third-party-signed certificate, then you must supply the path to both the server and agent keystores and their respective passwords when prompted by the deployment wizard.

Proceed to the topic, [“Pre-install Checklist for Certificates for SAS Environment Manager”](#).

### Pre-install Checklist for Certificates for SAS Environment Manager

If you plan to supply pre-existing keystores for SAS Environment Manager, record the keystore locations and passwords. The SAS Deployment Wizard prompts you for this information during SAS installation and configuration.

When you are finished, proceed to the topic, [“Implement Certificates for SAS Environment Manager”](#) on page 109.

**Table 4.2** Pre-installation Checklist for Keystore Values

Keystore Properties	Actual Value
SAS Environment Manager (Server) keystore path	
SAS Environment Manager (Server) keystore password*	
SAS Environment Manager alias*	
SAS Environment Manager (Agent) keystore path	
SAS Environment Manager (Agent) keystore password	

\* SAS Environment Manager requires that the keystore alias and its password be identical.

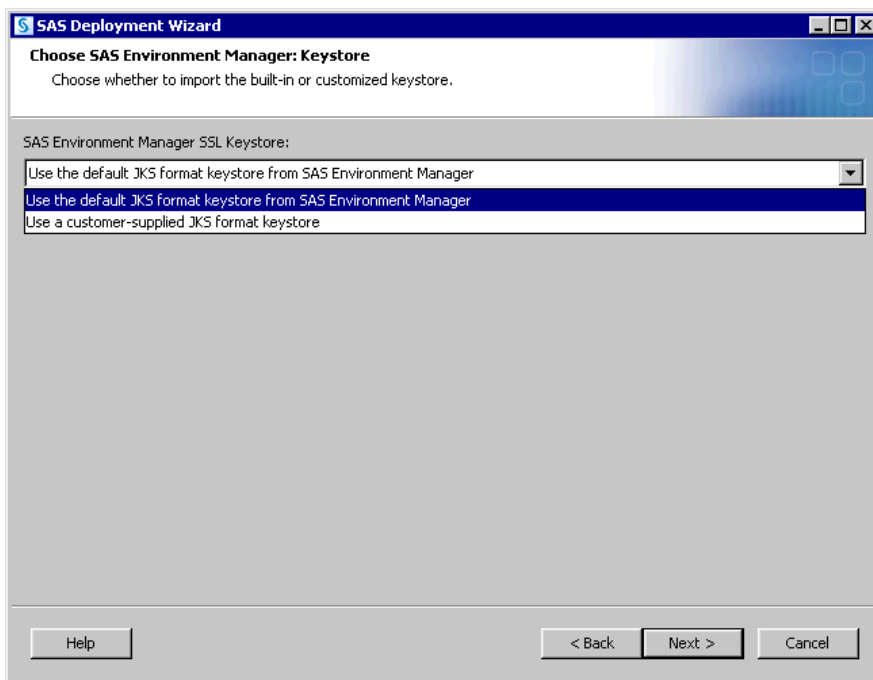
## Implement Certificates for SAS Environment Manager

During installation, the SAS Deployment Wizard gives you two options for securing communication between the SAS Environment Manager server and its agent:

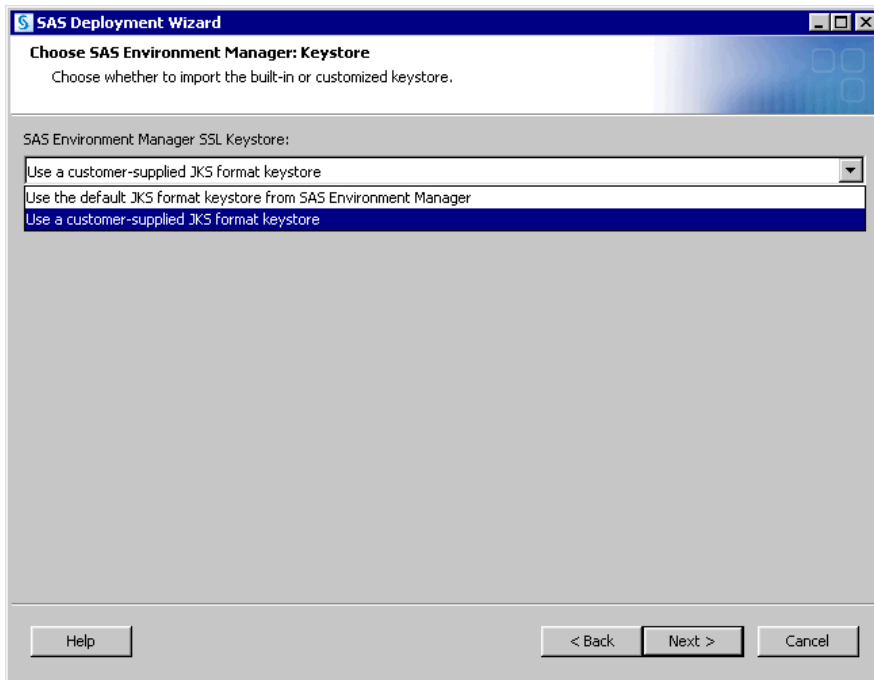
- The deployment wizard creates a self-signed certificate for you.
- You provide a pre-existing self-signed certificate or a site-signed or third-party-signed certificate.

If you want the deployment wizard to create a self-signed certificate for you, then, when prompted, choose **Use the default JKS format keystore from SAS Environment Manager**.

*Figure 4.7 SAS Deployment Agent Keystore Prompts*



If you are providing a pre-existing self-signed certificate or a site-signed or third-party-signed certificate, then choose **Use a customer-supplied JKS format keystore**.

**Figure 4.8** SAS Environment Manager Server Keystore Configuration Prompts

If you choose **Use a customer-supplied JKS format keystore**, the deployment wizard prompts you on later pages for the keystore location and password for both the SAS Environment Manager server and its agent.

**Note:** SAS Environment Manager requires that the keystore password and private key password be identical. For more information, see [http://pubs.vmware.com/vfabric5/index.jsp?topic=/com.vmware.vfabric.hyperic.4.6/Configure\\_SSL\\_Options.html](http://pubs.vmware.com/vfabric5/index.jsp?topic=/com.vmware.vfabric.hyperic.4.6/Configure_SSL_Options.html).

**Figure 4.9** SAS Environment Manager Server Keystore Path Configuration Prompts

The screenshot shows a Windows-style dialog box titled "SAS Deployment Wizard". The main heading is "SAS Environment Manager: Keystore Configuration". Below the heading, a message states: "Specify the server keystore to use when communicating with the SAS Environment Manager." The dialog contains three input fields: "Keystore Path:" with a text box containing the path "C:\SAS\EBIServer\Lev1\Web\SASEnvironmentManager\conf\hyperic.keystore" and a "Browse..." button to its right; "Keystore Password:" with an empty text box; and "Confirm Password:" with an empty text box. At the bottom of the dialog, there are four buttons: "Help" on the left, and "< Back", "Next >", and "Cancel" on the right.

**SAS Deployment Wizard**

**SAS Environment Manager: Keystore Configuration**

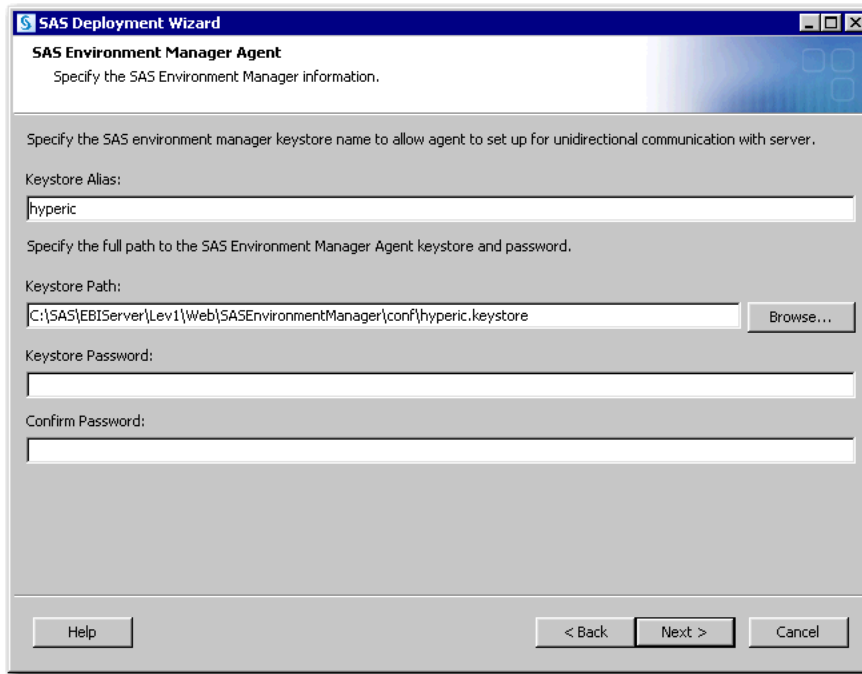
Specify the server keystore to use when communicating with the SAS Environment Manager.

Keystore Path:

C:\SAS\EBIServer\Lev1\Web\SASEnvironmentManager\conf\hyperic.keystore

Keystore Password:

Confirm Password:

**Figure 4.10** SAS Environment Manager Agent Keystore Path Configuration Prompts

Proceed to the topic [“Certificates for SAS Information Retrieval Studio”](#)

## Certificates for SAS Information Retrieval Studio

During installation, there are no security-related prompts to respond to when deploying SAS Information Retrieval Studio. However, you must do the following task, based on your operating system:

- On Linux, create a trust list.

For more information, see “TLS on UNIX: Setting Up Digital Certificates” in Chapter 7 of *Encryption in SAS*, available at <http://support.sas.com/documentation/cdl/en/secref/67436/HTML/default/viewer.htm#p0gy97oedcx0finln83srxchqpzk.htm>.

- On Windows, make sure that all the certificate authorities are members of the Trusted Root Certification Authorities (TRCA) store.



- You can use your web browser to see whether a certificate's CA is a member of the TRCA. Point it to your secure SAS Web Server and view the certificate. For more information, see your web browser documentation.
- If the certificate is *not* a member of the TRCA, add it. For more information, see “TLS on Windows: Setting Up Digital Certificates ” in Chapter 8 of *Encryption in SAS*, available at <http://support.sas.com/documentation/cdl/en/secref/67436/HTML/default/viewer.htm#p1g2v5c010q6gyn1fi8f17r7pdi3.htm>.

After you deploy SAS Information Retrieval Studio, there is a second task that you must perform. For more information, see “[Post-Deployment Step for SAS Information Retrieval Studio](#)” on page 119.

Proceed to the topic, “[Certificates for SAS Web Server](#)”.

## Certificates for SAS Web Server

### Overview of Certificates for SAS Web Server

During installation, the SAS Deployment Wizard gives you the option to secure communication between the SAS Web Server and its clients. A native application built with OpenSSL, the SAS Web Server does not use Java Keystores. The web server requires the following:

- an RSA private key, not protected with a passphrase, in PEM-encoded format
- an X509-signed certificate containing the public key in PEM-encoded format

For more information, see “Providers of Encryption” in Chapter 1 of *Encryption in SAS*, available at <http://support.sas.com/documentation/cdl/en/secref/67436/HTML/default/viewer.htm#n0gzdro5ac3enzn18qbmaqy4liz3.htm>.

When you have your RSA private key and your certificate, proceed to the topic, “[Pre-install Checklist for Certificates for SAS Web Server](#)”.

### Pre-install Checklist for Certificates for SAS Web Server

If you plan to use certificates to secure communication between SAS Java clients and SAS Web Server, record the certificate and private key location. The SAS Deployment Wizard prompts you for this information during SAS installation and configuration.

When you are finished, proceed to the topic, “[Implement Certificates for SAS Web Server](#)” on page 114.

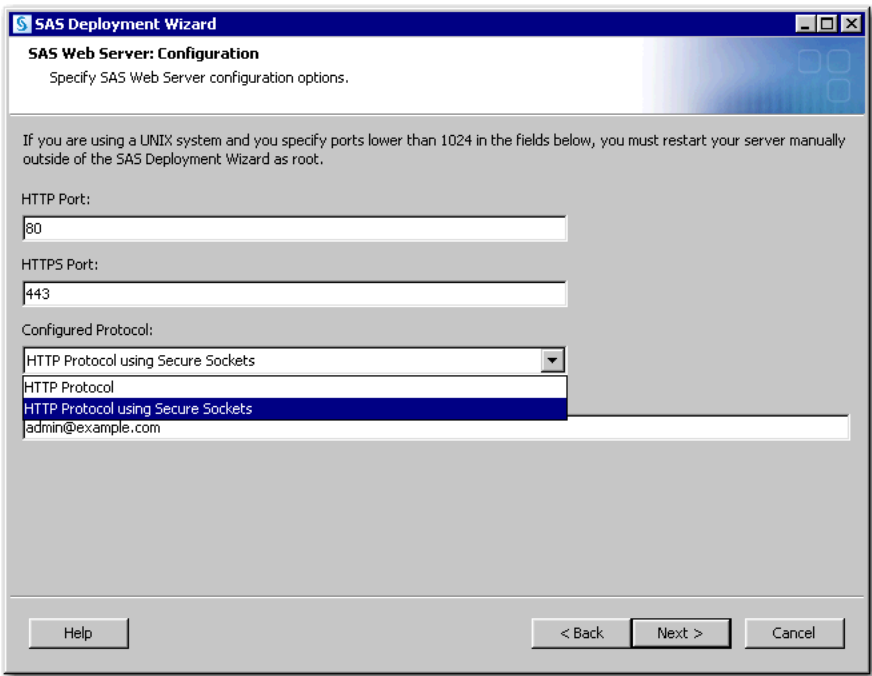
**Table 4.3** Pre-installation Checklist for Certificate Path Values

Certificate and Key Properties	Actual Value
SAS Web Server X509 certificate path	
SAS Web Server RSA private key path	

## Implement Certificates for SAS Web Server

During installation, the SAS Deployment Wizard gives you the option of securing web server communication with its clients. Select **HTTP Protocol using Secure Sockets** for secured communication with clients. (Certificates are used.)

**Figure 4.11** SAS Web Server Configuration Prompts

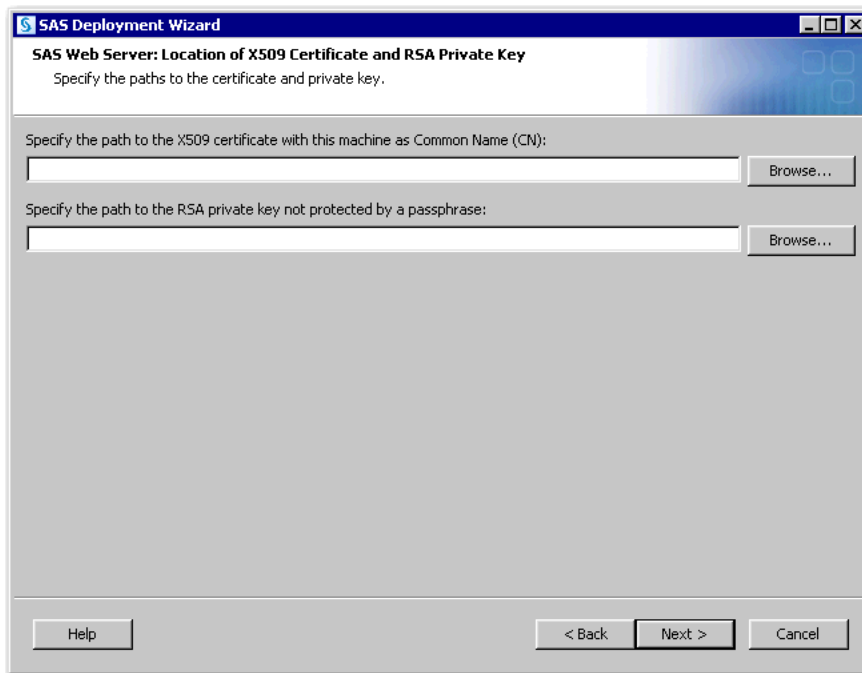


If you choose **HTTP Protocol using Secure Sockets**, the deployment wizard prompts you on a later page for the following information:

- In the **X509 Certificate** field, enter the path to the valid X509 certificate with the DNS name of the machine as the Common Name (CN).
- In the **RSA private key** field, enter the path to the RSA private key that is not protected by a passphrase.

**Note:** The web server does not use a passphrase so that the server can start without having to prompt the administrator for it.

**Figure 4.12** SAS Web Server Certificate and Key Configuration Prompts



Proceed to the topic [“Post-Deployment Steps for Certificates”](#)

---

## Post-Deployment Steps for Certificates

### Post-Deployment Server Tier Setting for Certificates

In SAS 9.4, when you have implemented certificates for the SAS Web Server, perform the following action based on the type of certificate used:

- For self-signed certificates:

The self-signed certificate must be available on the client.

- For the SAS server tier on Linux:

Indicate the location of the server's self-signed certificate to SAS using the SSLCALISTLOC system option. The option specifies the path to the server's self-signed certificate (in PEM format).

For more information, see “[More about SSLCALISTLOC System Option](#)” on [page 117](#).

- For the SAS server tier on Windows:

The site-signed or third-party-signed certificate must be in the Windows System truststore (not the private JRE truststore discussed in earlier topics).

- Perform these two post-deployment steps:

- [Set SSLCALISTLOC for autoload on page 118](#).
    - [Set paths for SAS Information Retrieval Studio on page 119](#).

- For site-signed and third-party-signed certificates:

- For the SAS server tier on Linux:

Certificates can be in one of two locations:

- All certificates must be in one file in PEM format that is referenced by the SSLCALISTLOC option.

- All certificates must be in an OpenSSL CA certificates directory pointed to by the `SSL_CERT_DIR` or `SSLCACERTDIR` environment variable.

`SSL_CERT_DIR` is the OpenSSL environment variable and `SSLCACERTDIR` is the SAS environment variable. The layout of this directory is specified by OpenSSL, where the certificates are in PEM format and referenced by their hash values.

For more information, see “[More about SSLCALISTLOC System Option](#)” on [page 117](#).

- For the SAS server tier on Windows:

The self-signed certificate must be in the Windows System truststore (not the private JRE truststore discussed in earlier topics). Many certificates are already pre-populated on Windows machines.

- Perform these post-deployment steps:
  - [Set SSLCALISTLOC for autoloading on page 118](#).
  - [Set paths for SAS Information Retrieval Studio on page 119](#).
  - [Disable HTTP for the SAS Environment Manager server on page 120](#).
  - [Change security callback URLs for the SAS Environment Manager server on page 121](#).

## More about SSLCALISTLOC System Option

On Linux systems in the SAS Application Server `sasv9.cfg` file, SAS sets the `SSLCALISTLOC` system option by default to `SAS-configuration-directory/certs/cacert.pem`.

If certificates are not used, SAS ignores `SSLCALISTLOC`.

If certificates are used, one of the following occurs:

- If `cacert.pem` does not exist, and the `SSL_CERT_DIR` and `SSLCACERTDIR` environment variables are not set, SAS outputs an error.

- If `cacert.pem` does not exist, but the certificates are in the directory defined by `SSL_CERT_DIR` or `SSLCACERTDIR`, then SAS ignores `SSLCALISTLOC`.
- If `cacert.pem` exists and the `SSL_CERT_DIR` and `SSLCACERTDIR` environment variables are set, SAS checks `cacert.pem` first before it searches the directory.

## Post-Deployment Step for Autoload

For SAS Visual Analytics deployments on Linux, when you are securing web communication with certificates, you must also set the `SSLCALISTLOC` system option for the autoload feature to run.

Although `SSLCALISTLOC` is set in the main SAS Workspace Server usermods configuration file, you should also set `SSLCALISTLOC` in autoload's usermods file. If the `LOGCONFIGLOC` system option is set in the main SAS Workspace Server usermods config, `LOGCONFIGLOC` causes autoload *not* to generate output. Hence, setting `SSLCALISTLOC` in autoload's usermods file is a best practice.

To set the `SSLCALISTLOC` system option, follow these steps:

- 1 Sign on to the SAS Visual Analytics server and middle tier machine as the SAS installer user.
- 2 Using a text editor, open  
`SAS-configuration-directory/Applications/SASVisualAnalytics/VisualAnalyticsAdministrator/Autoload_usermods.cfg`
- 3 Add the `SSLCALISTLOC` system option, which includes the absolute path to your certificate file.

Your `SSLCALISTLOC` declaration should resemble the following:

```
-ssllcalistloc sas-configuration-directory/certs/cacerts.pem
```

- 4 Save your changes and close `Autoload_usermods.cfg`.
- 5 Repeat steps 3 and 4 for the `Autoload_usermods.cfg` used for SAS Environment Manager Data Mart LASR, located at `SAS-configuration-directory`

```
/Applications/SASVisualAnalytics/VisualAnalyticsAdministrator/EVDMLA
usermods.cfg.
```

- 6 Repeat steps 3 and 4 for the Autoload\_usermods.cfg used for any other autoload implementations your site uses.

Proceed to the topic [“Post-Deployment Step for SAS Information Retrieval Studio”](#)

## Post-Deployment Step for SAS Information Retrieval Studio

After running the SAS Deployment Wizard to install and configure SAS Visual Analytics, you must add the path to SAS Foundation for SAS Information Retrieval Studio. On Linux, in addition to the path to SAS Foundation, you must add the path to the SAS Authentication Server certificates file.

To add the SAS Foundation path to SAS Information Retrieval Studio, follow these steps:

- 1 Sign on to the SAS Visual Analytics server and middle tier machine as the SAS installer user.

- 2 Using a text editor, open

```
SAS-installation-directory/
SASInformationRetrievalStudioforSAS/1.53/Static/work/
information-retrieval-studio.conf
```

- 3 Add the following paths to information-retrieval-studio.conf appropriate for your operating system:

- Linux:

```
tkpath=/sas-installation-directory/SASFoundation/9.4/sasexe:
/sas-installation-directory/SASFoundation/9.4/utilities/bin/
auth-server-certificates-path=certificate-file.pem
```

- Windows:

```
tkpath=sas-installation-directory\SASFoundation\9.4\core\sasext
```

- 4 After you make your changes to `information-retrieval-studio.conf`, restart SAS Information Retrieval Studio.

## Disable HTTP for the SAS Environment Manager Server

By default, the SAS Environment Manager server listens on both HTTP (7080) and HTTPS (7443) ports. When implementing site-signed and third-party-signed certificates, you should disable HTTP.

**Note:** Once you have disabled the HTTP connector, the SAS Environment Manager agents will not be able to monitor and collect metrics for the Apache Tomcat instance hosting the SAS Environment Manager server.

To disable HTTP on the SAS Environment Manager server, follow these steps:

- 1 Using a text editor, open `server.xml`, located at `Web/SASEnvironmentManager/server-5.0.0-EE/hq-engine/hq-server/conf`

- 2 Locate the HTTP connector and surround it with comment tags:

```
<!--
<Connector port="${server.webapp.port}" executor="tomcatThreadPool"
maxHttpHeaderSize="8192"          emptySessionPath="true" protocol="HTTP/1.1"
    enableLookups="false" redirectPort="${server.webapp.secure.port}"
    acceptCount="100"
    connectionTimeout="20000" disableUploadTimeout="true" compression="on"
    compressableMimeType="text/html,text/xml,text/plain,text/css,text/
    javascript" URIEncoding="UTF-8"/>
-->
```

- 3 Save and close `server.xml`.
- 4 Proceed to the topic [“Change Security Callback URLs”](#)



## Change Security Callback URLs

To change the security callback URLs for the SAS Environment Manager server, follow these steps:

- 1 Using a text editor, open `security-web-context.xml`, located at

```
SAS-configuration-directory/Web/SASEnvironmentManager/  
server-5.0.0-EE/hq-engine/hq-server/webapps/ROOT/WEB-INF/  
spring
```

- 2 Change all four occurrences of

```
http://hostname:7080
```

to

```
https://hostname:7443
```

**Note:** One of the occurrences is encoded. After you make the change, it should resemble the following:

```
https://myserver.example.com:443/SASLogon/logout?sas_svcs_logon_LogonUrl=  
https%3A%2F%2Fmyserver.example.com%3A7443%2F
```

**CAUTION!** Be careful *not* to change the SASLogon URLs.

- 3 Save and close `security-web-context.xml`.

## Configure Clients to Trust SAS Web Server with Site-Signed and Self-Signed Certificates

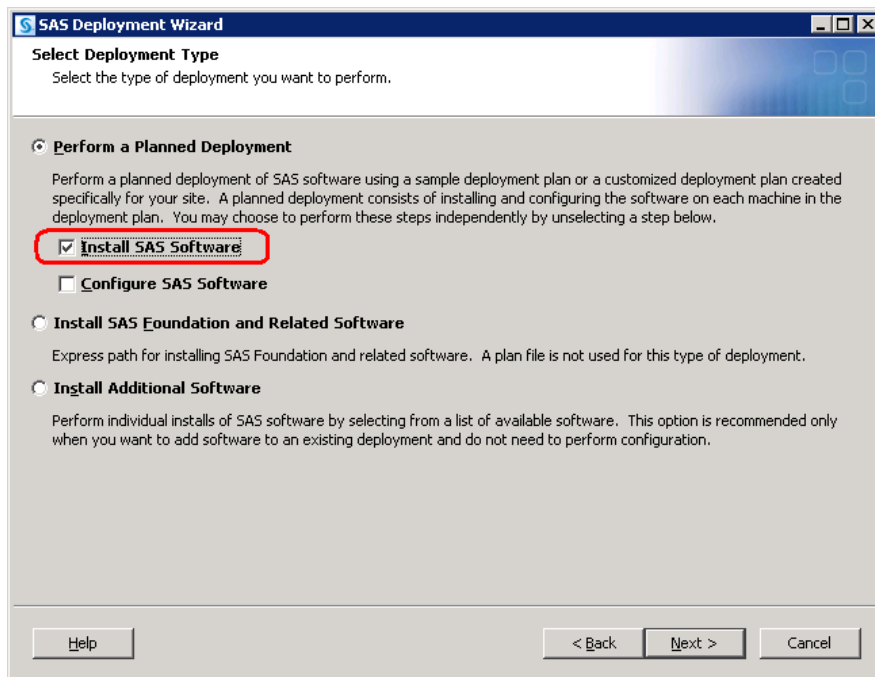
Web applications running in the SAS Web Application Server act as clients of other web applications, directing requests to applications residing in other instances of SAS Web Application Server. These requests are directed through the SAS Web Server. Thus, each SAS Web Application Server instance must trust the SAS Web Server. This trust is achieved by adding site-signed and self-signed certificates to the SAS private JRE truststore.

**Note:** If you are using a site-signed or self-signed certificate and do not import the certificate into the SAS private JRE default truststore (cacerts), the SAS Deployment Wizard fails to load content to the SAS Content Server. (This failure is not immediate. It occurs after the SAS Content Server starts.) This failure occurs because the wizard's load content step acts as a client sending requests through SAS Web Server. The SAS Web Server application server uses the SAS private JRE and has no trust of the site-signed or self-signed certificate.

Because SAS web applications use the SAS private JRE and its default truststore, cacerts, a special deployment process is required when you install and configure SAS Web Server using site-signed or self-signed certificates.

- 1 Know the location of your self-signed or site-signed certificate.
- 2 Run the SAS Deployment Wizard in install mode only to install SAS Web Server.

**Figure 4.13** SAS Deployment Wizard in Install Mode



- 3 Import your self-signed or site-signed certificate into the SAS private JRE default truststore (cacerts).

Importing a certificate into a keystore is accomplished with the Java `keytool -importcert` command. The location of cacerts in the SAS private JRE is as follows:

***SAS-installation-directory/SASHome/  
SASPrivateJavaRuntimeEnvironment/9.4/jre/lib/security***

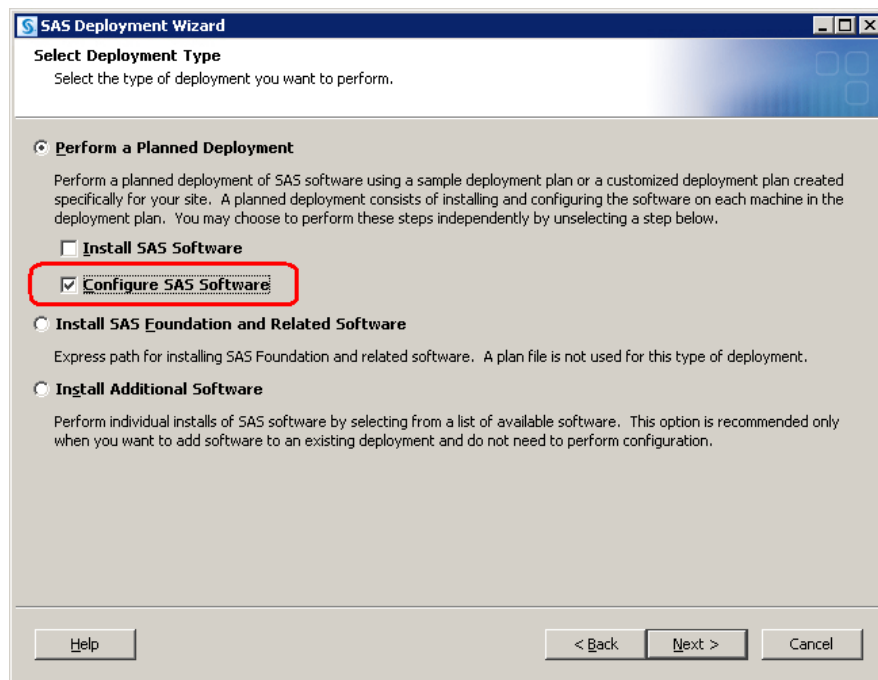
For example, on Windows, the command that you run is similar to this:

```
cd C:\Program Files\SASHome\SASPrivateJavaRuntimeEnvironment\9.4\jre\lib\security  
..\..\bin\keytool -importcert -keystore cacerts -file mycert.crt
```

**TIP** The default password for cacerts is **changeit**. It is publicly documented on the Oracle website.

For more information, see your Java documentation at <http://docs.oracle.com/javase/7/docs/technotes/tools/solaris/keytool.html>.

- 4** Run the SAS Deployment Wizard in configure mode only to configure SAS Web Server.

**Figure 4.14** SAS Deployment Wizard in Configure Mode

# 5

## Deploying the SAS Visual Analytics Server and Middle Tier

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## Deployment Process Overview: Step Seven

This chapter describes how to use the SAS Deployment Wizard to install and configure all of the SAS Visual Analytics server and middle-tier components in your deployment plan.

Installing and configuring SAS Visual Analytics is the seventh and final step in deploying SAS Visual Analytics.

1. Create a SAS Software Depot.
2. Check for documentation updates.
3. (Optional) Deploy the SAS High-Performance Analytics infrastructure.
4. Create operating system users and groups and designate ports.
5. (Optional) Set up certificates.
6. Deploy required third-party software.
- **7. Deploy the servers and middle-tier.**

Deploying the SAS Visual Analytics server tier consists of installing and configuring the following components on the server-tier machine:

- SAS LASR Analytic Server Monitor
- SAS Workspace Servers
- SAS Pooled Workspace Servers
- SAS Stored Process Servers

Deploying the SAS Visual Analytics middle tier consists of installing and configuring the following components on the middle-tier machine:

- SAS Visual Analytics Home Page
- SAS Visual Analytics Explorer
- SAS Visual Analytics Designer
- SAS Visual Data Builder
- SAS Visual Analytics Viewer
- SAS Visual Analytics Administrator
- SAS LASR Authorization Service
- SAS Visual Analytics Transport Service
- Search Interface to SAS Content
- SAS Remote Services

---

## Preparing to Deploy SAS Visual Analytics

### Which SAS LASR Analytic Server Mode?

SAS LASR Analytic Server was originally developed to operate in a distributed computing environment and perform analytic tasks on data that is loaded in memory. This is referred to as running the server in *distributed* mode.

The server can also run on a single machine or in *non-distributed* mode.

SAS allows you to license SAS LASR Analytic Server to run in distributed mode, non-distributed mode, or both modes. The server mode that you deploy and run is driven by the license that accompanies your order. For more information, see your SAS representative.

## Deploy the SAS High-Performance Analytics Environment

SAS Visual Analytics that uses SAS LASR Analytic Server running in *distributed* mode is dependent on the SAS High-Performance Analytics environment. Before you proceed, make sure that you have consulted the *SAS High-Performance Analytics Infrastructure: Installation and Configuration Guide*, available at <http://support.sas.com/documentation/solutions/hpainfrastructure/>.

## SAS Deployment Wizard Options

The *SAS Deployment Wizard* is a cross-platform utility that installs and configures many SAS products. Using a SAS Installation Data (SID) file and a deployment plan (plan.xml) for its initial input, the wizard is designed to prompt the customer for all of the remaining input at the start of the session so that the customer does not have to monitor an entire deployment.

## About Deployment Plans

A *deployment plan* describes what software should be installed and configured on each machine in a SAS deployment. A deployment plan is an XML file that is used as input to the SAS Deployment Wizard. Deployment plans for SAS Visual Analytics are created by a SAS representative specifically for a site.

- A SAS representative has created a custom deployment plan for you (an XML file or a ZIP file containing an XML file). It has been e-mailed to your site.
- Your deployment plan must be a valid SAS 9.4 deployment plan. The SAS Deployment Wizard does not accept plans from earlier SAS releases.

At the end of the SAS deployment, the SAS Deployment Wizard makes a copy of the deployment plan that it used. The deployment plan can be helpful when you want to add



another SAS product or change your SAS configuration. The wizard stores a copy of the deployment plan in the SAS configuration directory in the Utilities directory, and it appends a date and time stamp to the deployment plan filename. Here is an example:

```
/opt/SAS/config/Lev1/Utilities/plan.2014-09-23-08.36.xml
```

# SAS Visual Analytics Configuration Options

To provide values specific to installing and configuring SAS Visual Analytics, choose the wizard's **Typical** or **Custom** prompting level.

**Figure 5.1** Select Configuration Prompting Level Page

In addition, there are JVM settings that are recommended for SAS Web Application Server and SAS Remote Services. For more information, see [“SAS Remote Services Application: JVM” on page 172](#).

**Table 5.1** Configuration Options By Prompting Level

Configuration Option in the SAS Deployment Wizard	Distributed Server Only	Prompting Level That Displays the Option		
		Express	Typical	Custom
SAS Visual Analytics Services Database Credentials on page 189*		X	X	X
SAS Visual Data Builder Database Credentials on page 191*		X	X	X
SAS Internal Account: Search Interface to SAS Content User on page 192*		X	X	X
SAS Visual Analytics: Allow Guest Access on page 167*			X	X
SAS Visual Analytics Data Provider on page 183*	X		X	X
SAS Visual Analytics High-Performance Configuration Information on page 183*			X	X
SAS Visual Analytics Data Provider: Hadoop on page 185*	X		X	X
SAS Visual Analytics Public Data Library: Hadoop on page 186*	X		X	X
SAS Visual Analytics Public Data Provider on page 186*			X	X
SAS LASR Analytic Server Monitor Configuration Information on page 187*	X		X	X

Configuration Option in the SAS Deployment Wizard	Distributed Server Only	Prompting Level That Displays the Option		
		Express	Typical	Custom
SAS Visual Analytics Public Data Library Information on page 187*			X	X
SAS Visual Analytics AutoLoad Location on page 187*			X	X
SAS Visual Analytics: SAS LASR Analytic Server Library on page 187*			X	X
SAS Visual Analytics Administrator: Public LASR Libraries on page 188*			X	X
SAS Visual Analytics Transport Service: Whitelist Mobile Devices on page 189*			X	X
SAS Visual Analytics: Protocol for OpenStreetMap Server on page 190*			X	X
SAS Visual Analytics: Configure ArcGIS Server on page 190*			X	X
SAS Information Retrieval Studio on page 192*			X	X
Search Interface to SAS Content Feeder Configuration on page 192*			X	X
SAS Visual Analytics High-Performance Configuration Properties on page 183*				X
SAS Visual Analytics Data Provider: Hadoop Ports on page 186*	X			X
SAS Visual Analytics: ArcGIS Server Details on page 190*				X

Configuration Option in the SAS Deployment Wizard	Distributed Server Only	Prompting Level That Displays the Option		
		Express	Typical	Custom
SAS Visual Analytics Services Hyperlink Service: Context Root on page 191*				X
SAS Visual Analytics Designer: Context Root on page 188*				X
SAS Visual Analytics Hub: Context Root on page 188*				X
SAS Visual Analytics Report Viewer: Context Root on page 188*				X
SAS Visual Analytics Admin: Context Root on page 189*				X
SAS Visual Analytics Graph Builder: Context Root on page 193*				X
SAS Visual Analytics Explorer: Context Root on page 182*				X
SAS Visual Data Builder: Context Root on page 191*				X
SAS Information Retrieval Studio Port Numbers on page 192*				X

\* An asterisk (\*) next to a configuration option indicates that more information is available in this document. See the SAS Deployment Wizard online Help for information about all options.

## SAS Deployment Agents

The SAS Deployment Agent and its remote clients are required for deployments that run remote processes. SAS uses the agent to copy content and to perform configuration management operations associated with creating new servers and clustering. It is also used for server administration tasks such as deployment backups.

For more information, see [“How SAS Deployment Agent Uses Certificates”](#) on page 97.

## **SAS Metadata Server Clustering**

A metadata server cluster is a group of three or more host machines (nodes) that have been configured as identical metadata servers. Each node runs its own server process and has its own server configuration information, journal file, and copy of the repository data sets. In addition, each node maintains a complete in-memory copy of the metadata repository. The nodes work together as if they were a single metadata server.

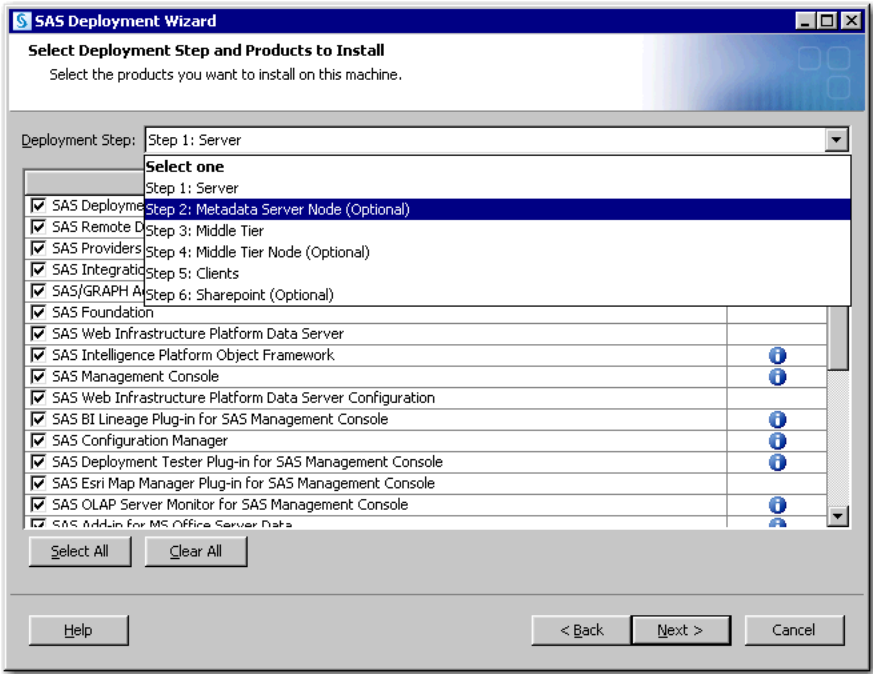
Clustering provides redundancy and high availability of the metadata server.

Client applications and users interact with the cluster in the same way that they would interact with a metadata server that is not clustered. A load balancing process automatically distributes work among the nodes. If a node ceases to operate, the server continues to be available using the remaining nodes.

All of the nodes in the cluster must have the same operating system.

You deploy your metadata cluster by installing an initial metadata server, and then moving to another machine and running the deployment wizard to deploy a metadata server node. You indicate which type of metadata server you want to deploy by choosing the appropriate step on the deployment wizard **Select Deployment Step** and **Products to Install** page.

Display 5.1 Select Deployment Step and Products to Install Page



For more information, see Chapter 17, “Using Metadata Server Clustering,” in *SAS Intelligence Platform: System Administration Guide*.

## Server and Middle Tier Topology Constraint Removed in Release 7.1

Starting with SAS Visual Analytics 7.1, if the server tier and middle tier are deployed on separate machines, these machines *no longer* must use operating systems in the same operating system family. (For example, Red Hat Enterprise Linux 6.1, x86, 64-bit, and SUSE Linux Enterprise 11 Service Pack 1, x86, 64-bit are both in the same operating system family.) The SAS Visual Analytics 7.1 server tier and middle tier—like the SAS Metadata Server and the SAS Web Infrastructure Platform—can be deployed on machines that use a different operating system family.

For example, the SAS Visual Analytics server tier can reside on a Windows machine and the SAS Visual Analytics middle tier can reside on a Linux x86 machine.

## SAS Web Application Servers

SAS supports multiple SAS Web Application Servers on the middle-tier machine.

## SAS Web Application Server Clustering

Server clustering provides availability and enhances performance. In SAS 9.4, the deployment model has been enhanced to better support clustering of SAS Web Application Servers. You can easily configure vertical cluster members (additional server instances on the same machine) and horizontal cluster members (servers on additional machines). Combining vertical and horizontal clustering is also supported and can be configured easily.

For more information, see [SAS 9.4 Intelligence Platform: Middle-Tier Administration Guide, Second Edition](#).

## Installation Rules for Multiple-Machine Deployments

Be aware that if you are deploying SAS on a multiple-machine distributed system, you must install software on your computers in a particular order.

- 1** Always install SAS software on the metadata server machine first.
- 2** If you are implementing metadata server clusters, install the metadata server nodes next.
- 3** Install the SAS application servers (such as the SAS Workspace Server or SAS Stored Process Server) on machines other than the metadata server machine.
- 4** If your deployment plan separates SAS Web Server from SAS Web Application Server, install SAS Web Server first.
- 5** Install the middle tier.

- 6** For SAS deployments where the metadata server and middle tier reside on the same machine, remember that the SAS server tier (the compute tier) must be configured *after* the metadata server and *before* the middle tier.
- 7** If you are implementing SAS Web Application Server clusters, install the application server nodes next.
- 8** Install software on machines that will host only clients *last*.

## **SAS Metadata Server Recommendation**

You should deploy the metadata server on a dedicated server machine. A machine running only the metadata server greatly simplifies tuning, management, and diagnostics.

For more recommendations, see the section about the SAS Metadata Server in the system requirements for your SAS product.

## **Metadata Repository Considerations**

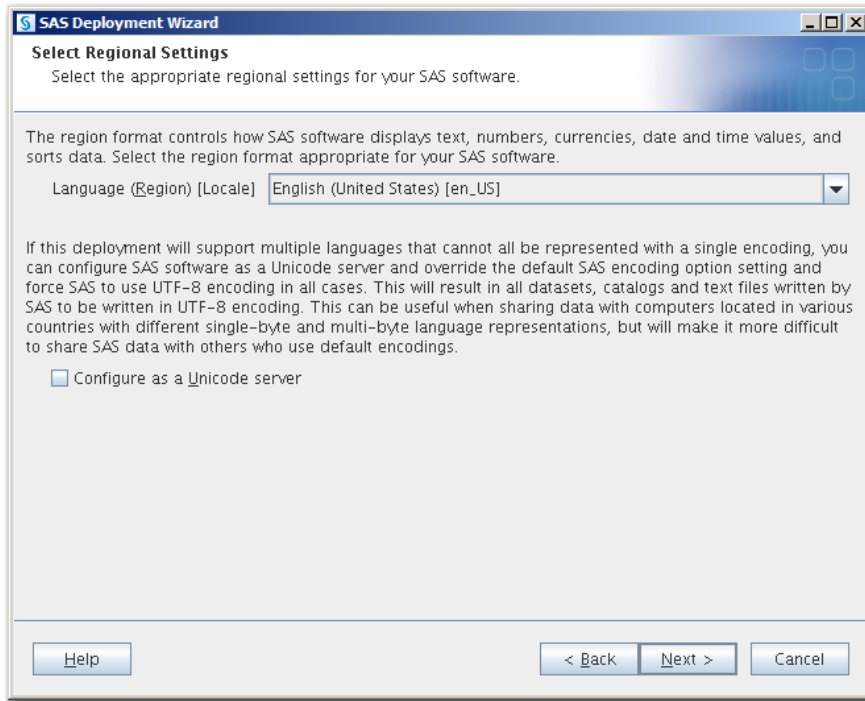
Your metadata repositories should reside either on a local file system or on a high-performance, high-availability network file system. For more information about metadata repositories, see “About SAS Metadata Repositories” in Chapter 18 of *SAS Intelligence Platform: System Administration Guide*.

## **Locale and Encoding Considerations**

### **Locale and Encoding Preparation**

Before you invoke the SAS Deployment Wizard, your operating system must match the locale and encoding that you plan to select on the Select Regional Settings page of the Deployment Wizard.



**Display 5.2** *Select Regional Settings Page*

On Windows, the Windows System Locale must match your choice on the Select Regional Settings page. For more information, refer to your Windows documentation.

On UNIX and Linux, the LANG environment variable setting must match the locale and encoding you plan to choose for SASFoundation and SAS Metadata.

Additionally, if you plan to select **Configure as a Unicode Server**, you must use UTF8 as your operating system encoding.

For example, on Linux, if you plan to choose the locale **Japanese (Japan)** and the default encoding, you would enter the following command:

```
$ LANG=ja_JP.eucjp; export LANG
```

On UNIX and Linux, there are differences in the spelling and case of language-encoding pairs. For this reason, we suggest that you run the `locale` command to check the current locale and to verify the spelling of locale values. A misspelling causes the LANG environment variable to be improperly set, and interferes with propagation to other

locale-related environment variables. For example, consider the case and spelling differences across Linux and UNIX for US English, UTF8:

- On Linux and Solaris:

`en_US.UTF-8`

- On AIX:

`EN_US.UTF-8`

- On HP-UX:

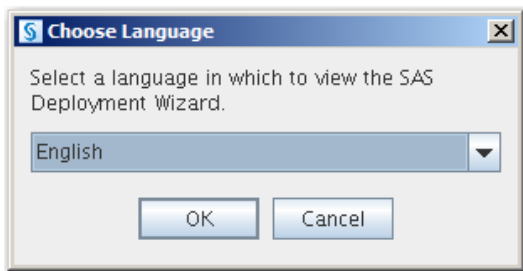
`en_US.utf8`

## Locale and Encoding Settings in the SAS Deployment Wizard

The SAS Deployment Wizard enables you to select the default locale and languages for the SAS Deployment Wizard and for SAS 9.4. (A separate tool, the SAS Deployment Manager, enables you to configure the locale of SAS Java clients. For more information, see Appendix 4, “Change Locale for SAS,” in *SAS Intelligence Platform: Installation and Configuration Guide*.)

One of the first dialog boxes in the deployment wizard is the Choose Language dialog box.

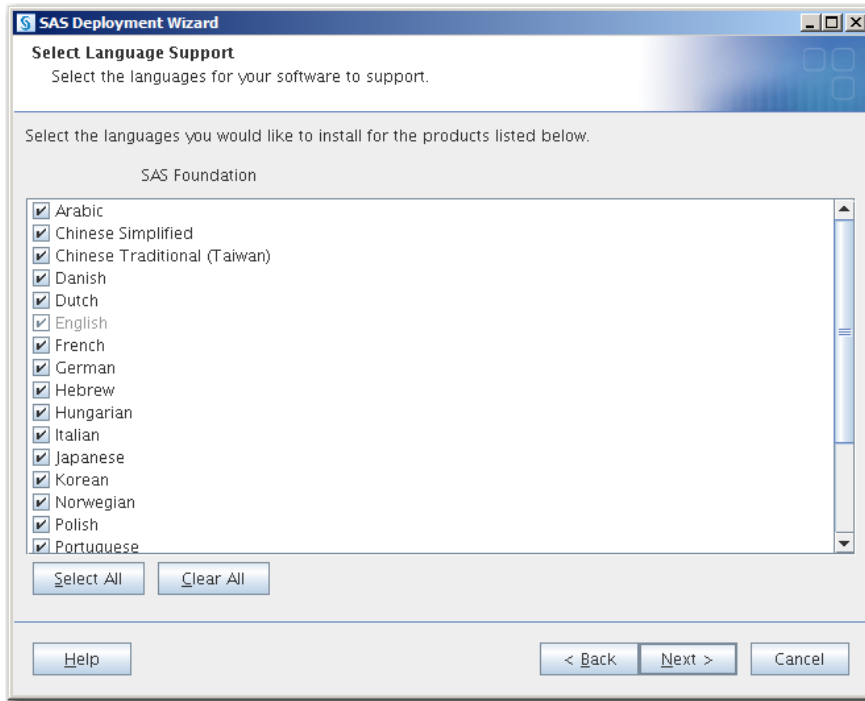
**Display 5.3** Choose Language Dialog Box



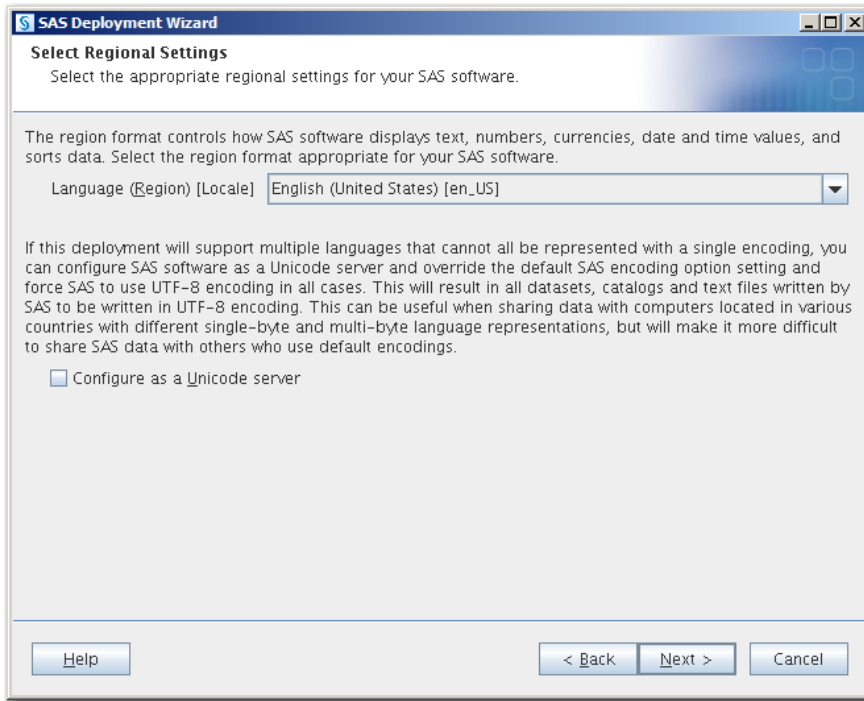
The language that you select in the Choose Language dialog box indicates the language that the deployment wizard uses to display text.

Further into the deployment wizard, you have an opportunity to set the language that your SAS 9.4 products support.

### Display 5.4 Select Language Support Page



And finally, the deployment wizard prompts you for your locale settings.

**Display 5.5** *Select Regional Settings Page*

The locale (or regional) setting controls how SAS 9.4 displays the following:

- text
- numbers
- currencies
- dates
- times
- data (sorting)

The locale (or regional) setting also specifies the language that the SAS Metadata Server uses to store objects in its repository.

On Windows and Linux machines, you can choose to configure SAS 9.4 as a Unicode server. Unicode can be particularly useful when your SAS deployment supports multiple languages. Choosing to make SAS a Unicode server means that SAS reads and writes

all of its data sets, catalogs, and text files in UTF-8 encoding. UTF-8 encoding supports characters from all of the world's languages, including characters found in both single- and double-byte character sets. However, UTF-8 can make data sharing with SAS sites that use default encodings problematic.

**CAUTION! The SAS automated deployment tools do not support changing locale after SAS is initially deployed. For example, you cannot initially deploy SAS as English (US), and then reconfigure SAS with the SAS Deployment Manager and change the locale to French.**

For single-byte character set languages, the chosen locale is set in the configuration file that matches the default language and also in the English configuration file. For example, if you choose fr\_FR, this value is added to both the French and English configuration files.

For double-byte character set languages, the chosen locale is set in the configuration file that matches the default language and English (US) is set as the default locale for English (SBCS), with some exceptions.

When a locale is set, a default encoding is used for that locale and the operating system.

For more information about how SAS supports locales and encodings, see the *SAS National Language Support (NLS): Reference Guide*.

## A Note about Host Names

The SAS Deployment Wizard follows the Internet Host Table Specification and does not allow the underscore character (\_) in host names. For more information about what constitutes a valid host name, see RFC 952 at <http://www.rfc-base.org/txt/rfc-952.txt>.

## How the SAS Deployment Wizard Names SAS Web Application Servers

The SAS Deployment Wizard creates multiple SAS Web Application Servers as needed based on the products in your SAS order. By default, each SAS Web Application Server is assigned to a specific server for deployment. This distribution helps balance the load

on each server and defines a recommended number of servers based on the products in each configuration.

Most of the time, the SAS Deployment Wizard numbers these servers sequentially (for example, SASserver1, SASserver2, and SASserver3). However, depending on your particular SAS product order, the default SAS Web Application Server names might not be named sequentially.

If you use the default names (for example, SASserver*n*) in your configuration, then you should maintain the default numbering scheme.

## Reviewing Third-Party Database Requirements

The SAS 9.4 middle-tier software and certain SAS solutions software use the SAS Web Infrastructure Platform Data Server to store transactions. The data server relies on PostgreSQL 9.1.9 and is configured specifically to support SAS 9.4 software.

**Note:** The database used by SAS Environment Manager, the SAS Deployment Backup and Recovery tool, and certain SAS solutions, such as SAS Visual Analytics, will be PostgreSQL regardless of the database you choose for the SAS Web Infrastructure Platform.

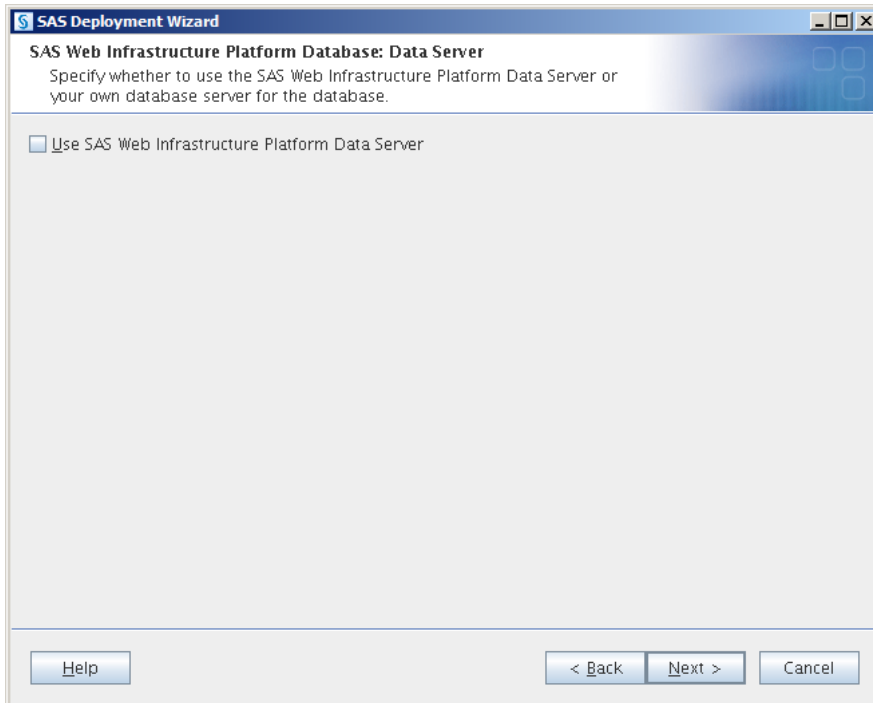
SAS enables you to use a database management system other than the SAS Web Infrastructure Platform Data Server for storing transactional data for the SAS middle tier and certain SAS solution software. (The SAS Deployment Wizard gives you this option when you choose the Custom prompting level.) In SAS 9.4, the following third-party databases are supported:

- DB2
- MySQL
- Oracle
- PostgreSQL
- SQLServer

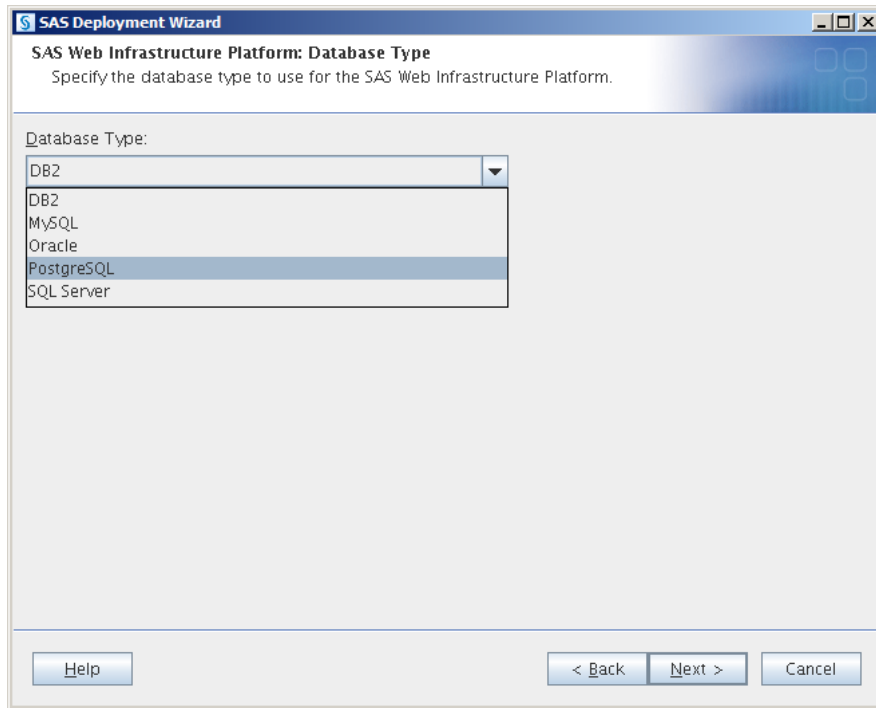
Third-party databases often have particular requirements that you need to know about, such as database name limits, minimum tablespace sizes, and so on. If you have not already done so, make sure that you review Appendix 5, “Configuring an Alternate Database for SAS Web Infrastructure Platform Services,” in *SAS Intelligence Platform: Installation and Configuration Guide*.

If you want to use a third-party database, you must deselect **Use SAS Web Infrastructure Platform Data Server** on the SAS Web Infrastructure Platform Database: Data Server page during SAS installation and configuration.

**Figure 5.2** SAS Web Infrastructure Platform Database: Data Server



On the SAS Web Infrastructure Platform: Database Type page, you choose the database management system type for the database that you plan to use.

**Figure 5.3** SAS Web Infrastructure Platform: Database Type

Later, the SAS Deployment Wizard prompts you for additional information about your database, including a database user ID and password. The user ID that you specify must have the ability insert, update, and delete database records.

For more information, see [“SAS Web Infrastructure Platform Database: JDBC Properties” on page 179](#).

---

## Deploying SAS Visual Analytics Interactively

Installing and configuring SAS Visual Analytics interactively with the SAS Deployment Wizard consists of two main phases:

- Providing installation information such as the following:
  - deployment type (planned or unplanned)



- deployment plan location (if planned)
- machine type (single machine, server machine, and so on)
- SAS components to be installed on the machine
- valid paths to any required, pre-installed, third-party software
- Providing configuration information such as the following:
  - prompting level (express, typical, or custom)
  - SAS components to be configured on the machine
  - configuration directory name
  - single sign-on preference (Windows only)
  - required user account credentials
  - server port numbers

This topic describes the installation pages and some of the more important configuration pages that you encounter during the configuration phase of a SAS Visual Analytics deployment. The type and number of configuration pages that you see depend on the prompting level and the contents of your SAS Visual Analytics custom order.

[“Configuration Options by Prompt Level” on page 240](#) lists which configuration options are available for each prompting level. For information about all SAS Deployment Wizard prompts, see the online Help.

To install and configure SAS Visual Analytics interactively, complete these steps:

- 1 Make sure that you have reviewed all of the documents listed in [“Step 2: Check for Documentation Updates” on page 14](#).
- 2 Verify that you have performed the previous required steps outlined in [“Preparing to Deploy SAS Visual Analytics” on page 127](#).

**Note:** A few pages into the SAS installation, the SAS Deployment Wizard prompts you for paths to the required third-party software. The required third-party software must be installed on the current machine or the SAS Deployment Wizard will *not* let you continue with the installation. In this situation, you need to end the SAS

Deployment Wizard session and install the required third-party software before you can continue.

- 3 If you are adding on SAS Visual Analytics or SAS Visual Analytics Administration and Reporting to an existing SAS 9.4 deployment, make sure that you first review [“Adding on SAS Visual Analytics Administration and Reporting” on page 254](#).
- 4 If you are deploying SAS LASR Analytic Server in non-distributed mode, you see fewer configuration prompts. You do not see any prompts about data providers and SAS High-Performance Computing Management Console. For a list of the prompts that you see, see [Table 5.1 on page 130](#).
- 5 If you use any garbage collection scripts, temporarily suspend these scripts during SAS Deployment Wizard. If any wizard temporary files are deleted during wizard execution, configuration failures can occur.
- 6 Review information about where to source certain SAS content repositories described in [“Metadata Repository Considerations” on page 136](#).
- 7 Review information about SAS Deployment Wizard configuration prompting levels described in [“Configuration Options by Prompt Level” on page 239](#).
- 8 Log on to the machine on which you plan to install the SAS Visual Analytics server tier and middle tier (blade 0). Do not use `root`.
- 9 Start the SAS Deployment Wizard from the highest-level directory in your SAS Software Depot using this command: `setup.sh -record -deploy`

**Note:** Using the `-record -deploy` options causes the wizard to create a response file that records the inputs that you supplied. This can be helpful when you want to repeat the deployment on other machines or when troubleshooting a deployment issue.

By default, the wizard writes the response file in the following location: `~/sdwresponse.properties`

You should see a welcome page similar to the following:



## 10 Choose Language

Select the language for the SAS Deployment Wizard, and click **OK**.

- From the drop-down list, select the language that you want the SAS Deployment Wizard to use when it displays text.

For more information, see [“Locale and Encoding Considerations” on page 136](#).

## 11 If you have more than one SAS software order in your depot, the wizard prompts you to select the order in which you want to deploy. When you are finished, click **Next**.

## 12 Select Deployment Task

Choose the deployment task that you want to perform, and click **Next**.

- Select **Install SAS Software**.

## 13 Specify SAS Home

Specify the location where you want to install SAS, and click **Next**.

- If you want to specify a different location where SAS is installed other than the default, enter this path in **SAS Home**.

Although your SAS installation directory (which the wizard refers to as SAS Home) and SAS configuration directories can share the same parent directory, one directory *cannot* reside inside another. Also, the SAS installation directory should *not* be a directory within your SAS Software Depot.

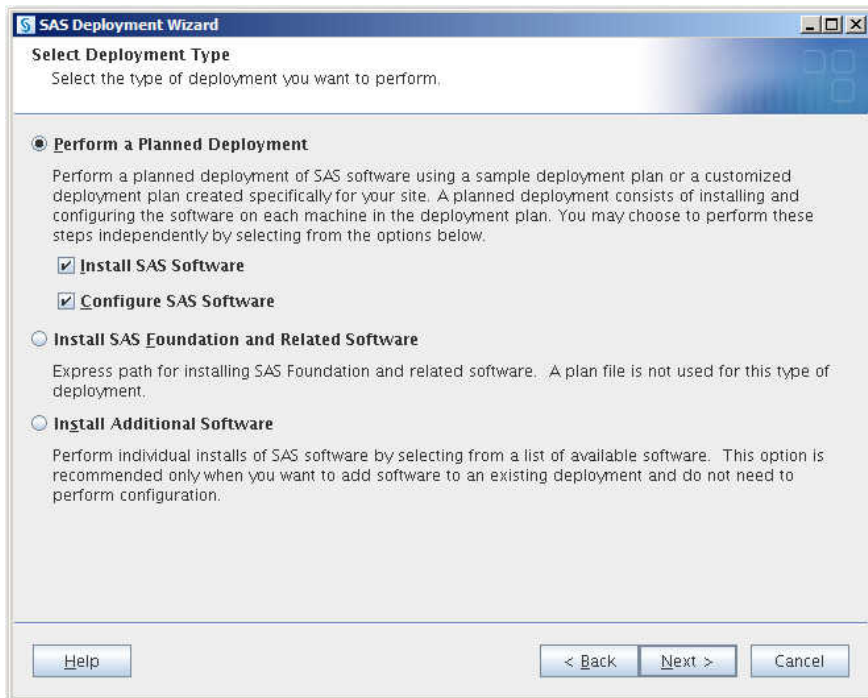
**CAUTION!** There should be one SAS installation directory (SAS Home) per SAS deployment. Therefore, when deploying multiple tiers on the same host, the SAS installation directory location should always be shared. By contrast, when deploying different versions of SAS on the same machine, there should be a unique SAS installation directory for each SAS version.

**Note:** On Windows, the deployment wizard prompts you for the SAS installation directory (which it refers to as SAS Home) the first time you run the wizard. On any subsequent sessions on this machine, the wizard uses the previously specified location for the SAS installation directory.

## 14 Select Deployment Type

Specify the type of deployment that you want to perform, and click **Next**.

- Confirm that **Perform a Planned Deployment, Install SAS Software**, are **Configure SAS Software** are all selected.



## 15 Specify Deployment Plan

Specify the type of deployment plan that you are using, and click **Next**.

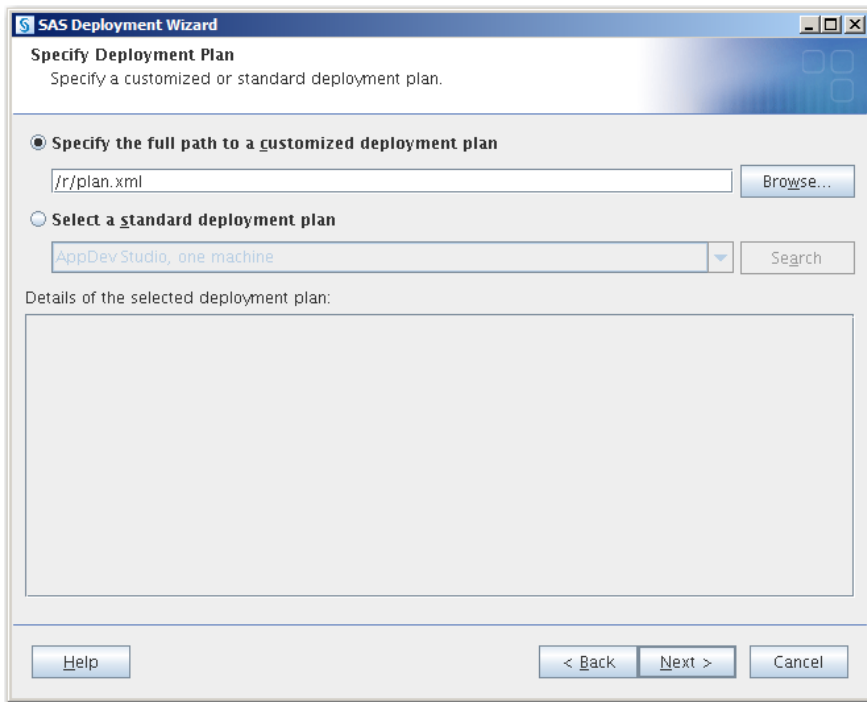
- customized deployment plan

Select **Specify the full path to a customized deployment plan**, and then click **Browse** to navigate to the plan file (`plan.xml`).

- standard deployment plan

Select **Select a standard deployment plan**, and then choose the appropriate plan in the drop-down list.

For more information, see [“About Deployment Plans” on page 128](#).



## 16 Select Deployment Step and Products to Install

Select the machine on which you are installing software, and select the SAS products that you want to install. When you are finished, click **Next**.

- Select the machine on which you are installing software from the **Deployment Step** drop-down list.

**Note:** If you are deploying SAS on multiple machines, make sure that you are following the process described in “Installation Order Rules for Multiple Machine Deployments” in Chapter 6 of *SAS Intelligence Platform: Installation and Configuration Guide* .

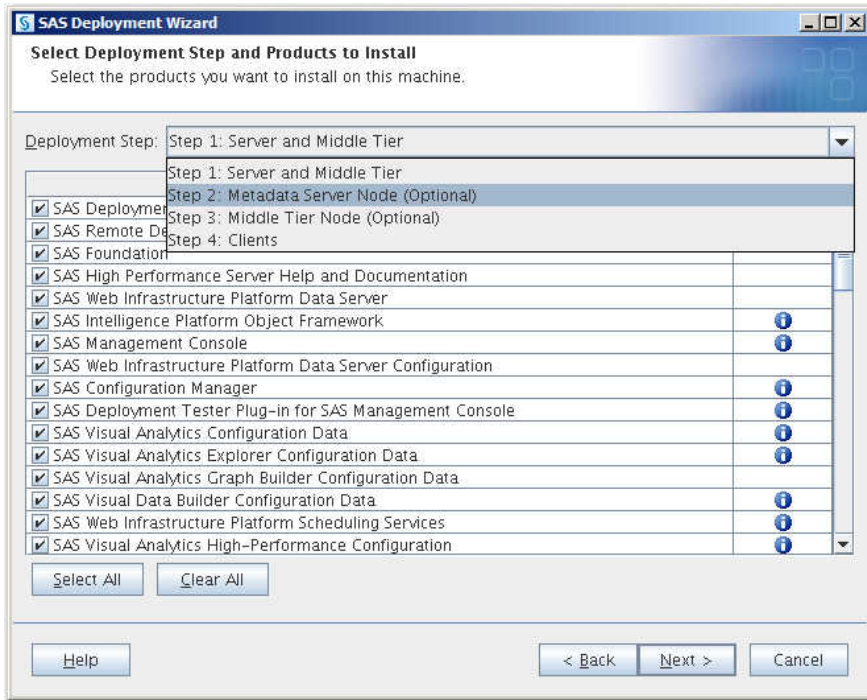
**Note:** When a machine has multiple deployment steps, the deployment wizard attempts to default to the correct step. However, in some cases this can be difficult for the wizard to determine. Therefore, always be careful to choose the correct step and avoid merely choosing the default step.

For information about SAS Web Parts for Microsoft SharePoint, see Appendix 2, “Deploying SAS Web Parts for Microsoft SharePoint,” in *SAS Intelligence Platform: Installation and Configuration Guide*.

**Note:** Starting with SAS Visual Analytics 7.1, if the server tier and middle tier are deployed on separate machines, these machines are *no longer* required to use operating systems in the same operating system family (for example, Red Hat Enterprise Linux 6.1, x86, 64-bit, and SUSE Linux Enterprise System 11 SP1, x86, 64-bit are both in the same family). The SAS Visual Analytics 7.1. server and middle tiers—like the SAS Metadata Server and the SAS Web Infrastructure Platform—can be located on machines that use a different operating system family. For example, the SAS Visual Analytics server tier could reside on a Windows machine, and the SAS Visual Analytics middle tier could reside on a Linux x86 machine.

- By default, all products that are displayed will be installed. Deselect any products that you do *not* want to install.

**Note:** If you are deploying a middle-tier node machine, make sure that **SAS Web Application Server Node Configuration** is selected.



## 17 Specify SAS Installation Data File

Specify the path to your SAS installation data file and, click **Next**.

- Click **Browse** and locate your SAS installation data file.

The SAS installation data file that contains information about the software that you have licensed for the current machine.

**CAUTION!** Be careful to use the correct installation data file that contains the SAS products that you are planning to install. Using an incorrect file can cause installation failure for SAS add-on products or other errors later when attempting to run SAS. For multi-machine deployments during the clients step, choose the SID file for the server machine that is associated with the clients being installed.

## 18 Select Language Support

Select the languages for your SAS software to support, and click **Next**.

- Click **Clear All**. (English remains selected as the default language.)

- Add any additional languages that you want SAS to support.

By default, SAS attempts to support all languages that your machine's operating system is configured for.

## 19 Select Regional Settings

Select the language, region, and locale setting that affect how SAS displays text, numbers, currencies, dates, and times and how SAS sorts data. Then, click **Next**.

- Accept the default value of English (United States), or select a different language, region, locale, in **Language (Region) [Locale]**.
- Select **Configure as a Unicode server** if you want to configure SAS as a Unicode server.

For more information, see “[Locale and Encoding Considerations](#)” on page 136.

## 20 Select Authentication Type

- Select **Use PAM Authentication** if your system uses Pluggable Authentication Modules (PAM).

In addition, you might need to update your PAM configuration files for SAS 9.4 to use PAM authentication. For more information, see the *Configuration Guide for SAS Foundation for UNIX Environments*, available at <http://support.sas.com/documentation/installcenter/en/ikfdtnunxcg/66380/PDF/default/config.pdf>.

If you are uncertain that this system uses PAM for authentication, contact your system administrator.

**Note:** Do not select the PAM option if you know that your system uses `/etc/passwd` or `/etc/shadow` authentication.

## 21 Specify Remote Communication Configuration

Specify the configuration for communication with the SAS Deployment Agent, and click **Next**.

- If you want to change the default port (5660) for communication with the SAS Deployment Agent, enter the new port in **Port**.



For more information, see “SAS Deployment Agents” in Chapter 6 of *SAS Intelligence Platform: Installation and Configuration Guide*.

- In **Specify how to secure the remote connection**, make one of the following selections:
    - Select **Generate credentials to secure the connection** if you want the deployment wizard to create a self-signed certificate, generate a keystore, and import the certificate into the keystore.
    - Select **Specify existing credentials to secure the connection** if you already have implemented CA-signed, site-signed, or self-signed certificates. On the next page, the wizard prompts you for the keystore location and password.
    - Select **Do not secure the connection** if you do not want to secure SAS Deployment Agent communication or have not yet implemented certificates.
- You can set up certificates later on your own or by using the SAS Deployment Manager. Do not start the SAS Deployment Agent until you have completed the manual security configuration.

For more information, see [“How SAS Deployment Agent Uses Certificates” on page 97](#).

## 22 Specify SAS Deployment Agent Keystore Credentials

Specify the location and credentials for the keystore used to verify credentials for outgoing communications from your SAS Deployment Agent machine, and click **Next**.

- In **Agent Keystore Location**, enter your SAS Deployment Agent keystore file location (path and filename).
- In **Agent Keystore Password**, enter the password that you used when you created the keystore using the Java `keytool` command.
- In **Confirm Agent Keystore Password**, re-enter the password.

For more information, see [“Pre-install Checklist for Certificates for SAS Deployment Agent” on page 100](#).

## 23 Specify SAS Deployment Agent Truststore Credentials

Specify the location and credentials for the truststore used to verify credentials for incoming communications to your machine, and click **Next**.

- In **Agent Truststore Location**, enter your agent truststore file location (path and filename).
- In **Agent Truststore Password**, enter the password that you used when you created the truststore using the Java `keytool` command.
- In **Confirm Agent Keystore Password**, re-enter the password.

For more information, see [“Pre-install Checklist for Certificates for SAS Deployment Agent” on page 100](#).

## 24 Specify SAS Remote Deployment Agent Client Keystore Credentials

Specify the location and credentials for the keystore used to verify credentials for outgoing communications from your remote SAS Deployment Agent client machine, and click **Next**.

- In **Remote Client Keystore Location**, enter your remote SAS Deployment Agent client keystore file location (path and filename).
- In **Remote Client Keystore Password**, enter the password that you used when you created the keystore using the Java `keytool` command.
- In **Confirm Remote Client Keystore Password**, re-enter the password.

For more information, see [“Pre-install Checklist for Certificates for SAS Deployment Agent” on page 100](#).

## 25 Specify SAS Remote Deployment Agent Client Truststore Credentials

Specify the location and credentials for the truststore used to verify credentials for incoming communications to your remote SAS Deployment Agent client machine, and click **Next**.

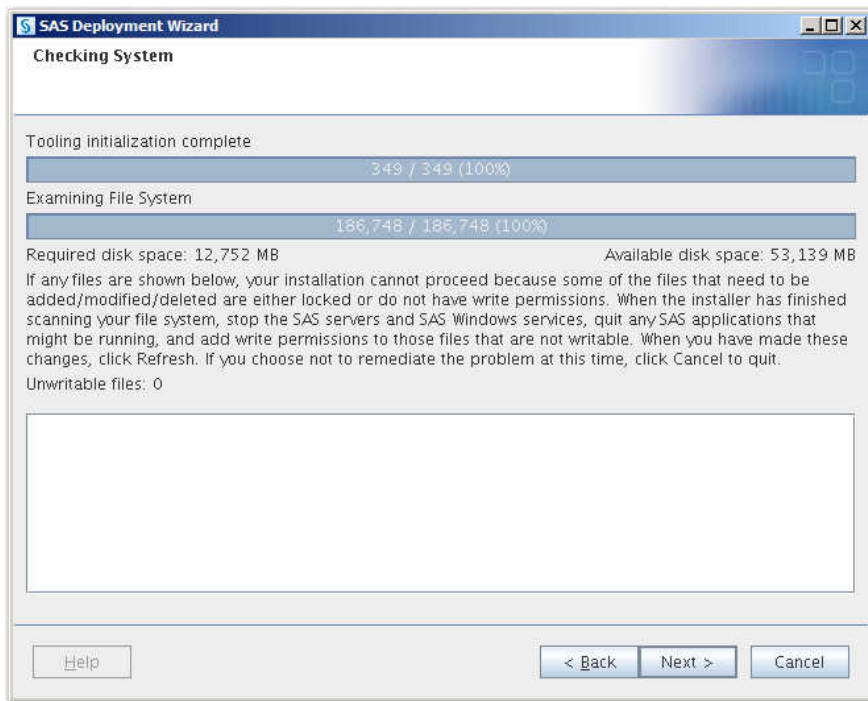
- In **Remote Client Truststore Location**, enter your remote SAS Deployment Agent client truststore file location (path and filename).

- In **Remote Client Truststore Password**, enter the password that you used when you created the truststore using the Java `keytool` command.
- In **Confirm Remote Client Truststore Password**, re-enter the password.

For more information, see [“Pre-install Checklist for Certificates for SAS Deployment Agent” on page 100](#).

**26** The deployment wizard scans your machine to determine whether any pre-existing SAS files are locked or do not have Write permission. If no action is required, click **Next**.

- If the wizard lists any files in the text box, then while the wizard is running, quit SAS and add Write permission to the files listed.



**27** If you use a third-party database, and SAS/ACCESS is a part of your order, select the software version for the third-party database.

The wizard uses your selection to configure SAS/ACCESS for the correct version of the third-party database.

Make sure that you perform any additional configuration on your system, such as installing the third-party database client and configuring the system environment for access to the native client libraries. For more information about the correct environment variables, go to SAS Install Center Documentation at <http://support.sas.com/documentation/installcenter/94>. Select an operating system and SAS version to locate the appropriate SAS Foundation configuration guide.

## 28 Review Required Software

Review the list of third-party software that is required for the SAS software that you are installing on the current machine, and click **Next**. (The list of third-party software depends on the SAS software that you are installing on the current machine.)

- In the pages that immediately follow, be prepared to provide paths to these third-party applications. The number of wizard pages varies depending on the SAS software that you are deploying on the current machine.

**Note:** You must provide valid paths to the requested third-party software or the SAS Deployment Wizard will not let you continue with the installation.

The *Third-Party Software for SAS 9.4* website is available at <http://support.sas.com/resources/thirdpartysupport/v94/index.html>.

The *System Requirements—SAS Visual Analytics (Distributed Mode)* is available at <http://support.sas.com/documentation/installcenter/en/ikvisanlytofrsr/68017/HTML/default/index.html>.

## 29 Specify Software Location

Specify the installation directory for the required software, and click **Next**.

- In the field, enter the installation directory for the required third-party software.

## 30 Select Configuration Prompting Level

Specify the amount of information to provide the SAS Deployment Wizard for configuring the SAS software that you are installing on the current machine. Select one of the three prompting levels, and click **Next**:

- **Express**

display the minimum number of wizard pages needed to complete the SAS configuration.

**Note:** When deploying the SAS middle tier, by default, the SAS Deployment Wizard automatically configures your SAS Web Application Server. To disable this feature, run the wizard using either the Typical or Custom prompting levels. Manually configuring your SAS middle tier is an advanced procedure and requires using other documents such as your Instructions.html file.

- **Typical**

display the basic set of wizard pages needed to complete the SAS configuration.

- **Custom**

display all the wizard pages needed to complete the SAS configuration.

Refer to [“Configuration Options by Prompt Level” on page 239](#) for more information about the SAS Deployment Wizard prompting levels.

### 31 Provide the remaining configuration information as the wizard prompts you for it.

**Note:** This topic describes some of the more important pages that you encounter during the configuration phase of a SAS Visual Analytics deployment. The options for which the SAS Deployment Wizard prompts you depend on which SAS products are identified in your deployment plan. In addition, in multiple-machine deployments, the options depend on which machine you are currently deploying. [“Configuration Options by Prompt Level” on page 240](#) lists which configuration options are available for each prompting level. For information about all SAS Deployment Wizard prompts, see the online Help.

#### Specify Configuration Information

Select the path where the SAS Deployment Wizard will write SAS configuration files and logs and the level that you want to deploy (for example, Lev1 = production). Then, click **Next**.

- In **Configuration Directory**, enter the path for SAS configuration files and logs.
- In **Configuration Level**, enter the level that you want to deploy (for example, Lev1 = production).

In environments, the SAS Installer generally overrides the default configuration directory with the site's preferred location (for example, `/opt/sas/config`). The installer must have Write permission on this path.

**Note:** The last digit of the default port number reflects the configuration level that you select in the SAS Deployment Wizard. For example, when you select **Lev1**, the default port for the metadata server is 8561. If you choose another level, such as **Lev2**, the wizard changes the default port to 8562.

For more information, see “Overview of the Configuration Directory Structure” in Chapter 2 of *SAS Intelligence Platform: System Administration Guide*.

**Note:** Although your SAS installation directory and SAS configuration directories can share the same parent directory, one directory should not reside inside another. Defining the configuration directory under the SAS installation directory, or vice versa, can lead to file permission issues arising from the need to manage installed files differently from site-specific configurations.

### Local Machine Name

Identify the local machine in various ways, and click **Next**.

- In **Fully-qualified Local Host Name**, enter the complete name of the local host.

The fully qualified local host name typically takes the form of the local host name plus the domain name server (for example, `MyMachine.example.com`).

**TIP** If you do not know the domain name used at your site, check with your system administrator.

- In **Short Local Host Name**, enter a short host name.

The short local host name is the abbreviated, more common method of referring to the host, usually only a single word (for example, `MyMachine`).

### Migration Information

Specify the path to the migration package, and click **Next**.

- Select **Perform Migration** if you are migrating to SAS 9.4.

**Note:** Ignore this page unless you are migrating.

Refer to the instructions in [“Overview of Migrating SAS Visual Analytics” on page 224](#).

- In **SAS Migration Utility Package Directory**, enter an absolute path to your migration package that you created with the SAS Migration Utility.

This path should be to the top level directory of the migration package (for example: `C:\SMU\93_Deployment`). (This path should match the value of the `SMU.Output.Dir` property.)

**Note:** During installations for the additional metadata server nodes, the SAS Deployment Wizard prompts for a migration. Ignore this prompt. Migration is supported only on the primary metadata server node.

**Note:** Migrating via the SAS Deployment Wizard should be performed only once per tier for a deployment. (Also, you cannot selectively choose products to migrate. You must migrate all products targeted for the current machine.) If SAS components are unconfigured for a particular tier, you cannot migrate them a second time by choosing **Perform Migration**. In this situation, you have to perform a standard, non-migrated configuration using the deployment wizard (unless you want to unconfigure the entire SAS deployment).

**CAUTION!** The **Perform Migration** check box should not be selected when running the SAS Deployment Wizard on any middle-tier node machines or client-tier machines. The **Perform Migration** check box should be selected only when there is content available in the SAS Migration Utility package for that machine.

### Authentication Domain

Specify the authentication domain SAS uses to authenticate logins to servers, and click **Next**.

- Accept the default value (DefaultAuth) unless you are planning to use a different SAS authentication domain for servers on this machine. For example, if the SAS Metadata Server is on Windows and the SAS Workspace Server is on Linux, the workspace server might be assigned to a SAS authentication domain named LinuxAuth.

For more information, see “Manage Authentication Domains” in Chapter 2 of *SAS Management Console: Guide to Users and Permissions*.

Windows Options (run as server management scripts or Windows services)

Select options available for the Windows operating system, and click **Next**.

- In **Server Operation Type**, choose how to run your SAS servers, either by using management scripts or running them as Windows services.

If you choose the script option, then the user account that runs the SAS Object Spawner must be the administrator or a member of the Windows Administrator’s group. Or, it must have the following Windows local user rights on the SAS Object Spawner machine:

- ☐ Adjust memory quotas for a process
- ☐ Replace a process level token
- Select **Create Windows Shortcuts** to create shortcuts to start and stop your SAS servers.

These shortcuts function whether the servers are running as Windows services or are already running from server management scripts.

Integrated Windows Authentication

Indicate whether you are using Integrated Windows Authentication (IWA) for SAS client/server connections, and click **Next**.

- Select **Use Integrated Windows authentication (single sign-on)** to configure SAS Workspace Servers running on Windows or Linux to use IWA.

IWA uses a single sign-on feature that allows a user’s identity, obtained from authentication to the user’s desktop, to be securely passed from the desktop to other processes such as the metadata server and the workspace server running on either Windows or Linux. The mechanism used is typically Kerberos, but on Windows, NTLM can also be used.

**Note:** If you choose to use IWA, you cannot also implement token-based authentication.



You will also encounter this page when deploying SAS Enterprise Guide and SAS Add-In for Microsoft Office. If you have not chosen IWA for the workspace server, then choosing IWA for these clients has no effect.

For more information, see “Integrated Windows Authentication” in Chapter 11 of *SAS Intelligence Platform: Security Administration Guide* and the chapter “Configuring Integrated Windows Authentication” in *Configuration Guide for SAS Foundation for UNIX Environments*, available at <http://support.sas.com/documentation/installcenter/en/ikfdtnunxgcg/66380/PDF/default/config.pdf>.

A metadata server running on Windows has IWA turned on by default. For more information, see “SSPI System Option” in *SAS Intelligence Platform: Application Server Administration Guide*.

### Token-based authentication

Indicate whether you are using token-based authentication for SAS client/server connections, and click **Next**.

- Choose **Use SAS Token authentication** to cause clients of this SAS Workspace Server to request a token from the SAS Metadata Server.

SAS client applications obtain a connection to the metadata server and request a SAS token to connect to the workspace server. For the workspace server to be launched, a launch credential will be defined for the workspace server by the SAS Spawnd Servers account.

If token authentication is not selected, SAS uses host authentication and clients provide either an IWA token or a user name and password to authenticate to the workspace server.

For more information, see “SAS Token Authentication” in Chapter 11 of *SAS Intelligence Platform: Security Administration Guide* and “Host Authentication” in Chapter 11 of *SAS Intelligence Platform: Security Administration Guide*.

**Note:** If you choose to use token-based authentication, you cannot also implement IWA.

## SAS Metadata Server

Specify connection information for the metadata server, and click **Next**.

- In **SAS Metadata Server Logical Name**, enter the logical name of the metadata server.

By default, SAS prefixes the logical server name with the application server name (SASMeta). A logical server is a container for definitions of physical servers. A logical server can have one server component for each SAS server type.

- In **SAS Metadata Server Name**, enter the logical name of the metadata server.

By default, SAS prefixes the logical server name with the application server name (SASMeta). A server name is the definition for a physical server. Servers are contained within a logical server (server component) that matches their server type (for example, a metadata server definition is contained in a logical metadata server).

- In **Host Name**, enter the name of the machine on which the metadata server runs.
- In **Port**, enter the metadata server listening port. If you choose to not accept the default value, refer to your completed Pre-Installation Checklist for the value that you should enter.

For more information, see “Overview of the SAS Metadata Server and Its Initial Configuration” in Chapter 2 of *SAS Intelligence Platform: System Administration Guide*.

## SAS Metadata Server: Override Backup Location

Use this page to indicate a different location for metadata server backups. When you are finished, click **Next**.

- When you want to change the location of the metadata server backup directory, select **Override the default SAS Metadata Server backup directory**.

When configuring a metadata server cluster, you must specify a network file system path accessible to all nodes in the cluster.

For more information, see Chapter 13, “Backing Up and Recovering the SAS Metadata Server,” in *SAS Intelligence Platform: System Administration Guide*.

### SAS Metadata Server: Override Service Login Account

Use this page to indicate a different default service login user account for the metadata server. When you are finished, click **Next**.

- When you want to change the service login user account for the metadata server, select **Specify the service login account for the SAS Metadata Server**. The local system account is the default Windows service login account for the metadata server.

When configuring a metadata server cluster, you must specify a different service login user account.

### Deployment Accounts: Type of Accounts

Select which type of user accounts to use for initial deployment SAS identities, and click **Next**.

- Select **Use SAS internal accounts when appropriate** for SAS to use accounts known only to SAS.

SAS creates and authenticates internal accounts in metadata rather than using an operating system account.

**Note:** On Windows, whenever the deployment wizard prompts you for an external account, always enter a domain-qualified user account (for example, myDomain\myAccount).

For more information, see [“Internal User Accounts” on page 75](#).

### External Account: Installer

Specify the operating system account (external account) used to initialize the SAS Metadata Server, and click **Next**.

- In **External User ID**, enter the user ID for the external account that you are using to install and configure SAS.

Depending on the operating system, this account should meet the following requirements:

Windows:

Use a domain-qualified account that is available in the long term (for future SAS maintenance) and is a member of the Administrators group.

Linux:

Use the same account on all machines on which you are deploying SAS. Do not use `root`.

- In **External Password**, enter the password for the user ID.

For more information, see [“Defining User Accounts” on page 74](#).

#### Automatic Script Execution

(UNIX only) Specify your preference for automatic script execution, and click **Next**.

- Select **Run `setuid.sh` with my ID and password** for the deployment wizard to attempt to run the script with the credentials that you provide.

You see this page on Linux for SAS products that require you run the `setuid.sh` script with `sudo` privileges. If you select this option, you will be asked on a subsequent page for the `sudo` password (if you are deploying a metadata server, you have already provided this information), and as it installs your software, the deployment wizard attempts to run the script with the credentials you provided.

If you do not select this option, you will have to run `setuid.sh` manually during installation (and configuration if you have chosen to configure) is complete. Note that `setuid.sh` must be run as `root` in order to complete successfully. If you have any concerns with the SAS Deployment Wizard running as `root` or you do not know the `sudo` information for the machine that you are installing on, you should not select this option.

#### SAS Internal Account: Unrestricted Administrator

Specify the metadata password for the first Unrestricted Administrator identity, and click **Next**.

- In **New Internal Password**, enter a password for the internal account (`sasadm@saspw`) that the wizard will create to serve as an unrestricted administrator for the purpose of configuring the metadata server.

**Note:** Remember this password as you will need it in the future.

- In **Confirm New Internal Password**, enter the password used in the earlier field. Click **Next**.

For more information, see [“Defining User Accounts” on page 74](#).

#### SAS Internal Account: Trusted User

Specify the metadata password for the Trusted User identity, and click **Next**.

- In **New Internal Password**, enter a password for an internal account (sustrust@saspw) that the wizard will create to enable SAS server and spawner components to communicate securely with each other.

**Note:** Remember this password as you will need it in the future.

- In **Confirm New Internal Password**, re-enter the password.

For more information, see [“Defining User Accounts” on page 74](#).

#### SAS BI Web Services: Authentication Method

Select the method by which users of SAS BI Web Services are authenticated, and click **Next**.

- In **Authentication Method**, make one of the following selections and click **Next**:
  - ☐ **SAS Authentication** is managed by the metadata server.
  - ☐ **Web Authentication** is managed by the SAS Web Application Server using container-based authentication or a third-party product.

Selecting **Web Authentication** has these effects:

- Partially configures web authentication for Java BI Web Services. For more information, see “Securing SAS BI Web Services for Java ” in Chapter 11 of *SAS Intelligence Platform: Middle-Tier Administration Guide*.
- Has no effect on the BI web applications (such as SAS Web Report Studio, SAS Web Information Portal, and so on). You will have to configure web authentication for these BI web applications.
- Prevents you from being offered a chance to set up an anonymous web user (as this is incompatible with web authentication).

### Anonymous Web Access

When using SAS authentication, you can select this option to set up a SAS identity for anonymous access to certain web services and web applications that support this feature. When you are finished, click **Next**.

- Choose **Enable anonymous web access** to set up a SAS identity for anonymous access to certain web services and web applications that support this feature.

SAS BI Web Services for Java and .NET, the SAS Stored Process Web Application, and SAS Visual Analytics Guest Access are the only components that support this feature.

For more information, see “PUBLIC Access and Anonymous Access” in Chapter 10 of *SAS Intelligence Platform: Security Administration Guide*.

### SAS Internal Account: Anonymous Web User

Specify the metadata password for the anonymous web user identity, and click **Next**.

- In **New Internal Password**, enter a password for the internal SAS account to be used to grant clients access to applicable SAS Web Infrastructure Platform applications such as SAS BI Web Services and the SAS Stored Process Web Application.

When SAS authentication is being used and the user has not preemptively specified credentials, the client will be given access to these web applications under the anonymous user account.

For more information, see “Using the SAS Anonymous Web User with SAS Authentication” in Chapter 19 of *SAS Intelligence Platform: Middle-Tier Administration Guide*.

**Note:** Remember this password as you will need it in the future.

- In **Confirm New Internal Password**, re-enter the password.

### SAS Visual Analytics: Allow Guest Access

Specify whether to allow anonymous access to a subset of SAS Visual Analytics resources and functionality, and click **Next**.

- Select **Guest Access Permitted** to allow guest access for participating SAS Visual Analytics applications.

Guest access is an optional feature. All users who connect to a guest access URL are authenticated as the same service account (the SAS Anonymous Web User), which functions as the single surrogate identity for all connecting users. Guest access is not compatible with web authentication.

**TIP** If you are unsure about whether to allow guest access in SAS Visual Analytics, you can create the SAS Anonymous Web User, and then easily add guest access *after* installation.

For more information, see “Supporting Guest Access” in Chapter 4 of *SAS Visual Analytics: Administration Guide*.

### External Account: SAS Spawnd Servers Account

Specify the credentials used to launch back-end stored process and workspace servers, and click **Next**.

- In **External User ID**, enter the user ID to be used to start the SAS Pooled Workspace Server and the SAS Stored Process Servers.

**Note:** On Windows, enter a domain-qualified user ID.

- In **External Password**, enter the password for the earlier entered user ID.

**Note:** Remember this password as you will need it in the future.

For more information, see “[Defining User Accounts](#)” on page 74.

### Create Common Directories

Indicate the common directories that you want the deployment wizard to create. On Windows, in the page that follows, you can specify a data directory, and click **Next**.

- Select the respective check box to create common directories for server and spawner logs, user-specific files, data (SAS libraries for tables and cubes), and temporary work tables and files.

When you select this option, the deployment wizard creates the specified directory (**Logs**, **Users**, **Data**, and **Temp**) under the SAS configuration directory.

- In **Data Directory** enter a location to contain SAS libraries for tables and cubes.

This directory is required when configuring SAS BI Dashboard.

#### Enable FIPS-certified Encryption Algorithms

Indicate whether you want to use AES encryption, and click **Next**.

- Choose the check box to use the Advanced Encryption Standard (AES) algorithm to encrypt communications to and from a SAS Metadata Server. A block cipher that encrypts 128-bit blocks by using a 256-bit key, AES complies with Federal Information Processing Systems (FIPS) standards. For more information, see “FIPS 140-2 Standards Compliance” in Chapter 1 of *Encryption in SAS*.

#### Server Encryption

Select the encryption level and algorithm that SAS clients and servers use to connect to the SAS Metadata Server, and click **Next**.

- In **Server Encryption Level**, choose **Credentials** to encrypt only login credentials. Choose **Everything** to encrypt all communication with the metadata server.

Choosing **Everything** can affect your SAS performance.

- In **Server Encryption Algorithm**, you can specify an encryption algorithm other than SAS Proprietary. The other algorithms are: RC2, RC4, DES, TripleDES, and AES.

For more information, see Chapter 13, “Encryption Model,” in *SAS Intelligence Platform: Security Administration Guide* and “SAS Proprietary Encryption” in Chapter 1 of *Encryption in SAS*.



## Client-side Credentials Policy

Set the policy for client-side storage of credentials, and click **Next**.

- Select **Allow users to save credentials in client-side connection profiles** to allow users to save their user IDs and passwords in client-side connection profiles on the metadata server for desktop applications.

When set, SAS enables OMA\_SASSEC\_LOCAL\_PW\_SAVE in omaconfig.xml.

For more information, see “Reference Information for omaconfig.xml” in Chapter 32 of *SAS Intelligence Platform: System Administration Guide*.

## Estimated System Size

Size your system configuration based on user number, system size, and workload size. Then, click **Next**.

- In **Size Estimate**, make one of the following selections: **Small System**, **Medium System**, or **Large System**.

The deployment wizard uses your sizing selection as a tuning hint during SAS server configuration. This option appears only during metadata server configuration and applies to all machines configured with this metadata server.

You might have to further refine individual tuning parameters after you have collected and evaluated system usage information. For more information, see Appendix 1, “Initial Sizing and Tuning Configuration Options for Deployments,” in *SAS Web Applications: Tuning for Performance and Scalability*.

## E-mail Server

Specify e-mail server configuration information, and click **Next**.

- In **Host Name**, enter the host name for an SMTP e-mail server at your site. SAS uses this server to send alerts for system-related issues to an administrator (for example, the SAS Metadata Server detects a journaling issue).

The SAS Deployment Wizard also uses this e-mail server as the default for the SAS Application Server to provide e-mail services to various SAS clients.

For example, with SAS Data Integration Studio, you can use a Publish to Email transformation to alert users about various data changes. In order for the SAS BI Dashboard to send alerts by e-mail to dashboard users and administrators, the port and host name must be configured for the e-mail server.

For more information, see “Pre-installation Checklist for Ports for SAS” in Chapter 2 of *SAS Intelligence Platform: Installation and Configuration Guide* and “Managing Alert E-mail Options for the SAS Metadata Server” in Chapter 15 of *SAS Intelligence Platform: System Administration Guide*.

- In **Port**, enter the port that the SMTP e-mail server uses.

For more information, see “Adding or Modifying E-Mail Settings for SAS Application Servers” in Chapter 11 of *SAS Intelligence Platform: Application Server Administration Guide* and “Managing Alert E-mail Options for the SAS Metadata Server” in Chapter 15 of *SAS Intelligence Platform: System Administration Guide*.

#### SAS Application Server: Server Context

Specify the name of the SAS Application Server context, and click **Next**.

- In **SAS Application Server Context Name**, accept the default (SASApp) or enter a different name of the server context for the SAS Application Server definition that the wizard will create in metadata.

A server context is a SAS IOM server concept that describes how SAS Application Servers manage client requests. A SAS Application Server has an awareness (or context) of how it is being used and makes decisions based on that awareness. The server context name is prepended to all server names defined in the server context.

**Note:** The server context name must be unique.

For more information, see “Overview of SAS Application Servers” in Chapter 2 of *SAS Intelligence Platform: Application Server Administration Guide*.

## SAS Pooled Workspace Server

Specify SAS Pooled Workspace Server information, and click **Next**.

- In **Logical SAS Pooled Workspace Server Name**, enter the name of the logical pooled workspace server to be stored in SAS metadata.
- In **SAS Pooled Workspace Server Name**, enter the name of the pooled workspace server to be stored in SAS metadata.
- In **Host Name**, enter the name of the machine on which the pooled workspace server runs. The machine name should match the name specified to the object spawner.
- In **Port**, enter the port on which the object spawner will listen for client requests to launch pooled workspace servers.

For more information, see “Overview of Workspace Servers and Stored Process Servers” in Chapter 3 of *SAS Intelligence Platform: Application Server Administration Guide*.

## SAS Web Infrastructure Platform Data Server

Specify information for the SAS Web Infrastructure Platform Data Server, and click **Next**.

- In **Host Name**, enter the fully qualified host name of SAS Web Infrastructure Platform Data Server or accept the default value.

The default is the host name where the deployment wizard is currently running. In most cases the default is correct. However, a machine can have more than one network interface card (NIC) or host name alias. In such a case, to determine whether the default is correct, refer to your Pre-Installation Checklist.

- In **Port**, enter the TCP/IP port number on which SAS Web Infrastructure Platform Data Server listens or accept the default value.
- In **Data Server Administrator**, enter the user ID for administering SAS Web Infrastructure Platform Data Server.

- In **Data Server Administrator Password**, enter the password for the user ID associated with the SAS Web Infrastructure Platform Data Server administrator.

**Note:** Remember this password as you will need it in the future.

- In **Confirm Password**, re-enter the password entered in the earlier field.

For more information, see “Reviewing Third-Party Database Requirements” in Chapter 6 of *SAS Intelligence Platform: Installation and Configuration Guide*.

#### SAS Remote Services Application: JVM

Specify the desired heap sizes for the SAS Remote Services application using the JVM option format, and click **Next**.

- In **Initial JVM Heap Size**, enter the desired initial heap size for the remote services application using the JVM option format.

**Note:** SAS 9.4 no longer requires SAS Remote Services. However, some custom SAS applications still require SAS Remote Services. The SAS Deployment Wizard deploys SAS Remote Services, but it is not automatically started by default.

- In **Max JVM Heap Size**, enter the desired maximum heap size for the remote services application using the JVM option format.
- In **Additional JVM Options**, enter any additional Java options that you want the SAS Remote Services VM to use. For example, you might want to add `-Dmulticast_udp_ip_ttl=1` to restrict multicast traffic to a single subnet based on your network topology.

For more information, see *SAS Web Applications: Tuning for Performance and Scalability*.

#### SAS Web Server: Automated or Manual Configuration Option

Indicate whether you want the deployment wizard to configure the SAS Web Server automatically, and click **Next**.

- If you want to configure the SAS Web Server manually, clear **Configure SAS Web Server automatically**.

Select this option for the deployment wizard to automatically build and configure the SAS web applications as well as configure a sample web application server for use with SAS 9.4. (To use this wizard feature, make sure that your web application server is not running before proceeding.)

It is strongly recommended that you choose to automatically configure the SAS Web Server. If you find that you need to make changes to the SAS Web Server after the automatic configuration, there are tools to help you reconfigure it. For more information, see “Scripting Tool for SAS Web Application Server” in Chapter 21 of *SAS Intelligence Platform: Middle-Tier Administration Guide*.

If you choose not to automatically configure your web application server, you will still be prompted for web application server information, and deployment stages such as Configure Products, Deploy Web Applications, and Start Web Application Servers will execute to create instructions for manual deployment. When configuration is complete, follow these manual instructions on how to configure your server and deploy your web applications.

For more information, go to <http://support.sas.com/resources/thirdpartysupport/v94/appservers/index.html> and select the product name of your web application server.

**Note:** Manually configuring your SAS middle tier is an advanced procedure and requires using other documents such as your Instructions.html file.

## SAS Web Server: Configuration

Specify SAS Web Server configuration options, and click **Next**.

- The standard port for HTTP traffic is 80. If you want to change this for SAS Web Server, then specify a new port number in **HTTP Port**.

**Note:** On systems that you must start servers as root if you want servers to listen on ports lower than 1024. We recommend that you install and configure as a less-privileged user and then start SAS Web Server manually as root.

For more information, see “Pre-installation Checklist for Ports for SAS” in Chapter 2 of *SAS Intelligence Platform: Installation and Configuration Guide* and “Managing Alert E-mail Options for the SAS Metadata Server” in Chapter 15 of *SAS Intelligence Platform: System Administration Guide*.

- The standard port for Transport Layer Security (TLS) traffic is 443. If you want to change this for SAS Web Server, then specify a new port number in **HTTPS Port**. (See earlier note.)
- In **Configured Protocol**, select the communication protocol for SAS Web Server. There are two choices, HTTP (unsecured) and HTTPS (secured).  
If you select HTTPS, an X509 certificate and private key are required. The deployment wizard prompts you for the paths to these items on a later page. You will have an opportunity to enter a location for these components or provide information to create them. For more information, see Chapter 5, “Setting Up Certificates for SAS Deployment,” in *SAS Intelligence Platform: Installation and Configuration Guide*.
- In **Administrator Mail Address**, specify an e-mail address for e-mail to be sent to the SAS Web Server administrator.

#### SAS Web Server: Location of X509 Certificate and RSA Private Key

If you already have a private key and a signed certificate, enter the location where these reside. When you are finished, click **Next**.

- In **X509 Certificate**, enter the path to the valid X509 certificate with the DNS name of this machine as the Common Name (CN).
- In **RSA private key**, enter the path to the RSA private key that is not protected by a passphrase.

For more information, see Chapter 5, “Setting Up Certificates for SAS Deployment,” in *SAS Intelligence Platform: Installation and Configuration Guide*.

#### Web Application Server: Configure Internet Proxy Server

On this page and the one that immediately follows, indicate whether to configure an Internet proxy server and specify proxy information, and click **Next**.

- In **Proxy Host**, enter the fully qualified host name for the proxy server.

If you are using SAS Information Delivery Portal RSS feeds, then you will have to provide proxy server information.

- In **Proxy Port**, enter the port that your site uses to access the Internet.

- In **NonProxy Hosts**, enter the DNS names of all the machines that should not be accessed through the proxy server. Separate each machine name with a vertical line character (|). Use an asterisk (\*) as a wildcard for an entire subnet. For example, \*.subnet.com excludes all machines with a DNS name that ends with .subnet.com.

If your site does not allow Internet access on production systems, refer to configuration information available at this SAS website: <http://support.sas.com/resources/thirdpartysupport/v94> and select your web application server.

### Web Application Server: Multiple Servers

Indicate whether to configure multiple web application servers on which to deploy SAS web applications, and click **Next**.

- Select **Configure multiple servers** to have the deployment wizard automatically configure multiple managed servers for you using SAS best practices for choosing the server to deploy each application to.

In some situations, it might be preferable to split the SAS web applications across multiple managed servers. This is usually done for performance reasons.

If you chose to manually configure your application servers, you will be provided with recommended configuration settings in a generated instructions file (Instructions.html) when the SAS Deployment Wizard completes.

More advanced performance configuration considerations are documented in the *SAS Intelligence Platform: Middle-Tier Administration Guide*.

### Web Application Server: Server Configuration

Specify web application server information, and click **Next**.

- In **Server Name**, enter a logical name for your server. A suffix is automatically added to the name that is provided here in order to distinguish cluster members.

For example, if the name SASServer1 is selected, the actual name will be SASServer1\_1. If the multiplier provided on the next page is greater than one, additional servers will be created with unique suffixes. For example, if the

multiplier is 2, then servers named SASServer1\_1 and SASServer1\_2 will be created.

- In **Additional JVM Options**, enter any additional Java options that you want the server VM to use. These JVM options are tagged onto the end of the server's command line. Options that are hardcoded into the SAS Deployment Wizard default set can be over-ridden in this way.

#### Web Applications: Automatic Deployment

Indicate if you want the wizard to automatically deploy SAS web applications to the SAS Web Application Server, and click **Next**.

- Select **Deploy web applications automatically** for the deployment wizard to automatically deploy SAS web applications to the web application server.

If you do not choose to deploy web applications automatically, manual deployment instructions will be written to Instructions.html during the web application deployment stage.

**Note:** Manually deploying your SAS web applications is an advanced procedure and requires using other documents such as your Instructions.html file.

Regardless of whether you choose to automatically deploy your SAS web applications, when building web applications, the wizard also automatically explodes web application archive files (EAR files).

For more information, see “Overview” in Chapter 10 of *SAS Intelligence Platform: Middle-Tier Administration Guide*.

#### IP Multicast Version

(UNIX only) Specify the IP version to use for the IP multicast address, and click **Next**.

- In **IP Version**, select the Internet Protocol version appropriate for your system.

The deployment wizard detects that this machine has an IPv4 and an IPv6 address. If you choose IPv6, you are confirming that all servers containing SAS products are connected to an IPv6 enabled network and have IPv6 enabled network interfaces.



For more information, see “Designating Ports and Multicast Addresses” in Chapter 2 of *SAS Intelligence Platform: Installation and Configuration Guide*.

## IP Multicast

Specify IP multicast information between SAS applications. Accept these IP multicast settings or enter new ones. If you choose to use an authentication token, a wizard page immediately follows in which you enter token information. When you are finished, click **Next**

- In **IP Multicast Address**, enter a new multicast address.

A multicast group communications protocol is used to communicate among middle-tier SAS applications in a single SAS deployment (the set of applications connected to the same metadata server). The combination of multicast IP address and multicast UDP port should be different for each SAS deployment and also different from those used by other multicast applications at your site. The defaults are most appropriate for deployments in a firewall-isolated data center environment.

For more information, see “Designating Ports and Multicast Addresses” in Chapter 2 of *SAS Intelligence Platform: Installation and Configuration Guide*.

- In **IP Multicast UDP Port**, enter a valid UDP port for use on all the machines where a SAS middle-tier application is installed.
- In **IP Multicast UDP TTL**, enter a valid multicast TTL property (default = 1, range = 0–255). This property affects the number of network hops a multicast packet will take before being dropped. This TTL value must be greater than or equal to the largest number of hops between any two servers containing SAS products.
- Choose **Use an authentication token to connect** to prevent access to the multicast group from unauthorized listeners. The authentication token can be any password-like string. You must provide the same authentication token string to each tier in the same SAS deployment (that is, each tier associated with the same metadata server).

### SAS Web Infrastructure Platform Database: Data Server

Indicate whether to use a third-party database for the SAS Web Infrastructure Platform database, and click **Next**.

- Clear **Use SAS Web Infrastructure Platform Data Server** to use a different database to store SAS Web Infrastructure Platform data.

In SAS 9.4, the following third-party database management systems are supported: DB2, MySQL, Oracle, PostgreSQL, and SQLServer.

### SAS Content Server: Repository Directory

Specify content server repository options, and click **Next**.

- In **Repository Directory**, enter the location on the disk for the content server indexes and repository configuration file. You can also click **Browse** to search for this location.

For more information, see Chapter 10, “Administering the SAS Content Server,” in *SAS Intelligence Platform: Middle-Tier Administration Guide*.

- Select **Start initial node as clustered**, when this machine is (or might be) part of a clustered deployment.

**CAUTION!** If you enable this option, you must also establish a central backup vault for the SAS Deployment Backup and Recovery Tool. Starting in the second maintenance release for SAS 9.4, a vault is no longer required for clustered content servers.

Deselect **Start initial node as clustered** when you are not deploying the SAS middle tier on a machine cluster. (This setting enables journaling and the necessary cluster synchronization processes.)

If you redeploy the middle tier on a machine cluster in the future, you can manually set the Java system property

'-Dcom.sas.server.isclustered=true' and restart the initial application server node. For more information, see “Adding a Horizontal Cluster Member” in Chapter 16 of *SAS Intelligence Platform: Middle-Tier Administration Guide*.

## SAS Web Infrastructure Platform: Database Type

Specify the alternate database that you want to use for the SAS Web Infrastructure Platform, and click **Next**.

- In **Database Type**, select one of the following supported databases: DB2, MySQL, Oracle, PostgreSQL, or SQLServer.

**Note:** The database used by SAS Environment Manager, the SAS Deployment Backup and Recovery tool, and certain SAS solutions, such as SAS Visual Analytics, will be PostgreSQL regardless of the database you choose for the SAS Web Infrastructure Platform.

For more information, see [“Reviewing Third-Party Database Requirements” on page 142](#).

## SAS Web Infrastructure Platform Database: JDBC Properties

If you selected a database server other than the SAS Web Infrastructure Data Server, then the following fields are editable. If you are using the SAS Web Infrastructure Database Server, the database name and user ID is ReadOnly. When you are finished, click **Next**.

- In **Database Name**, specify the name of the database that contains the SAS Web Infrastructure Database tables.
- In **User ID**, specify the user ID for accessing the database used with your SAS Web Infrastructure Database tables. This user ID must have the ability to insert, update, and delete records.
- In **Password**, specify a valid password for the user ID associated with the database server account. The deployment wizard will use this password to create the database server account.

**Note:** Remember this password as you will need it in the future.

- In **Confirm Password**, re-enter the password that you specified in **Password**.

### SAS Environment Manager: Administration Database Configuration

Specify administrator credentials for the SAS Environment Manager database, and click **Next**.

- In **User ID**, specify the user ID for accessing the database used with your SAS Web Infrastructure Platform Database tables. This user ID must have the ability to insert, update, and delete records.

By default, the SAS Environment Manager uses the Administration database on the SAS Web Infrastructure Data Server. If you are using the SAS Web Infrastructure Platform Database Server, the user ID is ReadOnly.

For more information, see “SAS Web Infrastructure Platform Data Server” in Chapter 2 of *SAS Intelligence Platform: Middle-Tier Administration Guide*.

- In **Password**, enter the password for the user ID.

**Note:** Remember this password as you will need it in the future.

- In **Confirm Password**, re-enter the password.

### SAS Internal Account: SAS Environment Manager Service Account

Specify the metadata password for the SAS Environment Manager service, and click **Next**.

- In **SAS Environment Manager Service Account Password**, enter a password for the SAS Environment Manager service account (sasevs@saspw).

The password must contain at least six characters. Make sure that you supply the same password that was specified in any previous SAS Environment Manager configuration prompts.

**Note:** Remember this password as you will need it in the future.

This service account is required for the SAS Environment Manager and its agent to communicate while monitoring the processes in your SAS deployment. This internal SAS account has unrestricted administrative access rights to the metadata server. For more information, see “SAS Environment Manager and SAS Metadata Users” in Chapter 9 of *SAS Environment Manager: User's Guide*.

- In **Confirm Password**, re-enter the password.

Choose SAS Environment Manager: Keystore

Indicate whether to use the built-in or customized keystore, and click **Next**.

- By default, the SAS Environment Manager uses the cacerts file shipped with the SAS private JRE.

If you want to use a different keystore, choose **Use a customer-supplied JKS format keystore**.

For more information, see Chapter 5, “Setting Up Certificates for SAS Deployment,” in *SAS Intelligence Platform: Installation and Configuration Guide*.

SAS Environment Manager: Database Configuration

Specify administrator credentials for the SAS Environment Manager database, and click **Next**.

- In **User ID**, specify the user ID for accessing the database used with your SAS Web Infrastructure Platform Database tables. This user ID must have the ability to insert, update, and delete records.

By default, the SAS Environment Manager uses the Administration database on the SAS Web Infrastructure Data Server. If you are using the SAS Web Infrastructure Platform Database Server, the user ID is ReadOnly.

For more information, see “SAS Web Infrastructure Platform Data Server” in Chapter 2 of *SAS Intelligence Platform: Middle-Tier Administration Guide*.

- In **Password**, enter the password for the user ID.

**Note:** Remember this password as you will need it in the future.

- In **Confirm Password**, re-enter the password.

### SAS Environment Manager Agent Configuration

On this page and the one that follows, specify SAS Environment Manager Agent information, and click **Next**.

- Select **Establish secure communication** to enable secure communication using Transport Layer Security (TLS) between the SAS Environment Manager and its agents.

For more information, see Chapter 5, “Setting Up Certificates for SAS Deployment,” in *SAS Intelligence Platform: Installation and Configuration Guide*.

### SAS Environment Manager Enablement Kit Database Credentials

Specify database connection information, and click **Next**.

- In **User ID**, enter the user ID for accessing the database used with SAS Environment Manager Enablement Kit.
- In **Password**, enter the password for the user ID.

**Note:** Remember this password as you will need it in the future.

- In **Confirm Password**, re-enter the password.

### SAS Visual Analytics Explorer: Context Root

Specify the context root, and click **Next**.

- In **Context Root for SAS Visual Analytics Explorer**, enter the context root that ties the user to the EAR file that is specified in the **Display Name** field.

The form of the URL for SAS Visual Analytics Explorer is `http://machine:port/SASVisualAnalyticsExplorer`. Although the machine and port are configured elsewhere and they typically apply to the web container as a whole, the **SASVisualAnalyticsExplorer** portion is the *context root*, and you can change it (within the constraints of URL rules).

For more information, see *SAS Studio: Administrator's Guide*.

## SAS Visual Analytics High-Performance Configuration Properties

Specify properties to create a libref to reference the directory that contains uploaded and extracted SAS data sets, and click **Next**.

- In **Uploaded SAS Dataset Libref Name**, enter the libref name to reference the directory that contains uploaded and extracted SAS data sets. The maximum number of characters for a libref name is eight.

## SAS Visual Analytics Data Provider

Specify the data provider to be used with SAS Visual Analytics, and click **Next**.

- In **SAS Visual Analytics High-Performance Data Provider**, select the data provider to be used with SAS Visual Analytics. The supported values are Hadoop and Non-distributed LASR.

Several versions of Hadoop are supported such as SAS High-Performance Deployment of Hadoop, Cloudera Hadoop, Hortonworks Data Platform, IBM BigInsights, and Pivotal HD. For more information, refer to Chapter 4, “Deploying Hadoop,” in *SAS High-Performance Analytics Infrastructure: Installation and Configuration Guide*.

## SAS Visual Analytics High-Performance Configuration Information

Specify configuration information for the SAS High-Performance Analytics environment, and click **Next**.

- In **SAS High-Performance Analytics Environment Host**, enter the fully qualified machine name in the cluster to which the SAS clients connect.
- In **SAS High-Performance Analytics Environment Port**, enter the port number in the environment through which the SAS clients connect. (By default, the port is 10010.)

For more information, refer to [“Pre-installation Checklist for Ports for SAS” on page 86](#).

- In **Signature files location**, specify the absolute path where the SAS LASR Analytic Server writes signature files.

If you are using SAS LASR Analytic Server in distributed mode, specify a path located on the SAS High-Performance Analytics environment root node. If

you are using non-distributed mode, specify a path located on the local machine.

It is important to carefully manage access to the signature files directory. User IDs under which certain activities are performed (for example, starting a server or loading data) must have Write access to the signature files directory. Access to a signature files directory can provide access to loaded data so the signature files directory should be protected against unauthorized access. For more information, see “Signature Files” in Chapter 3 of *SAS Visual Analytics: Administration Guide*.

- In **Location of the TKGrid or TKGrid\_REP Installation on the SAS High-Performance Analytics Environment**, specify the absolute path to the TKGrid directory or the TKGrid\_REP directory on the root node host (for example, `/opt/TKGrid`).

Specify the TKGrid\_REP directory when you are feeding your SAS High-Performance Analytics Environment with parallel loads from a remote (not co-located) data provider.

**TIP** Be sure not to leave any whitespace characters at the end of the path because whitespace characters can cause problems when you attempt to submit SAS LASR Analytic Server jobs later.

For more information, see “Install the Analytics Environment” in Chapter 6 of *SAS High-Performance Analytics Infrastructure: Installation and Configuration Guide* or “Configure for Access to a Data Store with a SAS Embedded Process” in Chapter 6 of *SAS High-Performance Analytics Infrastructure: Installation and Configuration Guide*, available at <http://support.sas.com/documentation/solutions/hpainfrastructure/index.html>.

- In **SAS High-Performance Computing Management Console URL**, enter the URL used to access SAS High-Performance Computing Management Console. (By default, the URL is `http://local_host_name:10020`.)

For more information, see *SAS High-Performance Computing Management Console: User's Guide*, available at <http://support.sas.com/documentation/solutions/hpainfrastructure/index.html>.



- In **Location for the SAS linguistic distributed binaries**, specify the directory on disk that stores the SAS linguistic binary files. These binary files are required to perform text analysis in SAS LASR Analytic Server with SAS Visual Analytics and to run PROC HPTMINE and PROC HPTMSCORE with SAS Text Miner.

SAS Visual Analytics Data Provider: Hadoop

Specify Hadoop configuration information, and click **Next**.

- In **Hadoop NameNode Host**, specify the machine in the HDFS cluster that is the Hadoop Name Node.
- In **Hadoop NameNode Port**, enter a port number for the HDFS Name Node service, which runs only on the Name Node in the HDFS cluster. This value maps to the Hadoop property  
`com.sas.lasr.hadoop.service.namenode.port`.

For more information, see [Configuration Guide for SAS 9.4 Foundation for UNIX Environments](#).

- In **Hadoop NameNode Authentication Domain**, enter the domain to use for identifying logins that access the Hadoop Name Node machine.

The authentication domain is a metadata construct that pairs each login with the servers for which that login is valid. The authentication domain provides logical groupings for resources and logins in a metadata repository. This ensures that resources use the same authentication process.

For example, when an application needs to locate credentials that enable a particular user to access a particular server, the application searches the metadata for logins that are associated with the authentication domain in which the particular server is registered.

- In **Library Name**, enter the library name for the Hadoop library.
- In **Libref**, specify the libref for the Hadoop library.
- In **Hadoop Path**, enter the path to the database for the Hadoop data server.

### SAS Visual Analytics Public Data Library: Hadoop

Specify public data library configuration information, and click **Next**.

- In **Library Name**, enter the library name for the public Hadoop library.
- In **Hadoop Path**, enter the database for the public Hadoop data server.
- In **Libref**, enter the libref for the public Hadoop library.

### SAS Visual Analytics Data Provider: Hadoop Ports

Confirm the various ports used for Hadoop, and click **Next**.

- In **File System Default Port**, enter the port used to access the Name Node default file system.
- In **MapReduce Job Tracker Port**, enter the port used to access the MapReduce server JobTracker process. This value maps to the Hadoop property `mapred.job.tracker`.
- In **Primary NameNode HTTP Port**, enter the port on which the Name Node primary web user interface listens. This value maps to the Hadoop property `dfs.namenode.http-address`.
- In **Secondary NameNode HTTP Port**, enter the port on which the Name Node backup web user interface listens. This value maps to the Hadoop property `dfs.secondary.http.address`.
- In **Job Tracker HTTP Port**, enter the port on which the JobTracker web user interface listens. This value maps to the Hadoop property `mapred.job.tracker.http.address`.

### SAS Visual Analytics Public Data Provider

Specify a library definition for a public, non-distributed SAS LASR Analytic Server data provider, and click **Next**.

- In **Data Reload Library Name**, specify the name for the Reload library.
- In **Data Reload Libref**, specify the libref for the Reload library.
- In **SAS Visual Analytics Reload Path**, enter the absolute path to the Reload library.

### SAS LASR Analytic Server Monitor Configuration Information

Specify SAS LASR Analytic Server Monitor configuration information, and click **Next**.

- In **SAS LASR Analytic Server Monitor Host**, enter the SAS LASR Analytic Server Monitor host name.
- In **SAS LASR Analytic Server Monitor RMI Registry Port**, enter the Remote Method Invocation (RMI) port that the SAS LASR Analytic Server Monitor listens on for activity.

For more information, see [“Pre-installation Checklist for Ports for SAS” on page 86](#).

### SAS Visual Analytics Public Data Library Information

Confirm the port for the SAS High-Performance Analytics environment to which the SAS clients connect, and click **Next**.

- In **SAS Visual Analytics Public Data Library Port**, enter the port number for the SAS High-Performance Analytics environment to which the SAS clients connect.

For more information, see [“Pre-installation Checklist for Ports for SAS” on page 86](#).

### SAS Visual Analytics AutoLoad Location

Specify the path to the SAS Visual Analytics AutoLoad location, and click **Next**.

- In **SAS Visual Analytics AutoLoad Location**, enter the absolute path of the host directory in which users place tables for loading to memory.

### SAS Visual Analytics: SAS LASR Analytic Server Library

Specify the SAS LASR Analytic Server library name and libref, and click **Next**. You can modify both of these properties after installation by using SAS Management Console.

- In **Library Name**, enter the name for the SAS LASR Analytic Server library.
- In **Libref**, enter the libref for the SAS LASR Analytic Server library.

### SAS Visual Analytics: Public LASR Libraries

Specify the public LASR library name and libref, and click **Next**. You can modify both of these properties after installation by using SAS Management Console.

- In **Public LASR Library Name**, enter the name for the library that is pre-populated for users when they import data files and create data queries. (This public LASR library provides ease of use rather than data security.)
- In **Public LASR Libref**, enter the libref for the public LASR library.

### SAS Visual Analytics Designer: Context Root

Specify the context root, and click **Next**.

- In **Context Root for SAS Visual Analytics Designer**, enter the context root that ties the user to the EAR file that is specified in the **Display Name** field.

The form of the URL for SAS Visual Analytics Designer is `http://machine:port/SASVisualAnalyticsDesigner`. Although the machine and port are configured elsewhere and they typically apply to the web container as a whole, the **SASVisualAnalyticsDesigner** portion is the *context root*, and you can change it (within the constraints of URL rules).

### SAS Visual Analytics Hub: Context Root

Specify the context root, and click **Next**.

- In **Context Root for SAS Visual Analytics Hub**, enter the context root that ties the user to the EAR file that is specified in the **Display Name** field.

The form of the URL for SAS Visual Analytics Hub is `http://machine:port/SASVisualAnalyticsHub`. Although the machine and port are configured elsewhere and they typically apply to the web container as a whole, the **SASVisualAnalyticsHub** portion is the *context root*, and you can change it (within the constraints of URL rules).

### SAS Visual Analytics Report Viewer: Context Root

Specify the context root, and click **Next**.

- In **Context Root for SAS Visual Analytics Report Viewer**, enter the context root that ties the user to the EAR file that is specified in the **Display Name** field.

The form of the URL for SAS Visual Analytics Report Viewer is `http://machine:port/SASVisualAnalyticsReportViewer`. Although the machine and port are configured elsewhere and they typically apply to the web container as a whole, the **SASVisualAnalyticsReportViewer** portion is the *context root*, and you can change it (within the constraints of URL rules).

#### SAS Visual Analytics Admin: Context Root

Specify the context root, and click **Next**.

- In **Context Root for SAS Visual Analytics Admin**, enter the context root that ties the user to the EAR file that is specified in the **Display Name** field.

The form of the URL for SAS Visual Analytics Administrator is `http://machine:port/SASVisualAnalyticsAdministrator`. Although the machine and port are configured elsewhere and they typically apply to the web container as a whole, the **SASVisualAnalyticsAdministrator** portion is the *context root*, and you can change it (within the constraints of URL rules).

#### SAS Visual Analytics Services Database Credentials

Specify JDBC connection information for the SAS Visual Analytics Services database, and click **Next**.

- In **User ID**, enter the user account that SAS uses to create a JDBC connection to the SAS Visual Analytics Services Database. (The default is `vatadm`.)
- In **Password**, enter a password for the user account (`vatadm`).

**Note:** Remember this password as you will need it in the future.

- In **Confirm Password**, re-enter the password.

#### SAS Visual Analytics Transport Service: Whitelist Mobile Devices

Specify whether to enforce a whitelist for SAS Mobile BI, and click **Next**.

- Select **Enforce whitelist for mobile devices** to use a whitelist to control access to SAS Mobile BI.

A deployment enforces either the blacklist or the whitelist. If the whitelist is not selected to be enforced, the blacklist is enforced by default. If the whitelist is enforced, only devices that are on the whitelist can use SAS Mobile BI. If the

blacklist is enforced, any device that is not on the blacklist can use SAS Mobile BI. Although only one list is enforced, you can make changes to both lists.

For more information, see “Access from Mobile Devices” in Chapter 3 of *SAS Visual Analytics: Administration Guide*.

#### SAS Visual Analytics: Protocol for OpenStreetMap Server

Specify the protocol for how SAS Visual Analytics Explorer communicates with the OpenStreetMap server hosted by SAS, and click **Next**.

- In **SAS-hosted OpenStreetMap Server Communication Protocol**, select a protocol to use for standard web browser communication.

Your options are **HTTP Protocol** (default) and **HTTPS Protocol** (secure).

Using HTTPS can result in performance degradation because of additional communication and encryption.

For more information, see “OpenStreetMap Server” in Chapter 4 of *SAS Visual Analytics: Administration Guide*.

#### SAS Visual Analytics: Configure ArcGIS Server

Specify whether to configure an Esri ArcGIS server, and click **Next**.

- Select **Configure ArcGIS Server** to configure an ArcGIS server. If this option is not selected, then the wizard skips ArcGIS server configuration.

For more information, see “Esri Server” in Chapter 4 of *SAS Visual Analytics: Administration Guide*.

#### SAS Visual Analytics: ArcGIS Server Details

Specify the URL of the ArcGIS REST Services directory, and click **Next**.

- In **ArcGIS REST Services Directory**, enter the URL used to connect to the ArcGIS REST Services directory.

Use the format *protocol://hostname:port/instance/services/folder*.

## SAS Visual Analytics Services Hyperlink Service: Context Root

Specify the context root, and click **Next**.

- In **Context Root for SAS Visual Analytics Services Hyperlink Service**, enter the context root that ties the user to the EAR file that is specified in the **Display Name** field.

The form of the URL for SAS Visual Analytics Service Hyperlink Service is `http://machine:port/SASVisualAnalytics`. Although the machine and port are configured elsewhere and typically apply to the web container as a whole, the **SASVisualAnalytics** portion is the *context root*, and you can change it (within the constraints of URL rules).

## SAS Visual Data Builder: Context Root

Specify the context root, and click **Next**.

- In **Context Root for SAS Visual Analytics Data Builder**, enter the context root that ties the user to the EAR file that is specified in the **Display Name** field.

The form of the URL for SAS Visual Analytics Data Builder is `http://machine:port/SASVisualAnalyticsDataBuilder`. Although the machine and port are configured elsewhere and typically apply to the web container as a whole, the **SASVisualAnalyticsDataBuilder** portion is the *context root*, and you can change it (within the constraints of URL rules).

## SAS Visual Data Builder Database Credentials

Specify JDBC connection information for the SAS Visual Data Builder database, and click **Next**.

- In **User ID**, enter the user account that SAS uses to create a JDBC connection to the SAS Visual Data Builder database. (The default is vdbadm.)
- In **Password**, enter a password for the user account (vdbadm).
- In **Confirm Password**, re-enter the password.

### SAS Information Retrieval Studio

On this page and the next page, confirm the ports used for SAS Information Retrieval Studio, and click **Next**.

- Review the SAS Information Retrieval Studio ports.

For more information, see [“Pre-installation Checklist for Ports for SAS” on page 86](#).

### Search Interface to SAS Content Feeder Configuration

Specify feeder information for Search Interface to SAS Content, and click **Next**.

- In **Index Loader Interval In Minutes**, enter the interval to provide SAS content to the server for search indexing.

### SAS Internal Account: Search Interface to SAS Content User

Specify a metadata password for the internal user account that permits access to SAS content that is provided to SAS Information Retrieval Studio for indexing. Click **Next**.

- **Display Name** contains the SAS Content User display name that is stored in SAS metadata.
- **Name** contains the SAS Content User account name that is stored in SAS metadata.
- **Internal User ID** contains the SAS Content User user ID that is stored in SAS metadata.
- In **New Internal Password**, enter a password for the SAS Content User. SAS stores this password in SAS metadata. The password must contain at least six characters.
- In **Confirm New Internal Password**, re-enter the password.

### SAS Deployment Backup and Recovery Tool: Enable Central Vault

Indicate whether to use a central backup vault for the SAS Deployment Backup and Recovery Tool, and click **Next**.

- Select **Enable central vault storage of backup files**, to enable central storage of backup files by specifying a network-accessible vault directory.



**CAUTION!** If your SAS deployment is not current with the second maintenance release for SAS 9.4, then a central vault location is required if your middle-tier environment includes a clustered SAS Content Server.

The default value for the shared centralized vault location is kept blank. The feature of storing backup at a centralized location is disabled as default.

To enable this feature, in the two pages that follow, provide a directory shared across all the tiers. The default retention period for a backup is 30 days. If the configuration that you are performing requires a backup at a centralized shared location and you want to change retention period, select this option.

Finally, provide a valid operating system (external) user account and password to be used to execute commands using the SAS Deployment Agent. This user account must have access to and sufficient privileges in order for each host machine to be included in the backup.

For more information, see Chapter 29, “Using the Deployment Backup and Recovery Tool,” in *SAS Intelligence Platform: System Administration Guide*.

#### SAS Visual Analytics Graph Builder: Context Root

Specify the context root, and click **Next**.

- In **Context Root for SAS Visual Analytics Graph Builder**, enter the context root that ties the user to the EAR file that is specified in the **Display Name** field.

The form of the URL for SAS Visual Analytics Graph Builder is `http://machine:port/SASVisualAnalyticsGraphBuilder`. Although the machine and port are configured elsewhere and they typically apply to the web container as a whole, the **SASVisualAnalyticsGraphBuilder** portion is the *context root*, and you can change it (within the constraints of URL rules).

#### SAS Studio Mid-Tier: Context Root

Specify the context root, and click **Next**.

- In **Context Root for SAS Studio Mid-Tier**, enter the context root that ties the user to the EAR file that is specified in the **Display Name** field.

The form of the URL for SAS Studio Mid-Tier is `http://machine:port/sasstudio`. Although the machine and port are configured elsewhere and

typically apply to the web container as a whole, the **SASStudio** portion is the context root, and you can change it (within the constraints of URL rules).

For more information, see *SAS Studio: Administrator's Guide*.

## 32 Deployment Summary

Review the summary of software that the deployment wizard will install and configure.

- When you see the Deployment Summary page, the deployment wizard has finished collecting installation and configuration input. This is the last opportunity to go back and change any information that you have provided in previous pages before the wizard begins writing to your system.

Make one of the following choices:

- ☐ Click **Start** to begin installing SAS files and writing the configuration to the current machine.

The deployment wizard launches the installation and configuration process and provides an on-going status update.

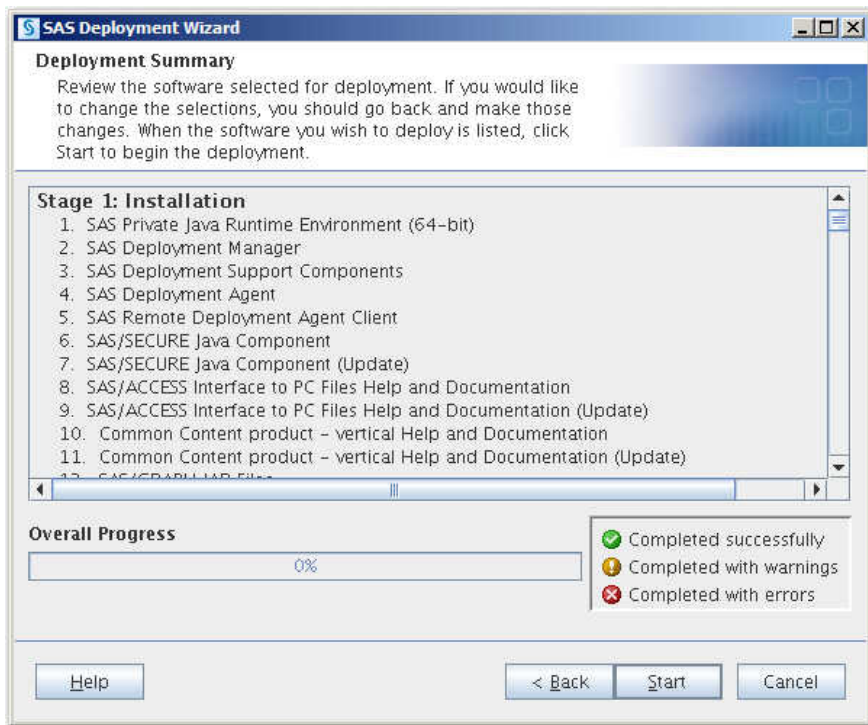
- ☐ Click **Back** to navigate to earlier wizard pages to change installation and configuration information previously entered.
- ☐ Click **Cancel** to terminate the wizard session. Note that you will lose installation and configuration information previously entered.

**CAUTION!** If you encounter a situation in which the deployment wizard reports a configuration failure, leave the error message displayed and do not continue. Consult additional documentation and, if necessary, contact SAS Technical Support. Moving past an error most often results in having to delete your deployment and start over.

On Linux, when you are installing the server tier, you will be instructed to run a script as root. As the message in the installation program explains, certain SAS products and features use functionality that requires SAS to check user ID authentication and file access authorizations. This, in turn, necessitates that certain files within your SAS installation have setuid permissions and be owned by root.

Your credentials are temporarily stored in your Windows registry using the Windows automatic logon functionality. In rare circumstances, it is possible those values will remain in your Windows registry after their use, thus posing a potential security risk.

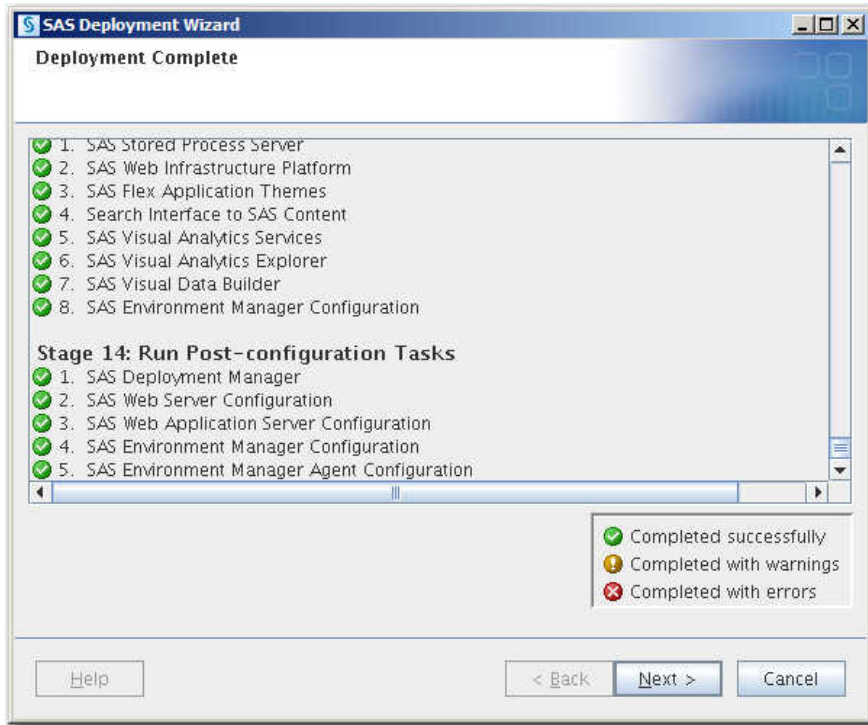
For more information about this functionality, including any risks, see Microsoft documentation about security and automatic logons. You should weigh the risks of convenience for automatic logon after restart against the security policies in place at your site.



### 33 Deployment Complete

The Deployment Complete page displays the configuration results for each SAS product.

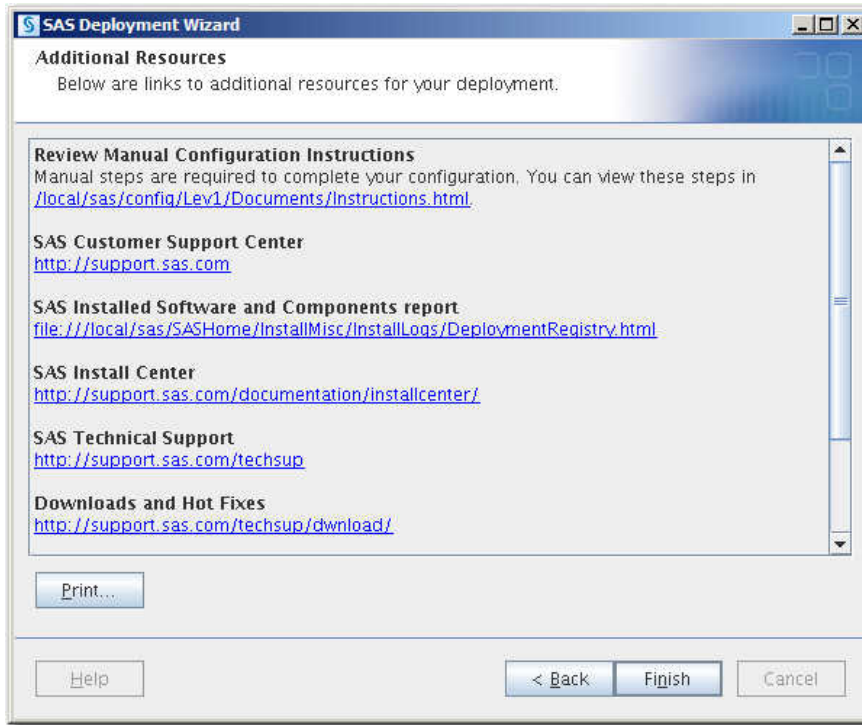
- Green check marks next to every item on this page indicate that your deployment completed successfully. Click **Next**.



### 34 Additional Resources

Use the links displayed to review more information about your SAS deployment.

- Click **Finish** to close the SAS Deployment Wizard.



### 35 Configuration Guidelines and Details

Review Configuration Guidelines and Details for post-deployment steps, and click **Next**.

- To complete your SAS deployment, review Configuration Guidelines and Details and perform the steps listed.

Configuration Guidelines and Details (Instructions.html) is automatically generated by the deployment wizard and has post-installation steps specific to your SAS order that you must perform.

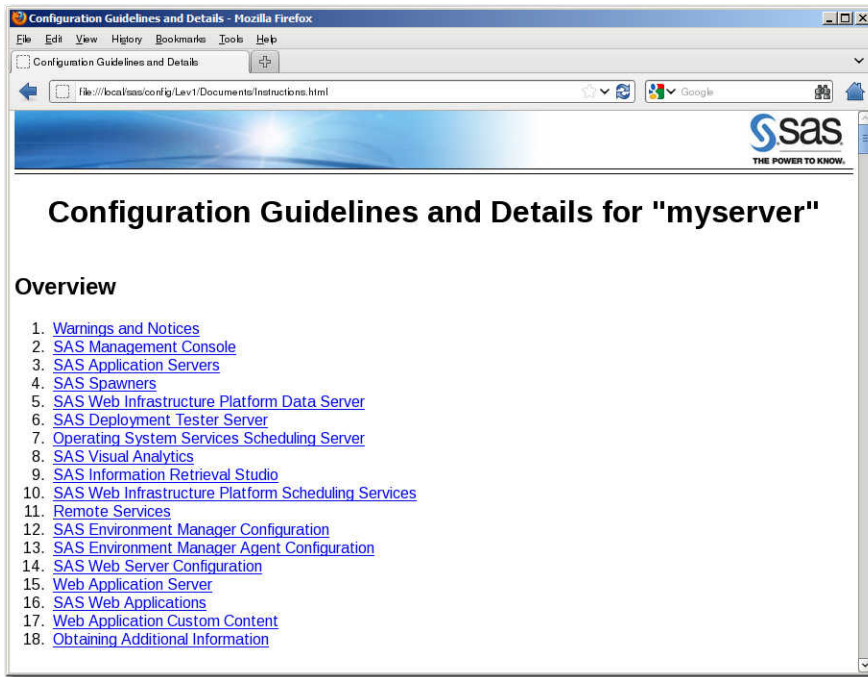
- The SAS Deployment Wizard writes the Configuration Guidelines and Details (Instructions.html) file to the `Documents` directory under the SAS configuration path. For example:

- Linux:

`/opt/SAS/Lev1/Documents/Instructions.html`

- Windows:

C:\SAS\Config\Lev1\Documents\Instructions.html



### 36 Back up your metadata repository and your SAS configuration directory.

- Make a backup copy of your SAS Visual Analytics configuration directories by using your site-approved method. Your SAS configuration directories are all of the child directories under the path that you specified previously on the Specify Configuration Information wizard page.
- Back up your SAS Web Application Server directories.
- Back up your metadata repository and repository manager. For more information, see Chapter 12, “Best Practices for Backing Up and Restoring Your SAS Content,” in *SAS Intelligence Platform: System Administration Guide*.

### 37 If you opted not to automatically deploy your SAS web applications, then you must manually deploy them. For more information, see [SAS Support for Web Application Servers and HTTP Servers](#).

### 38 Be sure to restart any servers that you stopped when creating the backup.

- 39** If you are deploying SAS Visual Analytics on Windows, proceed to [“Adding SAS LASR Analytic Server Monitor as a Windows Service”](#) on page 199. Otherwise, proceed to [“Validating Your SAS Visual Analytics Deployment”](#) on page 200.

---

## Adding SAS LASR Analytic Server Monitor as a Windows Service

To add the SAS LASR Analytic Server Monitor as a Windows Service, follow these steps:

- 1** Log on to the SAS LASR Analytic Server Monitor machine as a user who is a member of the Windows Administrator group.
- 2** In the Windows taskbar, click **Start**, in **Search programs and files**, type `services.msc`, and then press **Enter**.
- 3** In the Services window, right-click **SAS [configuration-name] LASR Analytic Server Monitor**, and select **Properties**.
- 4** On the **Log On** tab, select **This account**, and enter the domain and user name (for example, DOMAIN\user\_name). Click **Apply**.
- 5** Windows automatically grants the **Log On As A Service** right. Click **OK**.
- 6** Click **OK**.
- 7** Copy the SSH keys from the SAS High-Performance Analytics environment host to the SAS LASR Analytic Server Monitor machine under `disk:\Users\current-user-ID\.ssh`.
- 8** Open LASRMonitor.conf, located at  
`SAS-configuration-directory\Applications\SASVisualAnalytics\HighPerformanceConfiguration\wrapper.`

- 9 Update the `set .USERNAME=` property with the SAS High-Performance Analytics environment host user ID whose SSH keys match the SSH keys that you copied earlier.
- 10 Save and close `LASRMonitor.conf`.
- 11 Start the SAS LASR Analytic Server Monitor in the Services window or by running the following script from the command line:

```
SAS-configuration-directory\Applications\SASVisualAnalytics  
\HighPerformanceConfiguration\LASRMonitor.bat -start.
```

---

## Validating Your SAS Visual Analytics Deployment

### Overview of Validating Your SAS Visual Analytics Deployment

There are two basic types of SAS Visual Analytics deployments: one with a distributed analytics cluster (distributed) and one without (non-distributed). Make sure that you perform the correct validation steps for your deployment.

Remember that a large part of SAS Visual Analytics is shipped with SAS solutions. Therefore, you can use this section to validate any part of SAS Visual Analytics that your SAS solution contains (usually every part except SAS Visual Analytics Explorer).

You might want to wait to validate your deployment after you have deployed both the server tier and middle tier. If you have deployed only the server tier, then some of the validation steps cannot be completed until you have deployed the middle tier.

- [“Validate Your SAS Visual Analytics Deployment \(Non-Distributed\)” on page 201](#)
- [“Validate Your SAS Visual Analytics Deployment \(Distributed\)” on page 203](#)



## Validate Your SAS Visual Analytics Deployment (Non-Distributed)

Here are suggestions of how you can validate your non-distributed SAS Visual Analytics deployment. The SAS Visual Analytics documentation referenced is available at <http://support.sas.com/documentation/onlinedoc/va/index.html>.

**Table 5.2** Suggestions for SAS Visual Analytics Validation

Purpose	Actions	More Information
Create an account for use later in the validation.	<ol style="list-style-type: none"> <li>1 Use the SAS LASR Analytic Server installer account (sas) or create a new administrator account (such as saslasradm).</li> <li>2 Assign the Windows user permission <b>Log on as a batch job</b> to the account.</li> </ol>	See your operating system documentation.
Create a SAS identity for use later in the validation.*	<p>In SAS Management Console:</p> <ol style="list-style-type: none"> <li>1 Define a SAS Visual Analytics Administrator (use the account previously created (saslasradm)).</li> <li>2 Assign the administrator to the Visual Analytics Data Administrators group and the Visual Data Builder Administrators group.</li> </ol>	<i>SAS Management Console: Guide to Users and Permissions</i>
Create sample data for use later in the validation.	<p>In SAS Management Console, define a library and register a table. (You can use Sashelp: !SASROOT/sashelp.)</p>	<i>SAS Intelligence Platform: Data Administration Guide</i>
Validate that the home page is running and valid logins are accepted.	<p>Sign on to the home page as saslasradm. (<a href="http://VA-host.example.com/SASVisualAnalyticsHub">http://VA-host.example.com/SASVisualAnalyticsHub</a>).</p>	<i>SAS Visual Analytics: User's Guide</i>

Purpose	Actions	More Information
Demonstrate that SAS Visual Analytics Administrator is functional and able to communicate with the SAS LASR Analytic Server.	<p>On the home page, click <b>Administrator</b>. Then, do the following:</p> <ol style="list-style-type: none"> <li>1 Start a SAS LASR Analytic Server.</li> <li>2 Load a SAS table into SAS LASR Analytic Server.</li> </ol>	<i>SAS Visual Analytics: Administration Guide</i>
Demonstrate that SAS Visual Data Builder is functional.*	<p>On the home page, click <b>Create Data Query</b>. Then, do the following:</p> <ol style="list-style-type: none"> <li>1 Create a data query.</li> <li>2 Click <b>Home</b> in the banner to return to the home page.</li> </ol>	<i>SAS Visual Analytics: User's Guide</i>
Demonstrate that SAS Visual Analytics Explorer is functional.**	<p>On the home page, click <b>Create Exploration</b>. Then, do the following:</p> <ol style="list-style-type: none"> <li>1 Create an exploration.</li> <li>2 Click <b>Home</b> in the banner to return to the home page.</li> </ol>	<i>SAS Visual Analytics: User's Guide</i>
Demonstrate that SAS Visual Analytics Report Viewer is functional.	<p>On the home page, click <b>Create Report</b>. Then, do the following:</p> <ol style="list-style-type: none"> <li>1 Create a report.</li> <li>2 Click <b>Home</b> in the banner to return to the home page</li> </ol>	<i>SAS Visual Analytics: User's Guide</i>
Demonstrate that SAS Visual Analytics Designer is functional.	<p>On the home page, click on a report. Use the object inspector on the home page to view details about the report, and then click <b>View</b>.</p>	<i>SAS Visual Analytics: User's Guide</i>

Purpose	Actions	More Information
Demonstrate that SAS Mobile BI is operable.	Deploy SAS Mobile BI. View a SAS Visual Analytics report on a mobile device.	<i>SAS Visual Analytics: User's Guide</i>

- \* SAS Visual Data Builder requires that a SAS identity be a member of the Visual Data Builder Administrators group. Members of the Visual Analytics Data Administrators group do not have access to SAS Visual Data Builder.
- \*\* Some SAS orders do not contain SAS Visual Analytics Explorer.

## Validate Your SAS Visual Analytics Deployment (Distributed)

Here are suggestions of how you can validate your distributed SAS Visual Analytics deployment. The SAS Visual Analytics documentation referenced is available at <http://support.sas.com/documentation/onlinedoc/va/index.html>.

**Table 5.3** Suggestions for SAS Visual Analytics Validation

Purpose	Actions	More Information
Create an account for use later in the validation.	<p>In SAS High-Performance Computing Management Console:</p> <ol style="list-style-type: none"> <li>1 Use the SAS LASR Analytic Server installer account (sas) or create a new administrator account (such as saslasradm).</li> <li>2 Create SSH keys. (SSH keys have already been created for the installer account.)</li> </ol>	<p>To create an account, see “How to Add a User” in the <i>SAS Visual Analytics: Administration Guide</i>.</p> <p>To create SSH keys, see “Managing Users and Groups” in Chapter 4 of <i>SAS High-Performance Computing Management Console: User's Guide</i>.</p>
Create a SAS identity for use later in the validation.*	<p>In SAS Management Console:</p> <ol style="list-style-type: none"> <li>1 Define a SAS Visual Analytics Administrator (use the account previously created (saslasradm)).</li> <li>2 Assign the administrator to the Visual Analytics Data Administrators group and the Visual Data Builder Administrators group.</li> </ol>	<i>SAS Management Console: Guide to Users and Permissions</i>
Create sample data for use later in the validation.	<p>In SAS Management Console, define a library and register a table.</p> <p>(You can use Sashelp: !SASROOT/sashelp.)</p>	<i>SAS Intelligence Platform: Data Administration Guide</i>
Validate that the home page is running and valid logins are accepted.	<p>Sign on to the home page as saslasradm.</p> <p>(<a href="http://va-host.example.com/SASVisualAnalyticsHub">http://va-host.example.com/SASVisualAnalyticsHub</a>)</p>	<i>SAS Visual Analytics: User's Guide</i>

Purpose	Actions	More Information
Demonstrate that SAS Visual Analytics Administrator is functional and able to communicate with the SAS LASR Analytic Server.	<p>On the home page, click <b>Administrator</b>. Then, do the following:</p> <ol style="list-style-type: none"> <li>1 Start a SAS LASR Analytic Server.</li> <li>2 Load a SAS table into SAS LASR Analytic Server.</li> </ol>	<i>SAS Visual Analytics: Administration Guide</i>
Demonstrate that SAS Visual Data Builder is functional.*	<p>On the home page, click <b>Create Data Query</b>. Then, do the following:</p> <ol style="list-style-type: none"> <li>1 Create a data query.</li> <li>2 Click <b>Home</b> in the banner to return to the home page.</li> </ol>	<i>SAS Visual Analytics: User's Guide</i>
Demonstrate that SAS Visual Analytics Explorer is functional.**	<p>On the home page, click <b>Create Exploration</b>. Then, do the following:</p> <ol style="list-style-type: none"> <li>1 Create an exploration.</li> <li>2 Click <b>Home</b> in the banner to return to the home page.</li> </ol>	<i>SAS Visual Analytics: User's Guide</i>
Demonstrate that SAS Visual Analytics Report Viewer is functional.	<p>On the home page, click <b>Create Report</b>. Then, do the following:</p> <ol style="list-style-type: none"> <li>1 Create a report.</li> <li>2 Click <b>Home</b> in the banner to return to the home page</li> </ol>	<i>SAS Visual Analytics: User's Guide</i>
Demonstrate that SAS Visual Analytics Designer is functional.	<p>On the home page, click on a report. Use the object inspector on the home page to view details about the report, and then click <b>View</b>.</p>	<i>SAS Visual Analytics: User's Guide</i>

Purpose	Actions	More Information
Demonstrate that SAS Mobile BI is operable.	Deploy SAS Mobile BI. View a SAS Visual Analytics report on a mobile device.	<i>SAS Visual Analytics: User's Guide</i>

- \* SAS Visual Data Builder requires that a SAS identity be a member of the Visual Data Builder Administrators group. Members of the Visual Analytics Data Administrators group do not have access to SAS Visual Data Builder.
- \*\* Some SAS orders do not contain SAS Visual Analytics Explorer.

## Validating Your SAS LASR Analytic Server Monitor Deployment

On distributed server deployments only, certain features in the SAS Visual Analytics Administrator rely on the SAS LASR Analytic Server Monitor.

To validate the SAS LASR Analytic Server Monitor deployment, follow these steps:

- 1 Log on to the SAS LASR Analytic Server Monitor machine (blade 0) using the SAS installer account.
- 2 Change to the SAS LASR Analytic Server Monitor configuration directory.  
By default, this directory is located at *SAS-configuration-directory/Applications/SASVisualAnalytics/HighPerformanceConfiguration*.
- 3 Run the LASRMonitor.sh script with a user account that normally starts the SAS LASR Analytic Server or with a user account that has Read permission on the lasrmonitor.pid file. (The lasrmonitor.pid file is in the same folder as the LASRMonitor.sh script.)
- 4 Enter the following command to confirm that SAS LASR Analytic Server Monitor is running:

```
LASRMonitor.sh status
```

- 5** If the SAS LASR Analytic Server Monitor is not running, enter the following command:

```
LASRMonitor.sh start
```

For more information, see the [SAS Visual Analytics: User's Guide](#).





# 6

## What to Do Next: Administration Tasks

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### Overview of Required Administration Tasks

After installing and configuring SAS Visual Analytics using the SAS Deployment Wizard, you must perform certain administration tasks. These tasks are organized into the following topics:

- “Review Post-deployment Documentation” on page 210
- “Check Status for SAS Visual Analytics Servers” on page 210
- “Create SAS Users and Groups” on page 211
- “SAS Web Application Required Tasks” on page 212

---

## Review Post-deployment Documentation

Review the `Instructions.html` file that is generated by the SAS Deployment Wizard. This file provides an overview of the configuration guidelines and details. Any warnings that were generated during the deployment process are described in this file. The file is in the following location:

`SAS-config-dir/Levn/Documents/Instructions.html`

---

## Review SAS Intelligence Platform Post-deployment Documentation

Review the chapter, “What to Do Next: Administration Tasks” in the *SAS Intelligence Platform: Installation and Configuration Guide*.

---

## Check Status for SAS Visual Analytics Servers

Ensure that the SAS Visual Analytics servers are running:

- The status of SAS High-Performance Computing Management Console on the server tier is checked with the following command:

```
service sashpcmc status
```

- The status of the server-tier SAS servers is checked with the following command:

```
SAS-config-dir/Levn/sas.servers status
```

For more information, see *SAS Intelligence Platform: System Administration Guide*.

- The status of SAS LASR Analytic Server Monitor is checked with the following command:

```
SAS-config-dir/Levn/Applications/SASVisualAnalytics/  
HighPerformanceConfiguration/LASRMonitor.sh status
```

For more information, see “Managing the Monitoring Server” in the *SAS Visual Analytics: Administration Guide*.

- The status of SAS Information Retrieval Studio server is checked with the following command:

```
SAS-config-dir/Levn/Applications/  
SASInformationRetrievalStudioforSAS/IRStudio.sh status
```

For more information, see Chapter 14, “Administering the Search Facility,” in *SAS Intelligence Platform: Middle-Tier Administration Guide*.

---

## Create SAS Users and Groups

The following tasks related to SAS users and groups need to be performed. For more information, see the *SAS Visual Analytics: Administration Guide*, available at <http://support.sas.com/documentation/onlinedoc/va/index.html>.

- Create operating system groups and user accounts for data administrators on the machines in the cluster.
- Create SAS metadata users for the operating system accounts for data administrators and add these users to the Visual Analytics Data Administrators group.  
  
(Membership in the Visual Analytics Data Administrators group grants metadata users explicit permission to use a default library for the distributed database.)
- Create groups and users in SAS metadata for SAS Visual Analytics Explorer, SAS Visual Analytics Designer, and the mobile viewers.

For more information, see “Roles and Capabilities” in the *SAS Visual Analytics: Administration Guide*, available at <http://support.sas.com/documentation/onlinedoc/va/index.html>.

## SAS Web Application Required Tasks

The following SAS Web Application tasks must be performed:

- Specify the application-specific ulimit settings for SAS Web Application Server. In this document, SAS Web Application Server resides on blade 0.
  - Specify the following ulimit settings for the SAS Web Application Server instance. The file is named *SAS-configuration-directory/Web/WebAppServer/SASServer1\_1/bin/setenv.sh*.

For a deployment with multiple JVM deployments, update SASServer12\_1. For a single JVM deployment, update SASServer1\_1:

```
ulimit -n 20480
ulimit -u 8192
ulimit -s 256
```

**Note:** These ulimit settings are set in the start-up scripts and not at the system level in */etc/security/limits.conf*.

**Note:** These ulimit settings correspond to the suggested JVM options for SAS Web Application Server. For more information, see “[SAS Remote Services Application: JVM](#)” on page 172.

- Specify ulimits for SAS Visual Analytics in */etc/security/limits.conf*.

The following is an example of ulimit settings. This can vary for deployments.

```
ulimit -n 150000
ulimit -u 100000
ulimit -s 10240
```

- By default, SAS Visual Analytics schedules cron to run the *loadindex.sh* command on a specified interval.

For more information, see Chapter 14, “Administering the Search Facility,” in *SAS Intelligence Platform: Middle-Tier Administration Guide* available at <http://support.sas.com/documentation/cdl/en/bimtag/66823/HTML/default/viewer.htm#n0nuakqai7ar47n1uaj8hw1jggg6.htm>.

For more information about these two tasks, see the *SAS Visual Analytics: Administration Guide*, available at <http://support.sas.com/documentation/onlinedoc/va/index.html>.



# Appendix 1

## Deploying SAS LASR Analytic Server in a Different Mode

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## Overview of Deploying SAS LASR Analytic Server in a Different Mode

SAS LASR Analytic Server has two modes of operation:

- Distributed mode runs in a distributed computing environment and performs analytic tasks on data that is loaded in memory.
- Non-distributed mode runs on a single machine.

For documentation about deploying SAS Visual Analytics for a non-distributed SAS LASR Analytic Server, see the *SAS Visual Analytics: Installation and Configuration*

*Guide (Non-distributed SAS LASR)*, available at <http://support.sas.com/documentation/solutions/va/index.html>.

SAS enables you to license SAS LASR Analytic Server to run in distributed mode, non-distributed mode, or both modes. The server mode that you deploy and run is driven by the contents of your order and the license that accompanies it. For more information, see your SAS representative.

Using the SAS Deployment Wizard and the SAS Deployment Manager, you can do the following:

- Deploy the server in non-distributed mode.

For more information, see “[Deploy Visual Analytics with SAS LASR Analytic Server in Non-distributed Mode](#)” on page 216.

- Deploy the server in distributed mode.

For more information, see “[Deploying SAS Visual Analytics Interactively](#)” on page 144.

- Add a server to run in non-distributed mode.

For sites that are licensed for both server modes, you can add and run a server in non-distributed mode. For more information, see “[Add a SAS LASR Analytic Server to Run in Non-distributed Mode](#)” on page 217.

- Convert a non-distributed server to a distributed server.

Your non-distributed servers are upgraded, and you can run the server in distributed mode only. For more information, see “[Convert a Non-distributed SAS LASR Analytic Server to Distributed Mode](#)” on page 217.

---

## **Deploy Visual Analytics with SAS LASR Analytic Server in Non-distributed Mode**

For documentation about deploying SAS Visual Analytics for a non-distributed SAS LASR Analytic Server, see the *SAS Visual Analytics: Installation and Configuration*



*Guide (Non-distributed SAS LASR)*, available at <http://support.sas.com/documentation/solutions/va/index.html>.

---

## Add a SAS LASR Analytic Server to Run in Non-distributed Mode

For sites that are licensed to run both server modes, the SAS Deployment Wizard prompts you during installation to deploy SAS LASR Analytic Server in distributed mode only. (Actually, the non-distributed mode is deployed silently.) When sites are licensed for both server modes, to create a non-distributed SAS LASR Analytic Server, you use SAS Management Console.

For more information, see the *SAS Visual Analytics: Administration Guide*, available at <http://support.sas.com/documentation/onlinedoc/va/index.html>.

---

## Convert a Non-distributed SAS LASR Analytic Server to Distributed Mode

When converting to distributed mode, your non-distributed servers are upgraded, and SAS retains their names. (We recommend that you rename these new distributed servers.)

To convert your SAS LASR Analytic Server to run in distributed mode, follow these steps:

- 1 Shut down your SAS server and middle tiers.

For more information, see the *SAS Intelligence Platform: System Administration Guide*, available at <http://support.sas.com/documentation/cdl/en/bisag/66813/PDF/default/bisag.pdf>.

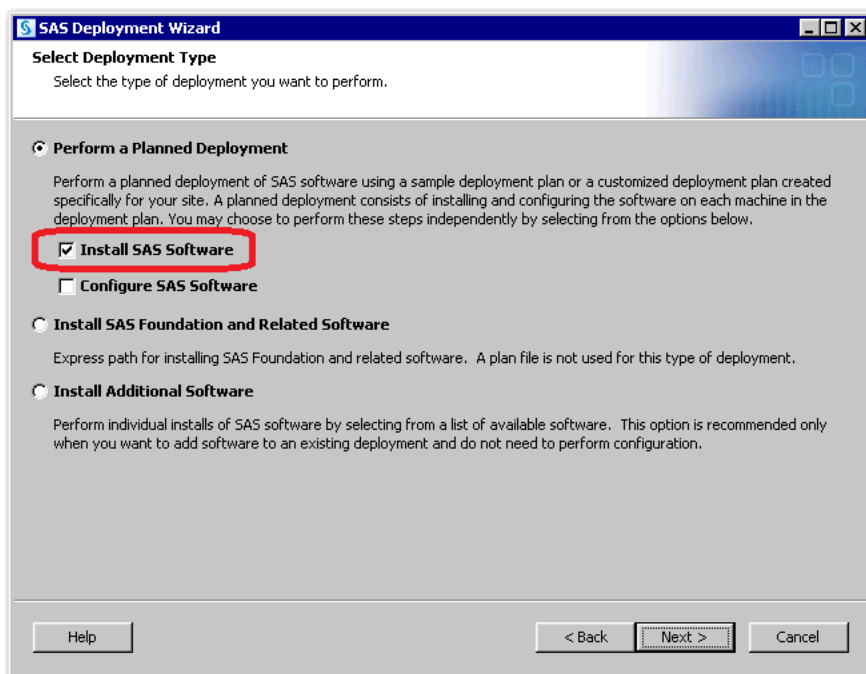
- 2 Deploy the SAS High-Performance Analytics environment on your data appliance or machine cluster.

For more information, see the *SAS High-Performance Analytics Infrastructure: Installation and Configuration Guide*, available at <http://support.sas.com/documentation/solutions/hpainfrastructure/index.html>.

### 3 Run the SAS Deployment Wizard with it set to install only.

Follow the directions in the topic, “[Deploying SAS Visual Analytics Interactively](#)” on [page 144](#). When the Select Deployment Type page appears, make sure that you choose **Install SAS Software**. Make sure that **Configure SAS Software** is deselected.

**Figure A1.1** SAS Deployment Wizard Install Mode



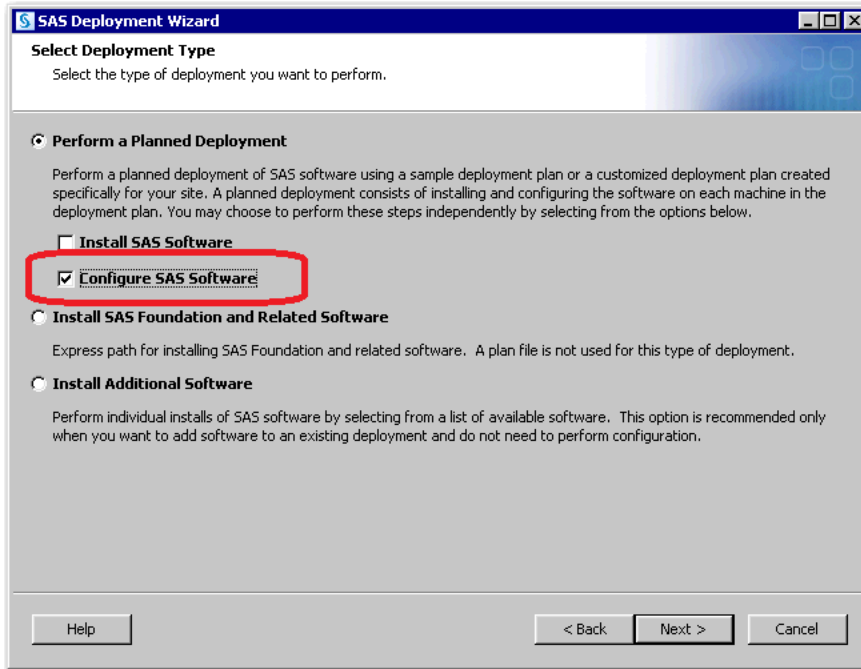
### 4 When the wizard is finished, restart your SAS server tier.

For more information, see Chapter 6, “Operating Your Servers,” in *SAS Intelligence Platform: System Administration Guide*, available at <http://support.sas.com/documentation/cdl/en/bisag/66813/PDF/default/bisag.pdf>.

### 5 Rerun the SAS Deployment Wizard with it set to configure only.

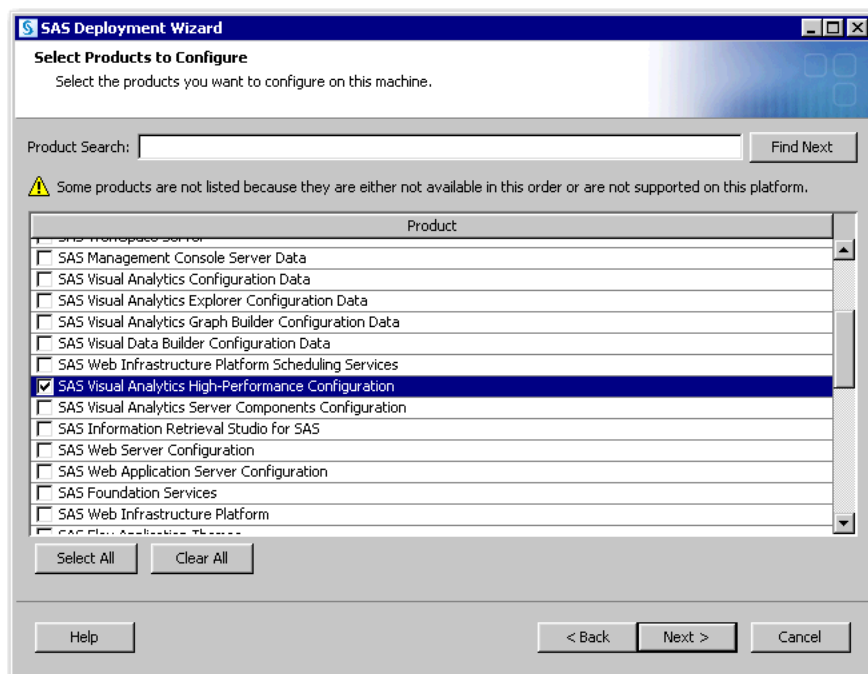
Follow the directions in the topic, “Deploy SAS Visual Analytics Interactively.” When the Select Deployment Type page appears, make sure that you choose **Configure SAS Software**. Make sure that **Install SAS Software** is deselected.

*Figure A1.2 SAS Deployment Wizard Configure Mode*



**Note:** When prompted for the SAS configuration directory, make sure that you specify the directory that contains your pre-existing SAS Visual Analytics configuration.

When the wizard displays the Select Products to Configure page, it is important that you choose **SAS Visual Analytics High-Performance Configuration**.

**Figure A1.3** SAS Visual Analytics High-Performance Configuration

- 6 When the wizard is finished, rebuild the SAS Visual Analytics Administrator application.

For more information, see “Rebuilding the SAS Web Applications” in Chapter 8 of *SAS Intelligence Platform: Middle-Tier Administration Guide*, available at <http://support.sas.com/documentation/cdl/en/bimtag/66823/PDF/default/bimtag.pdf>.

- 7 After you rebuild the SAS Visual Analytics Administrator application, make sure that you also redeploy it. For more information, see “Redeploying the SAS Web Applications” in Chapter 8 of *SAS Intelligence Platform: Middle-Tier Administration Guide*, available at <http://support.sas.com/documentation/cdl/en/bimtag/66823/PDF/default/bimtag.pdf>.
- 8 Make sure that the signature file path for SAS LASR Analytic Server exists on the root node machine.
- 9 Regenerate all pre-existing code maintained by SAS applications (SAS Visual Analytics, SAS Enterprise Guide, SAS Data Integration Studio, and so on) that

contain LIBNAME statements that reference SAS LASR Analytic Server tables. (You must also redeploy any scheduled jobs for this code.)



# Appendix 2

## Migrating SAS Visual Analytics

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---

## Overview of Migrating SAS Visual Analytics

### How to Use This Document

This document is designed to be used with the *SAS Intelligence Platform: Migration Guide* and previous sections of the *SAS Visual Analytics: Installation and Configuration Guide (Distributed SAS LASR)*.

### What Is Migration and What Is Supported?

Migration is a process in which your SAS content and configuration from an earlier SAS release are upgraded to run in a later SAS release. Same release migration is also possible (for example, 7.1 to 7.1). When performed successfully, migration attempts to preserve as much of your current content and configuration as possible, reduce the number of manual upgrade tasks, and minimize system downtime.

SAS provides automated migration tools—the SAS Migration Utility and the SAS Deployment Wizard. You can migrate with the SAS automated migration tools in the following scenarios:

- SAS Visual Analytics 6.1 to SAS Visual Analytics 7.1
- SAS Visual Analytics 6.2 to SAS Visual Analytics 7.1
- SAS Visual Analytics 6.3 to SAS Visual Analytics 7.1
- SAS Visual Analytics 6.4 to SAS Visual Analytics 7.1
- SAS Visual Analytics 7.1 to SAS Visual Analytics 7.1

Migration is a one-time operation to deploy SAS Visual Analytics 7.1 and upgrade your release 6.1, 6.2, 6.3, or 6.4 content. By contrast, you can choose to do the following:

- Deploy SAS Visual Analytics 7.1 and use promotion to upgrade your content piece by piece.



For more information, see “Comparing Promotion and Migration” in Chapter 1 of *SAS Intelligence Platform: Migration Guide*.

- Upgrade to SAS Visual Analytics 7.1.

For more information, see [“Upgrading SAS Visual Analytics” on page 251](#).

As with all migrations of SAS software, the system to which you are migrating (target) must have the same number of machines on the same operating systems as the system from which you are migrating (source).

Provided that you are properly licensed, you can change the type of SAS LASR Analytic Server (distributed or non-distributed) in your SAS Visual Analytics environment with the automated migration tools. SAS LASR Analytic Server migration supports the following:

- non-distributed to non-distributed
- distributed to distributed
- non-distributed and distributed to non-distributed and distributed
- non-distributed to distributed

The following deployments are *not* supported by the automated migration tools:

- data migration from distributed to non-distributed
- earlier SAS Visual Analytics deployments where the SAS High-Performance Analytics environment is co-located with a Greenplum Data Computing Appliance or a Teradata Managed Server Cabinet

The alternative to migration is to use partial promotion or to perform a software update. For more information, see “Introduction to the Promotion Tools” in Chapter 21 of *SAS Intelligence Platform: System Administration Guide* and *SAS Guide to Software Updates*.

## A High-Level View of Migration

The following list summarizes the steps required to install SAS 9.4 and migrate earlier SAS version content on a single machine or in a distributed, heterogeneous environment:

1. Review additional documentation on page 226.
2. Design your migration on page 226.
3. Perform pre-migration tasks on page 227.
4. Upgrade your SAS High-Performance Analytics infrastructure on page 227.
5. Install SAS Visual Analytics 7.1 and migrate your content on page 227.
6. Perform post-migration tasks on page 228.
7. Validate your migration on page 228.

The sections that follow provide brief descriptions of each of these tasks. Subsequent sections provide the step-by-step instructions that you need to perform.

## **Step 1: Review Additional Documentation**

It is very important to review all of the different documents associated with deploying your SAS software. There can be late-breaking information. Or, instructions that are specific to a particular configuration might be too narrow to be included in the *SAS Visual Analytics: Installation and Configuration Guide (Distributed SAS LASR)*. For more information, see [“Reviewing Additional Documentation” on page 228](#).

## **Step 2: Design Your Migration**

Designing your migration means reviewing the SAS Visual Analytics 7.1 requirements (hardware, software, and migration), comparing them to your current deployment, and developing a plan for how to get your SAS content—your data and configuration—integrated into a SAS Visual Analytics 7.1 system.

Download your software order. In the SAS Software Depot that contains your order, run the SAS Migration Utility to generate a migration analysis report. Using this report, you can analyze every machine in your current SAS Visual Analytics deployment to answer these crucial design questions:

- Which SAS products currently reside on each machine?

- Are there any changes that I need to make to my current deployment before migrating?

The SAS Software Depot contains SAS Visual Analytics 7.1 software that you deploy in a later step.

For more information, see “[Designing Your Migration](#)” on page 230.

### Step 3: Perform Pre-migration Tasks

During the pre-migration task phase, using the SAS Migration Utility, you create a migration package that contains your current SAS data and configuration. In a later step, the SAS Deployment Wizard uses your migration package as input to move your earlier SAS content successfully to SAS Visual Analytics 7.1.

For more information, see “[Performing Pre-migration Tasks](#)” on page 231.

### Step 4: Upgrade Your SAS High-Performance Analytics Infrastructure

Follow the steps in the topic, Appendix 2, “Updating the SAS High-Performance Analytics Infrastructure,” in *SAS High-Performance Analytics Infrastructure: Installation and Configuration Guide*, available at <http://support.sas.com/documentation/solutions/hpainfrastructure/index.html>.

**Note:** SAS Visual Analytics 7.1 requires that you use SAS High-Performance Analytics environment 2.9 or higher.

### Step 5: Install SAS Visual Analytics 7.1 and Migrate Your Content

In step four, you use the SAS Deployment Wizard to install SAS Visual Analytics 7.1 and to migrate your current SAS content and configuration that you packaged using the SAS Migration Utility in step three. During your deployment wizard session, you select the migration option.

For more information, see “[Deploying SAS Visual Analytics 7.1 and Migrating Your Content](#)” on page 233.

## **Step 6: Perform Post-migration Tasks**

Step five consists of performing any required manual tasks to complete your migration.

For more information, see “[Performing Post-Migration Tasks](#)” on page 234.

## **Step 7: Validate Your Migration**

An important final step in migration is validating that your SAS Visual Analytics 7.1 servers, clients, middle tier, and web clients are functioning and can use migrated content from your earlier SAS Visual Analytics release.

For a discussion of functionality changes in SAS Visual Analytics 7.1, see *SAS Guide to Software Updates*.

For more information, see the “[Validating Your Migrated Deployment](#)” on page 236.

---

## **Reviewing Additional Documentation**

Your review should include these documents:

- QuickStart Guide

This document is shipped with your SAS software. Follow its instructions.

The QuickStart Guides are also available online:

- Windows: <http://support.sas.com/documentation/installcenter/94/win/index.html>
- Linux: <http://support.sas.com/documentation/installcenter/94/unx/index.html>

- software order e-mail (SOE)

This e-mail is sent to your site to announce the software and detail the order. It enumerates the initial installation steps and, for SAS 9.4, contains instructions for

using Electronic Software Delivery (ESD), if applicable, and the SID file. The SID file contains your site's SAS license (SETINIT).

- SAS order information (SOI)

After you download your order to an existing SAS Software Depot, you can use the SAS order information (SOI) file to determine what products were in your order and when the order was placed. The SOI is in your SAS Software Depot in `install_doc/order-number/soi.html`.

- SAS software summary

In the same depot location as the SOI, the SAS software summary is a more detailed list of the software included in your order. Unlike the SAS order information, which lists only the software that you have specifically ordered, this document also describes the included software that supports your order. The SAS software summary is in your SAS Software Depot in `install_doc/order-number/ordersummary.html`.

**Note:** The SAS Deployment Wizard installs only what is listed in the deployment plan. The SAS software summary might list more products than the deployment plan. For more information, see “About Deployment Plans” in Chapter 6 of *SAS Intelligence Platform: Installation and Configuration Guide*.

- SAS 9.4 system requirements

<http://support.sas.com/resources/sysreq/index.html>

- SAS Visual Analytics system requirements

- *System Requirements—SAS Visual Analytics (Distributed Mode)*, available at

- at <http://support.sas.com/documentation/installcenter/en/ikvisanalytofrsr/68017/HTML/default/index.html>

- *System Requirements—SAS Visual Analytics (Non-distributed Mode)*, available

- at <http://support.sas.com/documentation/installcenter/en/ikvisanalytofrndmsr/68018/HTML/default/index.html>

- SAS Notes

Outstanding SAS Notes for alert status installation problems are available at <http://support.sas.com/notes/index.html>.

- For a discussion of functionality changes in SAS Visual Analytics 7.1, see the *SAS Guide to Software Updates*, available at <http://support.sas.com/documentation/cdl/en/whatsdiff/66129/PDF/default/whatsdiff.pdf>.

---

## Designing Your Migration

Consult the chapter, “Designing Your Migration,” in the *SAS Intelligence Platform: Migration Guide*, when designing your SAS Visual Analytics migration.

The tasks required for designing your migration are as follows:

- 1 Understand the high-level SAS migration requirements.

Consult “High-Level SAS Migration Requirements” in the *SAS Intelligence Platform: Migration Guide*.

- 2 Determine which SAS products reside on each machine.

Run a SAS migration analysis report on your SAS Visual Analytics server and middle tier machine. (Do not run the migration utility on the SAS High-Performance Analytics environment.)

- To report on SAS Visual Analytics 6.1, use smu93.
- To report on SAS Visual Analytics 6.2 and later, use smu94.

For more information, see “Inventorying Your Current SAS Deployment” in the *SAS Intelligence Platform: Migration Guide*.

- 3 Obtain a SAS 9.4 deployment plan.

With a current migration analysis report at hand, contact your SAS representative to obtain a valid SAS 9.4 deployment plan for your current SAS deployment.

**Note:** The SAS Visual Analytics Explorer Server Configuration component in release 6.1 has been merged into SAS Visual Analytics Server Components.

- 4 Plan SAS user downtime at your site.

You need to schedule a window of time when your SAS deployment is not being used to install and configure SAS 9.4 and migrate your SAS content.

---

## Performing Pre-migration Tasks

Consult “Performing Pre-migration Tasks” in the *SAS Intelligence Platform: Migration Guide*.

Pre-migration tasks are as follows:

**1** Back up your current SAS deployment.

This is a best practice to ensure that your current SAS deployment is protected.

For more information, see “Best Practices for Backing Up and Restoring Your SAS Content” in the *SAS Intelligence Platform: System Administration Guide*.

**2** Apply required maintenance to any current SAS products.

During your migration design, you identified any current SAS products that required maintenance before you can migrate them.

For more information, see “Apply Any Required SAS Maintenance” in the *SAS Intelligence Platform: Migration Guide* and the *SAS Guide to Software Updates*, available at <http://support.sas.com/documentation/cdl/en/whatsdiff/66129/PDF/default/whatsdiff.pdf>.

**3** Complete all pre-migration checklists.

The SAS Deployment Wizard prompts you for the required operating system accounts that you used with SAS and for ports to designate for the new SAS 9.4 servers.

For more information, see “Completing the Pre-migration Checklists” in the *SAS Intelligence Platform: Migration Guide*.

**4** Create a SAS 9.4 Software Depot.

The SAS Software Depot contains the SAS installation files used by the SAS Deployment Wizard to install and configure SAS 9.4.

For more information, see “Creating SAS Software Depots” in the *SAS Intelligence Platform: Migration Guide*.

## 5 Create a migration package.

Using the SAS Migration Utility, you create a package containing your current SAS data and configuration that the SAS Deployment Wizard uses.

(Do not run the migration utility on the SAS High-Performance Analytics environment.)

- To package SAS Visual Analytics 6.1, use smu93.
- To package SAS Visual Analytics 6.2 and later, use smu94.

For more information, see “Create the Migration Package” in the *SAS Intelligence Platform: Migration Guide*.

---

## Upgrading Your SAS High-Performance Analytics Infrastructure

Follow the steps in the topic, Appendix 2, “Updating the SAS High-Performance Analytics Infrastructure,” in *SAS High-Performance Analytics Infrastructure: Installation and Configuration Guide*, available at <http://support.sas.com/documentation/solutions/hpainfrastructure/index.html>.

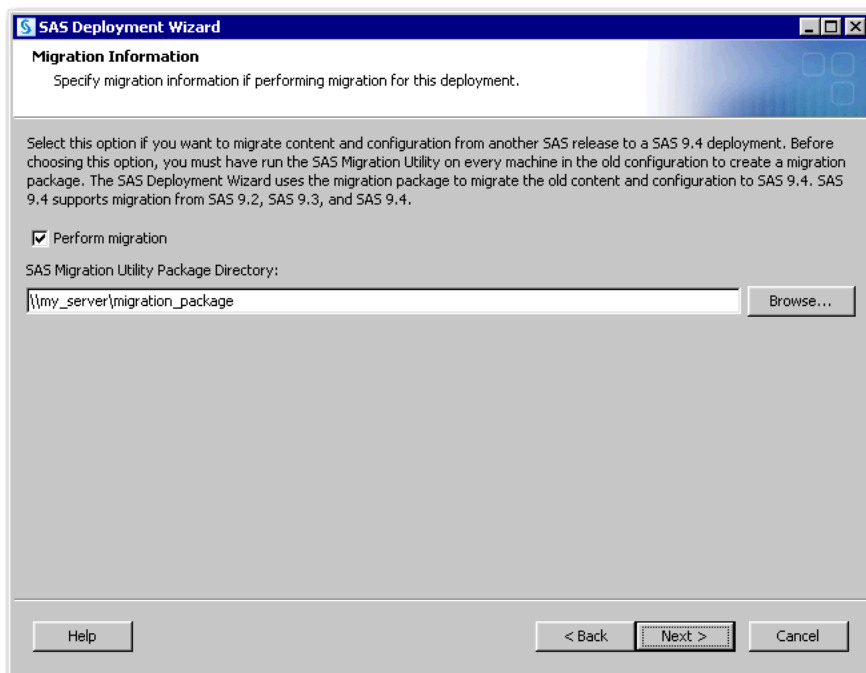
**Note:** SAS Visual Analytics 7.1 requires that you use SAS High-Performance Analytics environment 2.9 or higher.



## Deploying SAS Visual Analytics 7.1 and Migrating Your Content

The deploy step when performing a migration is similar to a typical SAS Visual Analytics deployment experience. The major difference is that early in the SAS Deployment Wizard session, you select the **Perform migration** option.

*Figure A2.1 Migration Information Page*



On the Remap Ports page, by default, the wizard assumes that ports used in your current SAS deployment are identical to the ports that will be used in your SAS Visual Analytics 7.1 deployment. Use this page if you want to specify different ports in your SAS Visual Analytics 7.1 deployment. The wizard displays the port being used in your current SAS deployment (**Port from Source** column). To specify a different port to use for SAS Visual Analytics 7.1, click the **Port for Target** cell in the appropriate row for the SAS product and enter the new port number.

**Figure A2.2** Remap Ports Page

**SAS Deployment Wizard**

**Remap Ports**  
Select new ports for migrating products.

In the table below, the Port from Source column contains the ports defined in your current deployment. You can change the ports to be used in the new deployment by editing the port numbers in the Port for Target column.

Product Instance	Port from Source	Port for Target
SAS Deployment Tester - Server	10021	10021
Metadata Server Alert E-mail Port	25	25
SAS Metadata Server Configuration	8561	8561
A51EZTIPPortBank_1	8811	8811
A51EZTIPPortBank_2	8821	8821
Connection: Object Spawner - pubhdc1	8581	8581
A51EZTIPPortBank_0	8801	8801
Connection: SASApp - OLAP Server	5451	5451
Connection: Operating System Services - pubhdc1	8451	8451
LB Conn 3: SASApp - Stored Process Server	8631	8631
LB Conn 2: SASApp - Stored Process Server	8621	8621
LB Conn 1: SASApp - Stored Process Server	8611	8611
Connection: SASApp - Stored Process Server	8601	8601
SAS Web Infrastructure Platform Data Server Configuration	9432	9432
Connection: SASApp - Workspace Server	8591	8591
Connection: SASApp - Pooled Workspace Server	8701	8701

Help      < Back      Next >      Cancel

For more information, follow the directions in [Chapter 5, “Deploying the SAS Visual Analytics Server and Middle Tier,”](#) on page 125.

## Performing Post-Migration Tasks

After deploying SAS Visual Analytics 7.1 and migrating your content, complete the following post-migration tasks:

- Regenerate all pre-existing code maintained by SAS applications (SAS Visual Analytics, SAS Enterprise Guide, SAS Data Integration Studio, and so on) that contains LIBNAME statements that reference SAS LASR Analytic Server tables. (You must also redeploy any scheduled jobs for this code.)
- The SAS Migration Utility migrates autoload files to the target system. However, before you can use these autoload files, you must update the host names and paths that they reference.

For your convenience, the SAS Migration Utility locates these migrated autoload files in a subdirectory named **backup** under the following directory (**SAS-configuration-directory/Levn/AppData/SASVisualAnalytics/VisualAnalyticsAdministrator**).

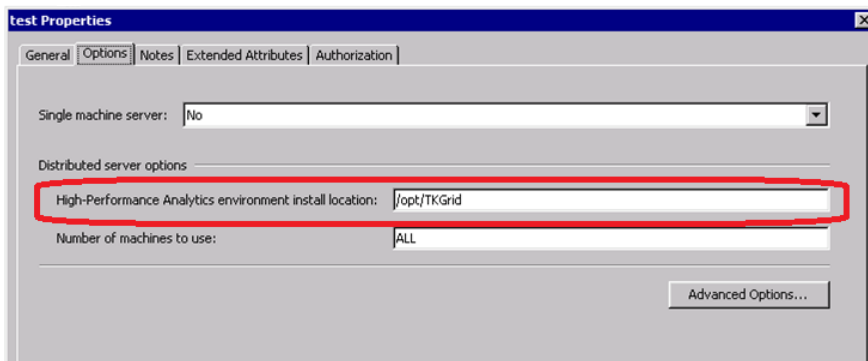
- Starting with SAS Visual Analytics 6.4, you are no longer prompted for the path to the TKGrid installation on the SAS High-Performance Analytics environment root node host.

If this location has changed for release 7.1, then after migration, you must do the following:

- 1 Shut down your SAS LASR Analytic Servers.

For more information, see “Operating Servers” in Chapter 1 of *SAS Visual Analytics: Administration Guide*.

- 2 Manually modify the **High-Performance Analytics environment install location** property using SAS Management Console (**Plug-ins ► Server Manager**, right-click the server, and select **Properties ► Options**).



For more information, see “Add a SAS LASR Analytic Server” in Chapter 5 of *SAS Visual Analytics: Administration Guide*

- 3 Restart your SAS LASR Analytic Servers.

For more information, see “Operating Servers” in Chapter 1 of *SAS Visual Analytics: Administration Guide*.

- Custom themes must be redeployed. For more information, see the *SAS Theme Designer for Flex: User's Guide*, available at <http://support.sas.com/documentation/onlinedoc/va/index.html>.
- Consult “Performing Post-migration Tasks” in the *SAS Intelligence Platform: Migration Guide*.
- Also, review “[Migration Considerations for SAS Visual Analytics 7.1](#)” on page 236.

---

## Validating Your Migrated Deployment

Consult “Validating Your SAS Migrated Deployment” in the *SAS Intelligence Platform: Migration Guide*.

Also, review “[Validating Your SAS LASR Analytic Server Monitor Deployment](#)” on page 206.

---

## Migration Considerations for SAS Visual Analytics 7.1

Because of the many ways that you can customize SAS Visual Analytics, the automated SAS migration tools cannot fully migrate all user customizations. The following list describes actions that you might need to perform to complete your SAS Visual Analytics 7.1 migration:

- Migration for user-created SAS LASR Analytic Servers is only partially supported. After migration, you must specify their port numbers and any changes to the install paths or signature files paths.
- The metadata labels for the two SAS LASR Analytic Servers created at installation remain the same. If these labels are to be changed in SAS Visual Analytics 7.1, you must do this manually.
- SAS Visual Analytics 6.1 GeoMap data sets are replaced when migrating.

- SAS LASR Analytic Server names are maintained. (The server names automatically created by the SAS Deployment Wizard include the host name. If you choose, you can easily change server names using SAS Management Console.)
- A device limitation whitelist is new for SAS Visual Analytics after release 6.1. The previous SAS Visual Analytics 6.1 blacklist is migrated forward. When doing a SAS Visual Analytics migration, both the blacklist and the whitelist are migrated. When a database other than Postgres is used, special migration utility properties must be specified. For more information, see “Product-Specific SAS Migration Utility Properties” in *SAS 9.4 Intelligence Platform: Migration Guide*.
- During migration from SAS Visual Analytics 6.1, the metadata user groups **Visual Analytics Admin Group** and **Visual Analytics Data Builder Group** are renamed to **Visual Analytics Admin** and **Visual Analytics Data Builder**, respectively.
- Java Virtual Machine (JVM) settings for SAS Visual Analytics web applications are not migrated from release 6.1. The JVM settings used in release 7.1 are the values supplied to the SAS Deployment Wizard during migration.



# Appendix 3

## Configuration Options by Prompt Level

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### Overview of Configuration Options By Prompting Level

Shortly after you begin running the SAS Deployment Wizard to interactively install and initially configure SAS, you are asked to choose between three wizard prompting levels:

#### **Express**

displays the minimum number of wizard pages needed to complete the SAS configuration.

#### **Typical**

displays the basic set of wizard pages needed to complete the SAS configuration.

#### **Custom**

displays all the wizard pages needed to complete the SAS configuration.

Figure A3.1 Select Configuration Prompting Level Page

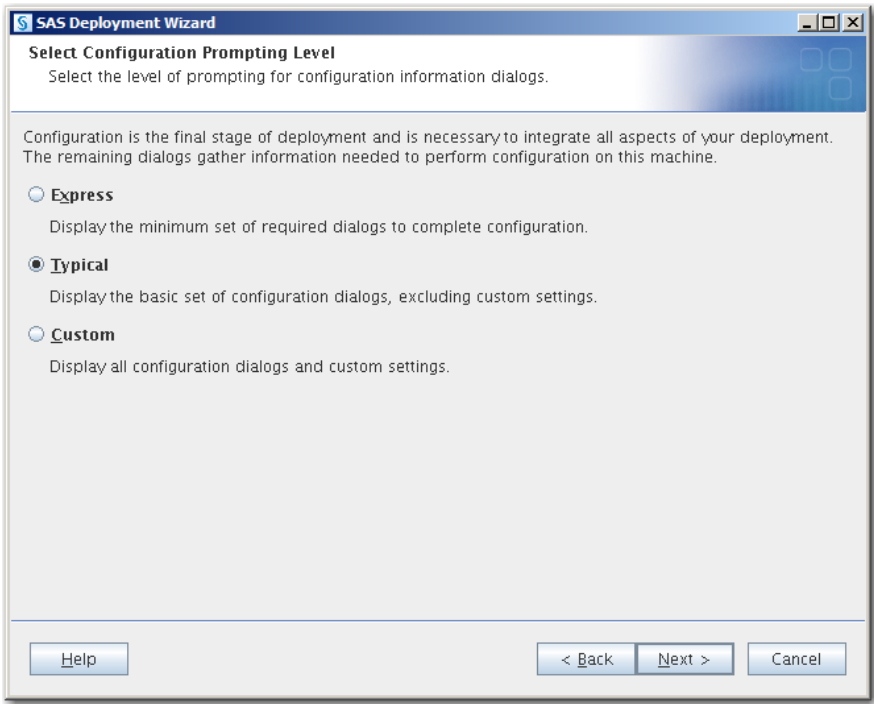


Table A3.1 on page 241 lists the SAS Deployment Wizard pages found in these prompting levels.

---

## Configuration Options by Prompt Level

The following table lists the configuration options and the prompting level in which they appear for the SAS Intelligence Platform only. For a list of the configuration options for SAS Visual Analytics, see “[SAS Visual Analytics Configuration Options](#)” on page 129.

Depending on your configuration, you might see differences for the prompting level in which a particular option is displayed. This is one example of a prompting level and configuration option mapping for a sample configuration.

**Note:** The configuration options that you encounter depend on which SAS products are identified in your deployment plan. They also depend on (in multiple machine deployments) the machine that you are currently deploying.



**Table A3.1** Configuration Options By Prompting Level

Configuration Option in the SAS Deployment Wizard	Prompting Level That Displays the Option		
	Express	Typical	Custom
Select Configuration Prompting Level on page 156*	X	X	X
Specify Configuration Information on page 157*	X	X	X
Migration Information on page 158*	X	X	X
Deployment Accounts: Type of Accounts on page 163*	X	X	X
External Account: Installer on page 163*	X	X	X
SAS Internal Account: Unrestricted Administrator on page 164*	X	X	X
SAS Internal Account: Trusted User on page 165*	X	X	X
SAS Internal Account: Anonymous Web User on page 166*	X	X	X
External Account: SAS Spawned Servers Account on page 167*	X	X	X
E-mail Server on page 169*	X	X	X
E-mail Addresses	X	X	X
E-mail Server: Authentication Credentials	X	X	X
SAS Web Infrastructure Platform Data Server on page 171*	X	X	X
SAS Web Server: Configuration on page 173*	X	X	X
SAS Web Server: Location of X509 Certificate and RSA Private Key on page 174*	X	X	X
SAS Web Application Server: Server Ports	X	X	X

Configuration Option in the SAS Deployment Wizard	Prompting Level That Displays the Option		
	Express	Typical	Custom
SAS Web Infrastructure Platform Database: JDBC Properties on page 179*	X	X	X
SAS Environment Manager: Administration Database Configuration on page 180*	X	X	X
SAS Internal Account: SAS Environment Manager Service Account on page 180*	X	X	X
SAS Environment Manager: Database Configuration on page 181*	X	X	X
SAS Environment Manager Enablement Kit Database on page 182*	X	X	X
SAS Visual Analytics Services Database Credentials on page 189*	X	X	X
SAS Visual Data Builder Database Credentials on page 191*	X	X	X
SAS Internal Account: Search Interface to SAS Content User on page 192*	X	X	X
Local Machine Name on page 158*		X	X
Windows Options on page 160*		X	X
Windows Shortcuts		X	X
Integrated Windows Authentication on page 160*		X	X
Token Based Authentication on page 161*		X	X
SAS Metadata Server on page 162*		X	X
SAS Metadata Server: Override Backup Location on page 162*		X	X

Configuration Option in the SAS Deployment Wizard	Prompting Level That Displays the Option		
	Express	Typical	Custom
SAS Metadata Server: Backup Location		X	X
<a href="#">SAS Metadata Server: Override Service Login Account on page 163*</a>		X	X
SAS Metadata Server: Service Login Account		X	X
<a href="#">Automatic Script Execution on page 164*</a>		X	X
<a href="#">Anonymous Web Access on page 166*</a>		X	X
<a href="#">SAS Visual Analytics: Allow Guest Access on page 167*</a>		X	X
Deployment Accounts: First User		X	X
External Account: First User		X	X
<a href="#">Server Encryption on page 168*</a>		X	X
<a href="#">Estimated System Size on page 169*</a>		X	X
SAS Object Spawner		X	X
SAS Object Spawner: Port Bank		X	X
<a href="#">SAS Application Server: Server Context on page 170*</a>		X	X
SAS Workspace Server		X	X
<a href="#">SAS Pooled Workspace Server on page 171*</a>		X	X
SAS Stored Process Server		X	X
SAS Stored Process Server: Multibridge Connections		X	X
SAS DATA Step Batch Server		X	X

Configuration Option in the SAS Deployment Wizard	Prompting Level That Displays the Option		
	Express	Typical	Custom
Operating System Services Scheduling Server		X	X
SAS Deployment Tester Server		X	X
<a href="#">SAS Web Server: Automated or Manual Configuration Option on page 172*</a>		X	X
SAS Web Application Server: JMS Configuration		X	X
SAS Web Application Server: Cache Locator Configuration		X	X
<a href="#">SAS Web Application Server: Server Configuration on page 175*</a>		X	X
<a href="#">Web Applications: Automatic Deployment on page 176*</a>		X	X
Scheduling Services Cache Locator		X	X
Scheduling Services DIP JobRunner		X	X
SAS Web Application Themes		X	X
<a href="#">IP Multicast Version on page 176*</a>		X	X
<a href="#">IP Multicast on page 177*</a>		X	X
IP Multicast: Authentication Token		X	X
<a href="#">SAS Content Server: Repository Directory on page 178*</a>		X	X
SAS Environment Manager: Configuration		X	X
<a href="#">SAS Environment Manager Agent Configuration on page 182*</a>		X	X
SAS Environment Manager Agent Communication		X	X

Configuration Option in the SAS Deployment Wizard	Prompting Level That Displays the Option		
	Express	Typical	Custom
SAS Flex Application Themes		X	X
SAS Visual Analytics Data Provider on page 183*		X	X
SAS Visual Analytics High-Performance Configuration Information on page 183*		X	X
SAS Visual Analytics Data Provider: Hadoop on page 185*		X	X
SAS Visual Analytics Public Data Library: Hadoop on page 186*		X	X
SAS Visual Analytics Public Data Provider on page 186*		X	X
SAS LASR Analytic Server Monitor Configuration Information on page 187*		X	X
SAS Visual Analytics Public Data Library Information on page 187*		X	X
SAS Visual Analytics AutoLoad Location on page 187*		X	X
SAS Visual Analytics Administrator: SAS LASR Analytic Server Library on page 187*		X	X
SAS Visual Analytics Administrator: Public LASR Libraries on page 188*		X	X
SAS Visual Analytics Transport Service: Whitelist Mobile Devices on page 189*		X	X
SAS Visual Analytics: Protocol for OpenStreetMap Server on page 190*		X	X
SAS Visual Analytics: Configure ArcGIS Server on page 190*		X	X

Configuration Option in the SAS Deployment Wizard	Prompting Level That Displays the Option		
	Express	Typical	Custom
<a href="#">SAS Information Retrieval Studio on page 192*</a>		X	X
<a href="#">Search Interface to SAS Content Feeder Configuration on page 192*</a>		X	X
<a href="#">SAS Deployment Backup and Recovery Tool: Enable Central Vault on page 192*</a>		X	X
<a href="#">SAS Deployment Backup and Recovery Tool on page 192*</a>		X	X
Select Products to Configure			X
<a href="#">Authentication Domain on page 159*</a>			X
SAS Metadata Server: Invocation Options			X
SAS Metadata Server: Repository Configuration			X
SAS Metadata Server: Windows Service			X
<a href="#">SAS BI Web Services: Authentication Method on page 165*</a>			X
SAS User Group: SAS General Servers			X
SAS User Group: BI Web Services Users			X
<a href="#">Create Common Directories on page 167*</a>			X
Common Directory Information			X
<a href="#">Enable FIPS-certified Encryption Algorithms on page 168*</a>			X
<a href="#">Client-side Credentials Policy on page 169*</a>			X
SAS Object Spawner: Server Component Name			X

Configuration Option in the SAS Deployment Wizard	Prompting Level That Displays the Option		
	Express	Typical	Custom
SAS Object Spawner: Invocation Options			X
SAS Object Spawner: Windows Service			X
SAS Application Server Librefs			X
SAS Workspace Server: Invocation Options			X
SAS Pooled Workspace Server: Invocation Options			X
SAS Stored Process Server: Invocation Options			X
SAS Web Infrastructure Platform Data Server (Windows Services)			X
Operating System Services Scheduling Server: Invocation Options			X
SAS Deployment Tester Server: Windows Service			X
SAS Remote Services Application			X
SAS Remote Services Application: Windows Service			X
<a href="#">SAS Remote Services Application: JVM on page 172*</a>			X
SAS Web Application Server: Secure JMS Resources			X
Web Application Server: Secure JMS Credentials			X
<a href="#">Web Application Server: Configure Internet Proxy Server on page 174*</a>			X
Web Application Server: Proxy Information			X
<a href="#">Web Application Server: Multiple Servers on page 175*</a>			X

Configuration Option in the SAS Deployment Wizard	Prompting Level That Displays the Option		
	Express	Typical	Custom
SAS BI Web Services: General Information			X
SAS BI Web Services: New Web Services			X
<a href="#">SAS Web Infrastructure Platform Database: Data Server on page 178*</a>			X
<a href="#">SAS Web Infrastructure Platform: Database Type on page 179*</a>			X
SAS Web Infrastructure Platform: JES File Logging			X
SAS Web Infrastructure Platform: JES File Logging Directory			X
<a href="#">Choose SAS Environment Manager: Keystore on page 181*</a>			X
Choose SAS Environment Manager: Keystore Configuration			X
<a href="#">SAS Visual Analytics High-Performance Configuration Properties on page 183*</a>			X
<a href="#">SAS Visual Analytics Data Provider: Hadoop Ports on page 186*</a>			X
<a href="#">SAS Visual Analytics: ArcGIS Server Details on page 190*</a>			X
<a href="#">SAS Visual Analytics Services Hyperlink Service: Context Root on page 191*</a>			X
<a href="#">SAS Visual Analytics Designer: Context Root on page 188*</a>			X
<a href="#">SAS Visual Analytics Hub: Context Root on page 188*</a>			X



Configuration Option in the SAS Deployment Wizard	Prompting Level That Displays the Option		
	Express	Typical	Custom
SAS Visual Analytics Report Viewer: Context Root on page 188*			X
SAS Visual Analytics Admin: Context Root on page 189*			X
SAS Visual Analytics Graph Builder: Context Root on page 193*			X
SAS Visual Analytics Explorer: Context Root on page 182*			X
SAS Visual Statistics: Context Root			X
SAS Visual Data Builder: Context Root on page 191*			X
SAS Information Retrieval Studio Port Numbers			X
SAS Studio Mid-Tier: Context Root on page 193*			X

\* Indicates that more information is available in this document. See the SAS Deployment Wizard online Help for information about all options.



# Appendix 4

## Managing Your SAS Visual Analytics Deployment

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<b><i>Change Autoload Location for the Public LASR Library</i></b> .....	<b>258</b>

## Upgrading SAS Visual Analytics

### Overview of Upgrading SAS Visual Analytics

You have two options for upgrading SAS Visual Analytics:

- SAS automatic migration tools

For more information, see [Appendix 2, “Migrating SAS Visual Analytics,”](#) on page 223.

- SAS Deployment Wizard (Update mode)

For more information, see “Upgrade SAS Visual Analytics” on page 252.

## Upgrade SAS Visual Analytics

Follow these steps to upgrade SAS Visual Analytics 6.4 to 7.1 using the SAS Deployment Wizard running in Update mode:

- 1 Understand how the SAS Deployment Wizard upgrades SAS software.  
See “How the SAS Deployment Wizard Adds, Updates, and Upgrades Software” in the *SAS Intelligence Platform: Installation and Configuration Guide*, available at <http://support.sas.com/documentation/cdl/en/biig/63852/PDF/default/biig.pdf>.
- 2 Understand how your SAS Visual Analytics deployment will change. In some releases, new SAS products are added during upgrades.  
See “SAS Visual Analytics” in the *SAS Guide to Software Updates*, available at <http://support.sas.com/documentation/cdl/en/whatsdiff/66129/PDF/default/whatsdiff.pdf>.
- 3 If you are running SAS Visual Analytics with a distributed SAS LASR Analytic Server, then upgrade your SAS High-Performance Analytics infrastructure before you upgrade SAS Visual Analytics.
- 4 Prepare your SAS Visual Analytics deployment.  
See “Preparing Your Site for a Software Update” in the *SAS Guide to Software Updates*, available at <http://support.sas.com/documentation/cdl/en/whatsdiff/66129/PDF/default/whatsdiff.pdf>.
- 5 Locate and familiarize yourself with your SAS software order.  
See “Installing Your Software Order” in the *SAS Guide to Software Updates*, available at <http://support.sas.com/documentation/cdl/en/whatsdiff/66129/PDF/default/whatsdiff.pdf>.
- 6 Download your order and create a SAS Software Depot.  
See Chapter 2, “Pre-Installation: Creating a SAS Software Depot,” on page 17.

## 7 Upgrade your SAS High-Performance Analytics infrastructure

**Note:** SAS Visual Analytics 7.1 requires that you use SAS High-Performance Analytics environment 2.9 or higher.

Follow the steps in the topic, Appendix 2, “Updating the SAS High-Performance Analytics Infrastructure,” in *SAS High-Performance Analytics Infrastructure: Installation and Configuration Guide*.

## 8 Upgrade SAS Visual Analytics 6.4 to 7.1.

See “Install and Configure a Software Update” in the *SAS Guide to Software Updates*, available at <http://support.sas.com/documentation/cdl/en/whatsdiff/66129/PDF/default/whatsdiff.pdf>.

## 9 Perform any post-upgrade deployment tasks.

See “SAS Visual Analytics” in the *SAS Guide to Software Updates*.

## 10 Before you begin using SAS Visual Analytics, check to see whether there are any new groups or capabilities that have been added to SAS metadata and whether any new metadata properties need to be manually updated. See “SAS Visual Analytics” in the *SAS Guide to Software Updates*, available at <http://support.sas.com/documentation/cdl/en/whatsdiff/66129/PDF/default/whatsdiff.pdf>.

## 11 Be sure to load your data sources into SAS LASR Analytic Server to enable reporting and exploration.

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## Adding on SAS Visual Analytics Administration and Reporting

If you are adding on SAS Visual Analytics or SAS Visual Analytics Administration and Reporting to your second maintenance release for SAS 9.4 (SAS 9.4\_M0) or later, do the following before deploying your SAS software order:

- 1 On your middle-tier machines, check your deployment summary to determine whether you already have these two SAS components:

- SAS Visual Analytics Administrator
- SAS Visual Analytics Services

Your SAS Deployment Registry is located on your machine here:

`SAS-installation-directory/SASHome/InstallMisc/InstallLogs/  
DeploymentRegistry.html`

- 2 If you plan to deploy the *middle tier* for SAS Visual Analytics or SAS Visual Analytics Administration and Reporting to:
  - the *same* middle-tier machine, then you do not need to do anything further.
  - a *different* middle-tier machine, continue to step 3.
- 3 Before deploying your SAS software order, unconfigure these two SAS software components:
  - SAS Visual Analytics Administrator
  - SAS Visual Analytics Services

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## Remove SAS Visual Analytics Product Configurations

The **Remove Existing Configuration** feature of the SAS Deployment Manager provides an automated way to remove one or more products of a SAS 9.4 configuration from your environment. With this feature, you can remove the configurations of all SAS products or just selected products from a machine.

When removing a product configuration, you must first determine the product's dependencies. If you remove a product configuration that another product depends on, then the dependent product is not able to function. Therefore, when you remove a product's configuration, the SAS Deployment Manager requires that you also remove the configurations of any dependent products.

To remove a SAS Visual Analytics product, consult the table in [“Identify Dependent SAS Visual Analytics Products” on page 255](#) to determine the product dependencies. Next, follow the instructions in the Appendix 4, “Removing a SAS Configuration,” in *SAS Intelligence Platform: Installation and Configuration Guide*.

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## Identify Dependent SAS Visual Analytics Products

Product dependencies are shown in the following table. If you remove the configuration for a product in the left column, then you must also remove the configurations for all of the products that are in the right column opposite that product. For example:

- If you remove SAS Visual Analytics Hub, then you do not need to remove any other products. No products depend on SAS Visual Analytics Hub.
- If you remove SAS Visual Analytics High-Performance Configuration, then you must also remove the following dependent products: SAS Visual Analytics Services and SAS Visual Analytics Administrator.

**Note:** Remove SAS Visual Analytics products in the opposite order in which you deployed them. For more information see, [“Installation Rules for Multiple-Machine Deployments” on page 135.](#)

**Table A4.1** Dependencies in SAS Visual Analytics

Product	Dependent Products*
SAS Visual Analytics Extensions for Services	None
SAS Visual Analytics Explorer Configuration Data	None
SAS Visual Analytics Configuration Data	None
SAS Visual Analytics Server Components Configuration	Application Server Context
SAS Visual Analytics Hub	None
SAS Visual Analytics Explorer	None
SAS Visual Analytics Designer	None
SAS Visual Analytics Viewer	None
SAS Visual Analytics High-Performance Configuration	SAS Visual Analytics Services SAS Visual Analytics Administrator
SAS Visual Analytics Report Viewer	None
SAS Visual Analytics Administrator	None
SAS Visual Data Builder	None
Search Interface to SAS Content	SAS Visual Analytics Hub



Product	Dependent Products*
SAS Visual Analytics Services	SAS Visual Analytics Hub SAS Visual Analytics Designer SAS Visual Analytics Explorer SAS Visual Analytics Report Viewer SAS Visual Analytics Administrator SAS Visual Data Builder
SAS Web Application Server	SAS Visual Analytics Hub SAS Visual Analytics Designer SAS Visual Analytics Explorer SAS Visual Analytics Report Viewer SAS Visual Analytics Services SAS Visual Analytics Administrator SAS Visual Data Builder
SAS Web Infrastructure Platform	SAS Visual Analytics Extensions for Services SAS Visual Analytics Designer SAS Visual Analytics Explorer SAS Visual Analytics Hub SAS Visual Analytics Report Viewer SAS Visual Data Builder SAS Visual Analytics Administrator SAS Visual Analytics Services
SAS Pooled Workspace Server	SAS Visual Analytics Explorer Server Configuration
Application Server Context	SAS Visual Analytics High-Performance Configuration SAS Visual Analytics Administrator SAS Visual Data Builder
SAS Workspace Server	SAS Visual Analytics Administrator SAS Visual Data Builder

Product	Dependent Products*
DATA Step Batch Server	SAS Visual Analytics Administrator
SAS Web Infrastructure Platform Data Server	Visual Analytics Services Visual Data Builder

\* These products depend on the product in the left column. Therefore, they must be removed if the product in the left column is removed.

When you remove a product’s configuration, the SAS Deployment Manager checks to see whether your deployment plan includes any products that depend on that product. If dependent products exist, and if you have not selected those products for removal, then the SAS Deployment Manager prompts you to remove them.

## Change Autoload Location for the Public LASR Library

In SAS Visual Analytics 6.3 and later, the default directory for SAS autoload has changed to the following: `configuration-directory/Levn/AppData/SASVisualAnalytics/VisualAnalyticsAdministrator/Autoload`.

Your previous configured SAS Autoload directory still exists and is your preferred Autoload directory. If you want to update your environment to use the newly created default directory, update the `VA.Autoload.Location` property using SAS Management Console. For more information, see “Autoload” in the *SAS Visual Analytics: Administration Guide*.

## Glossary

**browser**

See web browser

**co-located data provider**

a distributed data source, such as SAS Visual Analytics Hadoop or a third-party vendor database, that has SAS High-Performance Analytics software installed on the same machines. The SAS software on each machine processes the data that is local to the machine or that the data source makes available as the result of a query.

**data set**

See SAS data set

**data warehouse**

a collection of data that is extracted from one or more sources for the purpose of query, reporting, and analysis. Data warehouses are generally used for storing large amounts of data that originates in other corporate applications or that is extracted from external data sources.

**encryption**

the act or process of converting data to a form that is unintelligible except to the intended recipients.

**Extensible Markup Language**

a markup language that structures information by tagging it for content, meaning, or use. Structured information contains both content (for example, words or numbers) and an indication of what role the content plays. For example, content in a section heading has a different meaning from content in a database table.

**foundation services**

See SAS Foundation Services

**grid host**

the machine to which the SAS client makes an initial connection in a SAS High-Performance Analytics application.

**Hadoop Distributed File System**

a framework for managing files as blocks of equal size, which are replicated across the machines in a Hadoop cluster to provide fault tolerance.

**HDFS**

See Hadoop Distributed File System

**identity**

See metadata identity

**Integrated Windows authentication**

a Microsoft technology that facilitates use of authentication protocols such as Kerberos. In the SAS implementation, all participating components must be in the same Windows domain or in domains that trust each other.

**Internet Protocol Version 6**

a protocol that specifies the format for network addresses for all computers that are connected to the Internet. This protocol, which is the successor of Internet Protocol Version 4, uses hexadecimal notation to represent 128-bit address spaces. The format can consist of up to eight groups of four hexadecimal characters, delimited by colons, as in FE80:0000:0000:0202:B3FF:FE1E:8329. As an alternative, a group of consecutive zeros could be replaced with two colons, as in FE80::0202:B3FF:FE1E:8329.

**IPv6**

See Internet Protocol Version 6

**IWA**

See Integrated Windows authentication

**JAR file**

a Java Archive file. The JAR file format is used for aggregating many files into one file. JAR files have the file extension .jar.

**Java**

a set of technologies for creating software programs in both stand-alone environments and networked environments, and for running those programs safely. Java is an Oracle Corporation trademark.

**Java Database Connectivity**

a standard interface for accessing SQL databases. JDBC provides uniform access to a wide range of relational databases. It also provides a common base on which higher-level tools and interfaces can be built.

**Java Development Kit**

a software development environment that is available from Oracle Corporation. The JDK includes a Java Runtime Environment (JRE), a compiler, a debugger, and other tools for developing Java applets and applications.

**JDBC**

See Java Database Connectivity

**JDK**

See Java Development Kit

**localhost**

the keyword that is used to specify the machine on which a program is executing. If a client specifies localhost as the server address, the client connects to a server that runs on the same machine.

**login**

a SAS copy of information about an external account. Each login includes a user ID and belongs to one SAS user or group. Most logins do not include a password.

**Message Passing Interface**

is a message-passing library interface specification. SAS High-Performance Analytics applications implement MPI for use in high-performance computing environments.

**metadata identity**

a metadata object that represents an individual user or a group of users in a SAS metadata environment. Each individual and group that accesses secured resources on a SAS Metadata Server should have a unique metadata identity within that server.

**metadata object**

a set of attributes that describe a table, a server, a user, or another resource on a network. The specific attributes that a metadata object includes vary depending on which metadata model is being used.

**middle tier**

in a SAS business intelligence system, the architectural layer in which web applications and related services execute. The middle tier receives user requests, applies business logic and business rules, interacts with processing servers and data servers, and returns information to users.

**MPI**

See Message Passing Interface

**object spawner**

a program that instantiates object servers that are using an IOM bridge connection. The object spawner listens for incoming client requests for IOM services. When the spawner receives a request from a new client, it launches an instance of an IOM server to fulfill the request. Depending on which incoming TCP/IP port the request

was made on, the spawner either invokes the administrator interface or processes a request for a UUID (Universal Unique Identifier).

**planned deployment**

a method of installing and configuring a SAS business intelligence system. This method requires a deployment plan that contains information about the different hosts that are included in the system and the software and SAS servers that are to be deployed on each host. The deployment plan then serves as input to the SAS Deployment Wizard.

**root node**

in a SAS High-Performance Analytics application, the role of the software that distributes and coordinates the workload of the worker nodes. In most deployments the root node runs on the machine that is identified as the grid host. SAS High-Performance Analytics applications assign the highest MPI rank to the root node.

**SAS Application Server**

a logical entity that represents the SAS server tier, which in turn comprises servers that execute code for particular tasks and metadata objects.

**SAS authentication**

a form of authentication in which the target SAS server is responsible for requesting or performing the authentication check. SAS servers usually meet this responsibility by asking another component (such as the server's host operating system, an LDAP provider, or the SAS Metadata Server) to perform the check. In a few cases (such as SAS internal authentication to the metadata server), the SAS server performs the check for itself. A configuration in which a SAS server trusts that another component has pre-authenticated users (for example, web authentication) is not part of SAS authentication.

**SAS configuration directory**

the location where configuration information for a SAS deployment is stored. The configuration directory contains configuration files, logs, scripts, repository files, and other items for the SAS software that is installed on the machine.

**SAS data set**

a file whose contents are in one of the native SAS file formats. There are two types of SAS data sets: SAS data files and SAS data views.

**SAS Deployment Manager**

a cross-platform utility that manages SAS deployments. The SAS Deployment Manager supports functions such as updating passwords for your SAS deployment, rebuilding SAS web applications, and removing configurations.

**SAS Deployment Wizard**

a cross-platform utility that installs and initially configures many SAS products. Using a SAS installation data file and, when appropriate, a deployment plan for its initial input, the wizard prompts the customer for other necessary input at the start of the session, so that there is no need to monitor the entire deployment.

**SAS Foundation Services**

a set of core infrastructure services that programmers can use in developing distributed applications that are integrated with the SAS platform. These services provide basic underlying functions that are common to many applications. These functions include making client connections to SAS application servers, dynamic service discovery, user authentication, profile management, session context management, metadata and content repository access, information publishing, and stored process execution.

**SAS installation data file**

See SID file

**SAS installation directory**

the location where your SAS software is installed. This location is the parent directory to the installation directories of all SAS products. The SAS installation directory is also referred to as SAS Home in the SAS Deployment Wizard.

**SAS IOM workspace**

in the IOM object hierarchy for a SAS Workspace Server, an object that represents a single session in SAS.



**SAS Metadata Server**

a multi-user server that enables users to read metadata from or write metadata to one or more SAS Metadata Repositories.

**SAS Pooled Workspace Server**

a SAS Workspace Server that is configured to use server-side pooling. In this configuration, the SAS object spawner maintains a collection of workspace server processes that are available for clients.

**SAS Software Depot**

a file system that consists of a collection of SAS installation files that represents one or more orders. The depot is organized in a specific format that is meaningful to the SAS Deployment Wizard, which is the tool that is used to install and initially configure SAS. The depot contains the SAS Deployment Wizard executable, one or more deployment plans, a SAS installation data file, order data, and product data.

**SAS Stored Process Server**

a SAS IOM server that is launched in order to fulfill client requests for SAS Stored Processes.

**SAS Workspace Server**

a SAS IOM server that is launched in order to fulfill client requests for IOM workspaces.

**SASHDAT file**

the data format used for tables that are added to HDFS by SAS. SASHDAT files are read in parallel by the server.

**SASHOME directory**

the location in a file system where an instance of SAS software is installed on a computer. The location of the SASHOME directory is established at the initial installation of SAS software by the SAS Deployment Wizard. That location becomes the default installation location for any other SAS software that is installed on the same computer.

**server context**

a SAS IOM server concept that describes how SAS Application Servers manage client requests. A SAS Application Server has an awareness (or context) of how it is being used and makes decisions based on that awareness. For example, when a SAS Data Integration Studio client submits code to its SAS Application Server, the server determines what type of code is submitted and directs it to the correct physical server for processing (in this case, a SAS Workspace Server).

**server description file**

a file that is created by a SAS client when the LASR procedure executes to create a server. The file contains information about the machines that are used by the server. It also contains the name of the server signature file that controls access to the server.

**SID file**

a control file containing license information that is required in order to install SAS.

**single sign-on**

an authentication model that enables users to access a variety of computing resources without being repeatedly prompted for their user IDs and passwords. For example, single sign-on can enable a user to access SAS servers that run on different platforms without interactively providing the user's ID and password for each platform. Single sign-on can also enable someone who is using one application to launch other applications based on the authentication that was performed when the user initially logged on.

**SOE**

See software order e-mail

**software order e-mail**

an e-mail message, sent to a customer site, that announces arrival of the software and describes the order. It explains the initial installation steps and might also contain instructions for using Electronic Software Delivery (ESD), if applicable.

**spawner**

See object spawner

**SSO**

See single sign-on

**trusted user**

a privileged service account that can act on behalf of other users on a connection to the metadata server.

**unrestricted identity**

a user or group that has all capabilities and permissions in the metadata environment due to membership in the META: Unrestricted Users Role (or listing in the adminUsers.txt file with a preceding asterisk).

**update mode**

an operating state of the SAS Deployment Wizard in which users are required to install software updates before they can perform any other deployment tasks. The SAS Deployment Wizard automatically goes into update mode when it determines that the current SAS order contains new versions or maintenance updates to the deployed products in a given SAS installation directory.

**warehouse**

See data warehouse

**web application**

an application that is accessed via a web browser over a network such as the Internet or an intranet. SAS web applications are Java Enterprise Edition (JEE) applications that are delivered via web application archive (WAR) files. The applications can depend on Java and non-Java web technologies.

**web authentication**

a configuration in which users of web applications and web services are verified at the web perimeter, and the metadata server trusts that verification.

**web browser**

a software application that is used to view web content, and also to download or upload information. The browser submits URL (Uniform Resource Locator) requests to a web server and then translates the HTML code into a visual display.

**worker node**

in a SAS High-Performance Analytics application, the role of the software that receives the workload from the root node.

**workspace**

See SAS IOM workspace

**XML**

See Extensible Markup Language

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