SAS® Visual Analytics 6.1
Installation and Configuration Guide

Contents

What's New

What's New in Installation and Configuration for SAS Visual Analytics 6.1

Overview

The *SAS Visual Analytics: Installation and Configuration Guide* 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:

- support for non-distributed SAS LASR Analytic Server

- support for Cloudera Hadoop co-located data storage

- middle-tier SSH keys no longer required

Support for Non-distributed SAS LASR Analytic Server

SAS LASR Analytic Server was developed to operate in a distributed computing environment and perform analytic tasks on data that is loaded in memory. In this release, the server is enhanced to support running on a single machine.

SAS enables you to license a distributed SAS LASR Analytic Server, a non-distributed SAS LASR Analytic Server, or both. The SAS deployment tools enable you to do the following:

- deploy both server modes

- add a different server mode at a later time (and retain both modes)

- upgrade to a different server mode

For more information, see "Overview of Deploying SAS LASR Analytic Server in a Different Mode" on page 79.

Support for Cloudera Hadoop Co-Located Data Storage

Customers now have options for two supported versions of Hadoop: the Apache version shipped with SAS, or pre-existing Cloudera 4 Hadoop data storage.

See *SAS High-Performance Analytics Infrastructure: Installation and Configuration Guide*, available at `http://support.sas.com/documentation/solutions/hpainfrastructure/16/hpaicg.pdf#page=75`

Middle-Tier SSH Keys No Longer Required

SAS Visual Analytics no longer requires SSH keys to be distributed on the SAS middle tier. Authentication is now managed by the new SAS Authorization service.

Accessibility

Accessibility Features of the SAS Intelligence Platform Deployment Tools

Overview

For this release, the SAS 9.3 Intelligence Platform deployment tools have not been tested for compliance with U.S. Section 508 standards and W3C web content accessibility guidelines. If you have specific questions about the accessibility of SAS products, send them to `accessibility@sas.com` or call SAS Technical Support.

Recommended Reading

Here is the recommended reading list for this title:

- *Configuration Guide for SAS 9.3 Foundation for Microsoft Windows*, available at `http://support.sas.com/documentation/installcenter/en/ikfdtnwincg/64431/PDF/default/config.pdf`.

- *Configuration Guide for SAS 9.3 Foundation for UNIX Environments*, available at `http://support.sas.com/documentation/installcenter/en/ikfdtnunxcg/64205/PDF/default/config.pdf`.

- *SAS Deployment Wizard and SAS Deployment Manager 9.3: User's Guide*, available at `http://support.sas.com/documentation/installcenter/en/ikdeploywizug/64204/PDF/default/user.pdf`.

- *SAS 9.3 Guide to Software Updates*, available at `http://support.sas.com/documentation/cdl/en/whatsdiff/63859/PDF/default/whatsdiff.pdf`.

- *SAS High-Performance Analytics: User's Guide*, available at `http://support.sas.com/documentation/onlinedoc/securedoc/index_hpa.html`.

- *SAS High-Performance Analytics Infrastructure: Installation and Configuration Guide*, available at `http://support.unx.sas.com/documentation/solutions/hpainfrastructure/16/hpaicg.pdf`.

- *SAS High-Performance Computing Management Console: User's Guide*, available at `http://support.sas.com/documentation/solutions/hpainfrastructure/16/hpcmcug.pdf`.

- *SAS Intelligence Platform: Installation and Configuration Guide*, available at `http://support.sas.com/documentation/cdl/en/biig/62611/PDF/default/biig.pdf`.

- *SAS Intelligence Platform: Security Administration Guide*, available at `http://support.sas.com/documentation/cdl/en/bisecag/63082/PDF/default/bisecag.pdf`.

- *SAS LASR Analytic Server: Administration Guide* available at `http://support.sas.com/documentation/onlinedoc/securedoc/index_lasrserver.html`.

- *SAS Visual Analytics: Administration Guide* available at `http://support.sas.com/documentation/onlinedoc/va/index.html`.

- *SAS Visual Analytics: User's Guide* available at `http://support.sas.com/documentation/cdl/en/vaug/65747/PDF/default/vaug.pdf`.

- Help and tutorials integrated into SAS Mobile BI.

- 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`.

> For a complete list of SAS publications, go to support.sas.com/bookstore. If you have questions about which titles you need, please contact a SAS Publishing Sales Representative:
>
> SAS Publishing Sales
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> Cary, NC 27513-2414
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Introduction to Deploying SAS Visual Analytics

What is SAS Visual Analytics?

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

SAS Visual Analytics consists of the following components:

- A SAS LASR Analytic Server consisting of SAS High-Performance Analytics environment root and worker nodes.

- One of the supported co-located data providers:

  - Teradata Managed Server Cabinet

  - EMC Greenplum Data Computing Appliance

  - SAS High-Performance Deployment of Hadoop machine cluster

- A SAS Visual Analytics server tier consisting of the following:

  - SAS LASR Analytic Server Monitor

  - SAS Visual Analytics Explorer Server configuration

  - SAS Information Retrieval Studio

  - SAS Workspace Servers

  - SAS Pooled Workspace Servers

  - SAS Stored Process Servers

  - SAS/ACCESS to Greenplum and Teradata

  - SAS High-Performance Computing Management Console

- 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 Report Viewer

  - SAS Visual Analytics Administrator

  - 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 providers are absent.

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

- *SAS LASR Analytic Server: Administration Guide*, available at `http://support.sas.com/documentation/onlinedoc/securedoc/index_lasrserver.html`

- *SAS Visual Analytics: Administration Guide*, available at `http://support.sas.com/documentation/onlinedoc/va/index.html`

- *SAS Visual Analytics: User's Guide*, available at `http://support.sas.com/documentation/cdl/en/vaug/65747/PDF/default/vaug.pdf`

- Help and tutorials integrated into the SAS Mobile BI application.

These documents are available at `http://support.sas.com/documentation/onlinedoc/va`.

What Is Covered in This Document?

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.

Because so much of the installation process is similar to the SAS Intelligence Platform, this document is designed to be used with the *SAS Intelligence Platform: Installation and Configuration Guide*, available at `http://support.sas.com/documentation/cdl/en/biig/62611/PDF/default/biig.pdf`.

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`.

Deployment Model Used in This Document

The deployment model used in this document depends on answers to the following questions:

- Are you deploying SAS LASR Analytic Server on a data appliance or a machine cluster?

- Which co-located data provider are you using?

  (This does not apply if you deploy a non-distributed SAS LASR Analytic Server.)

For sites using a Greenplum or a Teradata appliance, see the deployment model discussed in Figure 1.1:

Figure 1.1 *SAS Visual Analytics Deployment Model for Greenplum and Teradata*
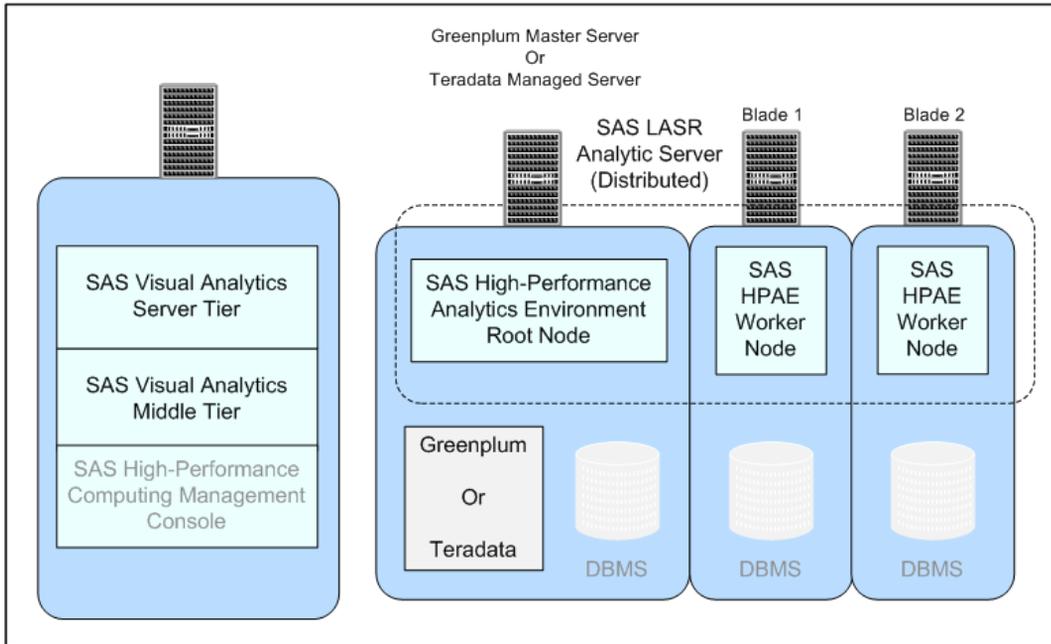
For sites using SAS High-Performance Deployment of Hadoop on a machine cluster, see the deployment model discussed in Figure 1.2:

Figure 1.2 *SAS Visual Analytics Deployment Model for Hadoop*
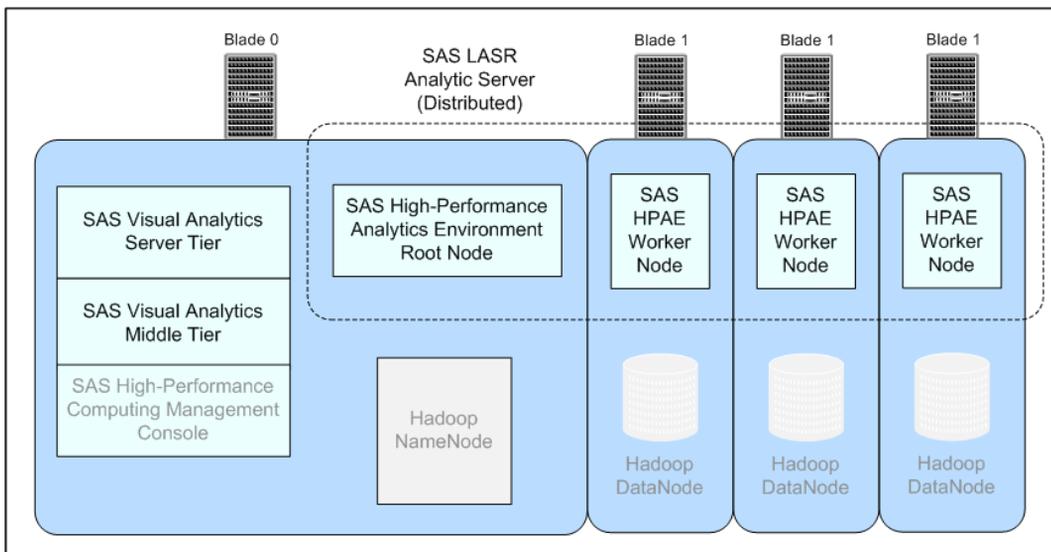
The deployment model used in this document for sites using the non-distributed SAS LASR Analytic Server is depicted in Figure 1.3:

Figure 1.3   *SAS Visual Analytics Deployment Model for Non-distributed SAS LASR Analytic Server*
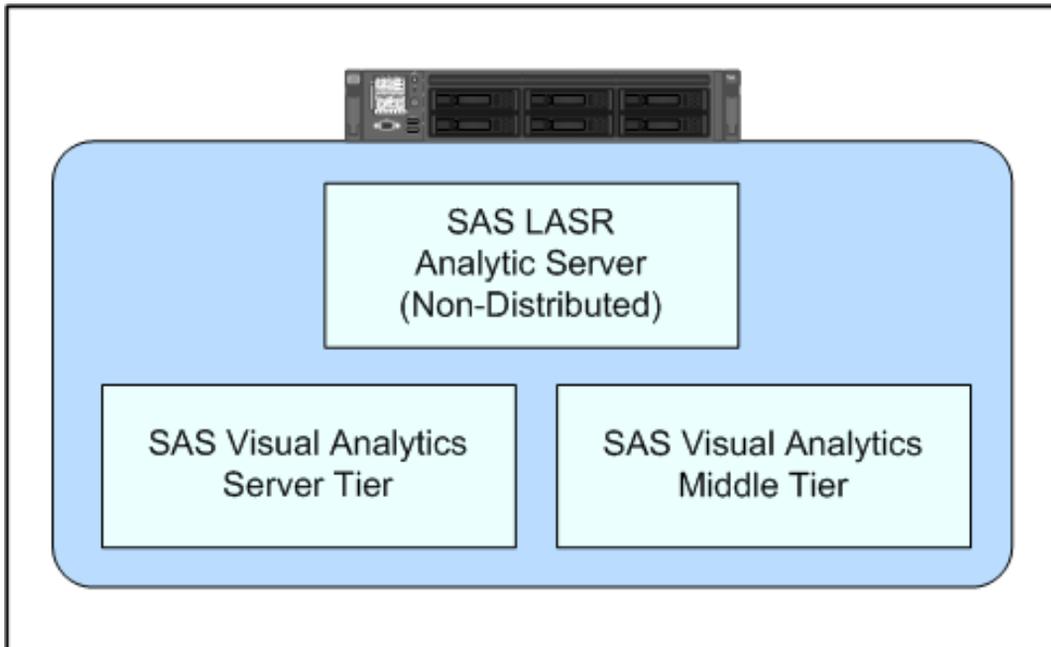
Deploying SAS Visual Analytics

Overview of Deploying SAS Visual Analytics

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

1. Review additional documentation.

2. Create a SAS Software Depot.

3. (Optional) Deploy the SAS High-Computing Analytics infrastructure.

4. Create operating system users and groups and designate ports.

5. Deploy required third-party software.

6. 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: Review Additional Documentation

It is very important to review all the different documents associated with deploying your SAS software. There can be late-breaking information, or instructions specific to a particular configuration might be too narrow for inclusion in the *SAS Visual Analytics: Installation and Configuration Guide*.

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 at `http://support.sas.com/documentation/installcenter/93/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 also enumerates the initial installation steps and, for SAS 9.3, contains instructions for using Electronic Software Delivery (ESD), if applicable. The SID file also 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 that is included in your order. Unlike the SAS order information sheet, which only lists the software you have specifically ordered, this document also describes the included software that supports your order. The 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 order summary might list more products than the deployment plan. For more information, see "About Deployment Plans" on page 34.

- system requirements

  See *System Requirements—SAS Visual Analytics*, available at `http://` `support.sas.com/documentation/installcenter/en/ikvisanlytofrsr/65999/HTML/` `default/index.html`.

- SAS Notes

  Outstanding SAS Notes for alert status installation problems are available at

  `http://support.sas.com/notes/index.html`.

Step 2: Create a SAS Software Depot

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

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

For more information, see "Creating a SAS Software Depot" in the *SAS Intelligence Platform: Installation and Configuration Guide*, available at `http://support.sas.com/` `documentation/cdl/en/biig/62611/PDF/default/biig.pdf#page=37`.

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

Note: This step is not required when deploying a non-distributed SAS LASR Analytic Server.

The SAS High-Performance Analytics infrastructure consists of:

■ 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 on each remaining machine in the cluster or database appliance.

■ 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. This version of Hadoop is based on Apache and is shipped with SAS. The NameNode is deployed on the grid host and DataNodes on each remaining machine in the cluster.

   Note: Use of Hadoop is optional. Teradata, Greenplum, and Cloudera Hadoop appliances can be used in lieu of SAS High-Performance Deployment of Hadoop.

For information about deploying the SAS High-Performance Analytics infrastructure, refer to the *SAS High-Performance Analytics Infrastructure: Installation and Configuration Guide*, available at `http://support.sas.com/documentation/solutions/ hpainfrastructure/16/hpaicg.pdf`.

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, and designate a set of ports to use.

SAS Visual Analytics users must have an operating system account and 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 "Overview of Users, Groups, and Ports" on page 12.

Step 5: Deploy Required Third-Party Software

Install any third-party products, such as a Java Development Kit and the web application server, that are necessary for your installation. These products are identified in your deployment plan.

For more information, see *System Requirements—SAS Visual Analytics*, available at `http://support.sas.com/documentation/installcenter/en/ikvisanlytofrsr/65999/HTML/default/index.html`.

See also the SAS 9.3 third-party support site located at `http://support.sas.com/resources/thirdpartysupport/v93`.

Step 6: Deploy the Servers and Middle Tier

Having identified the proper deployment plan for your order, 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 deployment wizard is an installation and configuration tool that is supplied by SAS.

For more information, see "Deploying the SAS Visual Analytics Server and Middle Tier" on page 31.

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Setting Up Users, Groups, and Ports

Overview of Users, Groups, and Ports

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 six tasks required to install and configure SAS Visual Analytics.

1. Review additional documentation.

2. Create a SAS Software Depot.

3. (Optional) Deploy the SAS High-Computing Analytics infrastructure.

4. ▶ **4. Create operating system users and groups and designate ports.**

5. Deploy required third-party software.

6. 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?

- 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 have their user accounts configured for passwordless SSH in order 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/16/hpaicg.pdf#page=23`.

- 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/16/hpaicg.pdf#page=30`.

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 and JBoss Application Server. 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. For more information, see *SAS High-Performance Analytics Infrastructure: Installation and Configuration Guide*, available at `http://support.sas.com/documentation/solutions/hpainfrastructure/16/hpaicg.pdf#page=44`.

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 *saspw*: `@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 2.1   *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
Search Interface to SAS Content User— The user account that permits access to SAS content that is supplied to SAS Information Retrieval Studio for indexing.	sassearch@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 provide access only 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: installation 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 stored process server and the 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 75.

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 end in 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 18. You will need this information when you run the SAS Deployment Wizard later.

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

Table 2.2   Required External User Accounts for SAS

Description	Recommended User ID	Machine Where Authenticated
SAS Installer— Used to install SAS, start the JBoss Application Server, 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 **hdpsetup** command.)	hadoop	
SAS Spawned Servers account— The process owner for stored process servers and pooled workspace servers.	sassrv	Stored process server 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 17.

- 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.

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 2.3 *Rights Required by External User Accounts for SAS*

External User Account	User Rights Needed
SAS Installer	The group that you designate as the *primary* group for the SAS Installer must contain the SAS Spawned Servers account.
SAS Spawned Servers account	Member of a group that is the *primary* group for the SAS Installer. (This group does *not* have to be the primary group for the SAS Spawned 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 2.4 *Pre-installation Checklist for External User Accounts for SAS Visual Analytics*

Account	Recommended User ID	Actual User ID
SAS Installer	sas	
JBoss Application Server user	sas	
SAS Spawned Servers account	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 17.

- 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 9.3 Foundation for UNIX Environments*, available at `http://support.sas.com/documentation/installcenter/en/ikfdtnunxcg/64205/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 2.5   *Pre-installation Checklist for Groups for SAS Visual Analytics*

Recommended Group Name	Group Members	Purpose	Actual Group Name
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 Spawned Servers account	Through group membership, grants Write permissions to the SAS Spawned Server 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 `/opt/VADP/var`).	

*   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 2.6   *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) JBoss Application Server Installer	Suggested method for assigning required permissions to write to certain installation directories.	

Configure Machine Access

In order 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 Teradata Enterprise Data Warehouse as a co-located data provider, the middle-tier machine is configured as a client of the database, because the SAS/ACCESS Interface to Teradata is used for accessing data. For the host names, such as dbccop0, the middle-tier client machine must have network name resolution. In **/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  dbccop0
# dbccop0 is not normally public
```

For deployments that use Greenplum Data Computing Appliance as a co-located data provider, the middle-tier machine is configured as a client of the database, because the SAS/ACCESS Interface to Greenplum is used for accessing data. For the master and segment server host names like mdw, the middle-tier client machine must have network name resolution. In **/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  mdw
# mdw is not normally public
```

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 name resolution works. **/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 is unavailable, select an alternate port, and record the new port on the following ports pre-installation checklist:

- "Multicast Address Considerations" on page 22

- "Pre-installation Checklist for Ports for SAS" on page 25

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-protected, 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 is 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 the middle-tier machine. 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 automatically isolates 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 9.3 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 9.3 deployment. For information about how to change these options after deployment, see Chapter 13, "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).

For more information about configuring web application servers to use with SAS 9.3, go to the Third-Party Software Downloads site at `http://support.sas.com/resources/thirdpartysupport/v93/index.html` and search for the product name of your web application 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.

We recommend that you document each SAS port that you reserve in the following standard location on each machine: `/etc/services`. This practice helps avoid port conflicts on the affected machines.

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.

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 2.7   *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	

Server or Spawner	Default Port	Data Direction	Actual Port
HTTP server (secure port)	443	Inbound and outbound	
SAS Remote Services application	5091	Inbound	
Event Broker administration	6051	Inbound	
SAS/CONNECT server and spawner	7551	Inbound and outbound	
Event Broker HTTP	8111	Inbound	
Operating System Services scheduler	8451	Inbound	
Multicast (UDP port)	8561	Inbound and outbound	
SAS Metadata Server	8561	Inbound	
SAS object spawner: operator port	8581	Inbound	
SAS Workspace Server	8591	Inbound	
Metadata utilities 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	
SAS Stored Process Server: load balancing connection 3 (MultiBridge)	8631	Inbound	
SAS Pooled Workspace Server	8701	Inbound	
SAS object spawner: pooled workspace server port bank 1	8801	Inbound	
SAS object spawner: pooled workspace server port bank 2	8811	Inbound	

Server or Spawner	Default Port	Data Direction	Actual Port
SAS object spawner: pooled workspace server port bank 3	8821	Inbound	
SAS LASR Analytic Server Monitor RMI port	9971	Inbound	
SAS High-Performance Configuration Management Console server	10020	Inbound	
SAS Deployment Tester server	10021	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	

Server or Spawner	Default Port	Data Direction	Actual Port
SAS Information Retrieval Studio query statistics server UDP	10741	Inbound	
SAS Information Retrieval Studio crawler admin	10751	Inbound	
SAS Information Retrieval Studio web query server	10761	Inbound	
SAS Framework Data Server	22031	Inbound	
Hadoop Service on the NameNode	15452	Inbound	
Hadoop Service on the DataNode	15453	Inbound	
Hadoop DataNode address	50010	Inbound	
Hadoop DataNode IPC address	50020	Inbound	
SAS High-Performance Computing Management Console server	10020	Inbound	
Hadoop JobTracker	50030	Inbound	
Hadoop TaskTracker	50060	Inbound	
Hadoop NameNode web interface	50070	Inbound	
Hadoop DataNode HTTP address	50075	Inbound	
Hadoop secondary NameNode	50090	Inbound	
Hadoop NameNode backup address	50100	Inbound	
Hadoop NameNode backup HTTP address	50105	Inbound	
Hadoop NameNode HTTPS address	50470	Inbound	
Hadoop DataNode HTTPS address	50475	Inbound	
SAS High-Performance Deployment of Hadoop	54310	Inbound	

Server or Spawner	Default Port	Data Direction	Actual Port
SAS High-Performance Deployment of Hadoop	54311	Inbound	

*   In SAS 9.3, two or more workspace servers can share the same port even if they are running at the same time.

3

Deploying the SAS Visual Analytics Server and Middle Tier

Overview of Deploying SAS Visual Analytics

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 called for in your deployment plan.

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

1. Review additional documentation.

2. Create a SAS Software Depot.

3. (Optional) Deploy the SAS High-Computing Analytics infrastructure.

4. Create operating system users and groups and designate ports.

5. Deploy required third-party software.

▶ **6. 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 Hub

- SAS Visual Analytics Explorer

- SAS Visual Analytics Designer

- SAS Visual Data Builder

- SAS Visual Analytics Report Viewer

- SAS Visual Analytics Administrator

- LASR Authorization Service

- SAS Visual Analytics Transport Service

- Search Interface to SAS Content

■ SAS Remote Services

Figure 3.1   *Deploying SAS Visual Analytics*
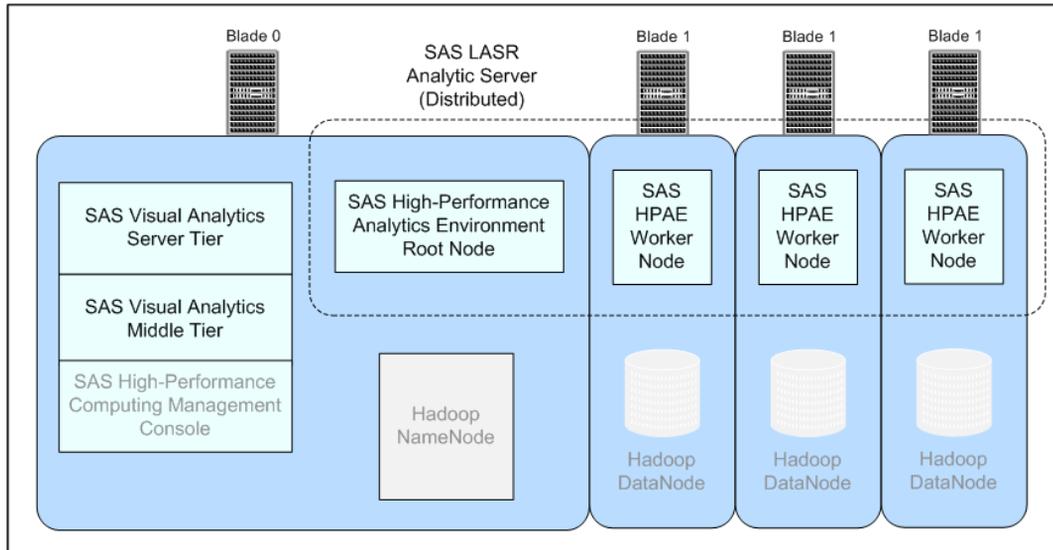
Preparing to Deploy SAS Visual Analytics

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.

In SAS Visual Analytics 6.1, the server is enhanced to support running on a single machine, or in *non-distributed* mode.

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 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.unx.sas.com/documentation/solutions/hpainfrastructure/16/hpaicg.pdf`.

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 file (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. There are two types of deployment plans: standard and custom. A standard deployment plan describes a common configuration. Standard deployment plans are included in the SAS Software Depot. A custom deployment plan is created by a SAS representative specifically for a site.

- If a SAS representative created a custom deployment plan for you, an XML file (or a ZIP file containing an XML file) will have been e-mailed to you.

- If your SAS representative recommended that you use a standard deployment plan, you just need the name of the plan that you will use. The actual deployment plan is downloaded with your SAS custom order (or included in your custom media that is shipped to you). During the installation, the standard deployment plan will be available from a drop-down list in the SAS installation program.

■ Your deployment plan must be a valid SAS 9.3 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 inserts a date and time stamp to the deployment plan filename. For example:

`/opt/SAS/config/Lev1/Utilities/plan.2012-05-17-12.04.xml`

To download the latest SAS 9.3 standard deployment plans that also contain a corresponding architectural diagram and pre-installation checklist, go to `http://support.sas.com/installcenter/plans`.

SAS Visual Analytics Configuration Options

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

Figure 3.2   Select Configuration Prompting Level Page
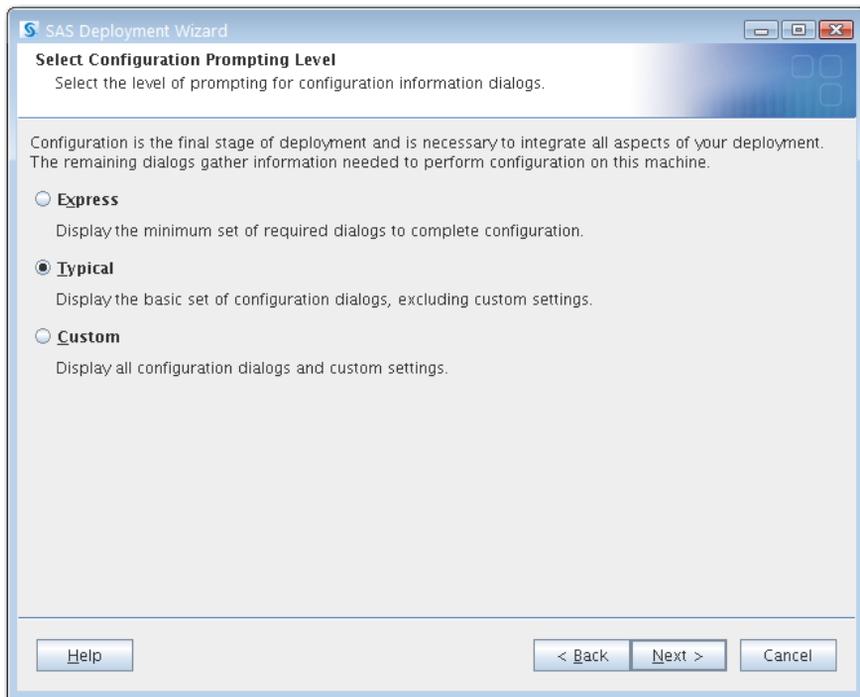
The following table lists SAS Deployment Wizard pages that are specific to SAS Visual Analytics and the prompting level under which you can find them.

In addition, there are JVM settings that are recommended for JBoss Application Server and SAS Remote Services. For more information, see "Web Application Server: Managed Server" on page 57 and "SAS Remote Services Application: JVM" on page 60.

Table 3.1   Configuration Options by Prompt Level

Configuration Option in the SAS Deployment Wizard	Distributed Server Only	Prompt Level That Displays the Option		
		Express	**Typical**	**Custom**
SAS Internal Account: Search Interface to SAS Content User on page 65*		X	X	X

Configuration Option in the SAS Deployment Wizard	Distributed Server Only	Prompt Level That Displays the Option		
		Express	Typical	Custom
SAS Visual Analytics High-Performance configuration information on page 62*			X	X
SAS Visual Analytics Data Provider on page 62*	X		X	X
SAS Visual Analytics Data Provider: Hadoop on page 62*	X		X	X
SAS Visual Analytics Data Provider: Greenplum on page 64*	X		X	X
SAS Visual Analytics Data Provider: Teradata on page 64*	X		X	X
SAS LASR Analytic Server Monitor Configuration Information on page 65*	X		X	X
SAS Information Retrieval Studio on page 65*			X	X
Search Interface to SAS Content Feeder Configuration on page 65*			X	X
SAS Visual Analytics Administrator: LASR Server on page 67*			X	X
SAS Visual Analytics Administrator: LASR Library on page 67*			X	X
SAS Visual Analytics: SAS Geomap Communication Protocol on page 67*			X	X
SAS Visual Analytics Explorer Server Configuration Properties on page 61*				X
SAS Visual Analytics Explorer: Context Root on page 61*				X
SAS Visual Analytics Data Provider: Hadoop Ports on page 63*				X

Configuration Option in the SAS Deployment Wizard	Distributed Server Only	Prompt Level That Displays the Option		
		Express	**Typical**	**Custom**
SAS Visual Analytics Designer: Context Root on page 66*				X
SAS Visual Analytics Hub: Context Root on page 66*				X
SAS Visual Analytics Report Viewer: Context Root on page 66*				X
SAS Visual Analytics Admin: Context Root on page 67*				X
SAS Visual Data Builder: Context Root on page 67*				X
SAS Visual Data Builder: Parallel Processing on page 68*				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 Installation Directory (SAS Home) Considerations

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

CAUTION! Users running SAS on 64-bit Linux machines must keep any 32-bit SAS Foundation products in a separate installation directory (SAS Home). Intermixing 32-bit SAS Foundation products with 64-bit SAS products in the same SAS Home location is not supported and might cause SAS to run improperly.

Note: SAS Home should *not* be a directory within your SAS Software Depot.

Content Repository Considerations

Before deploying, consider where certain content repositories will reside:

■ SAS Framework Data Server

When you deploy SAS Framework Data Server, the SAS configuration path should be a path local to the machine. The configuration path should not be on an NFS shared disk. If you want to put your configuration path on a shared disk, then you must make sure that you specify a local path for the data framework server content directory. Setting the data framework server content directory path is possible only on the SAS Deployment Wizard custom configuration prompting level. For more information, see "Overview of Configuration Options by Prompt Level" on page 87.

■ SAS Metadata Server

We recommend that your metadata repositories reside either on a local file system or a high-performance, high-availability network file system. For more information about metadata repositories, see "About SAS Metadata Repositories" in Chapter 16 of SAS Intelligence Platform: System Administration Guide.

Locale and Encoding Considerations

The SAS Deployment Wizard enables you to select the default locale and languages for the SAS Deployment Wizard and for SAS Visual Analytics.

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

Display 3.1   *Choose Language Dialog Box*
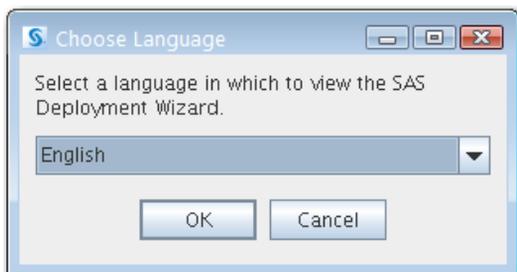
The language that you select in the Choose Language dialog box causes two actions:

■ indicates the language that the deployment wizard uses to display text

■ specifies the language that the SAS Metadata Server uses to store objects in its repository

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

Display 3.2 Select Language Support Page
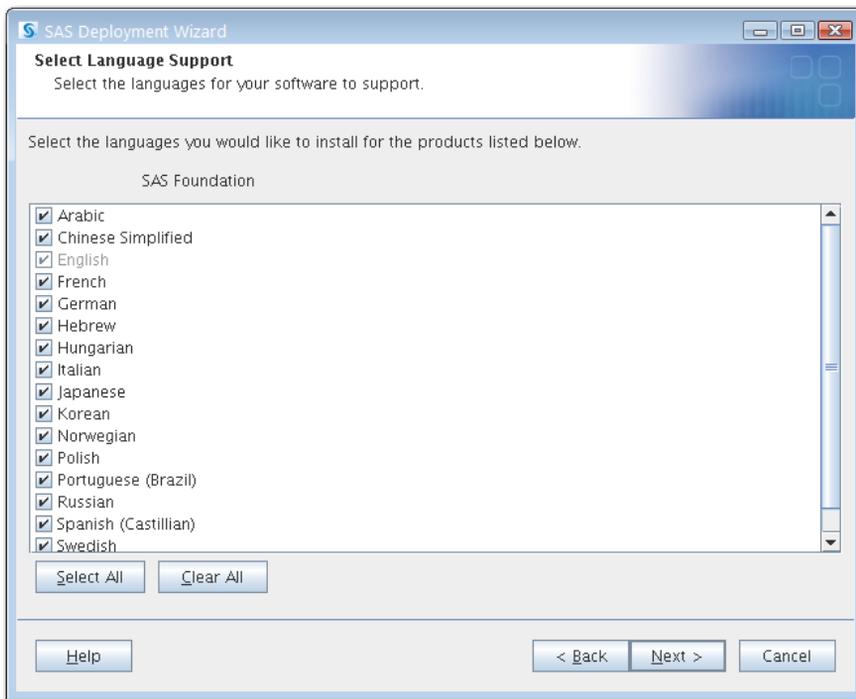
And finally, the deployment wizard prompts you for your locale settings.

Display 3.3   *Select Regional Settings Page*
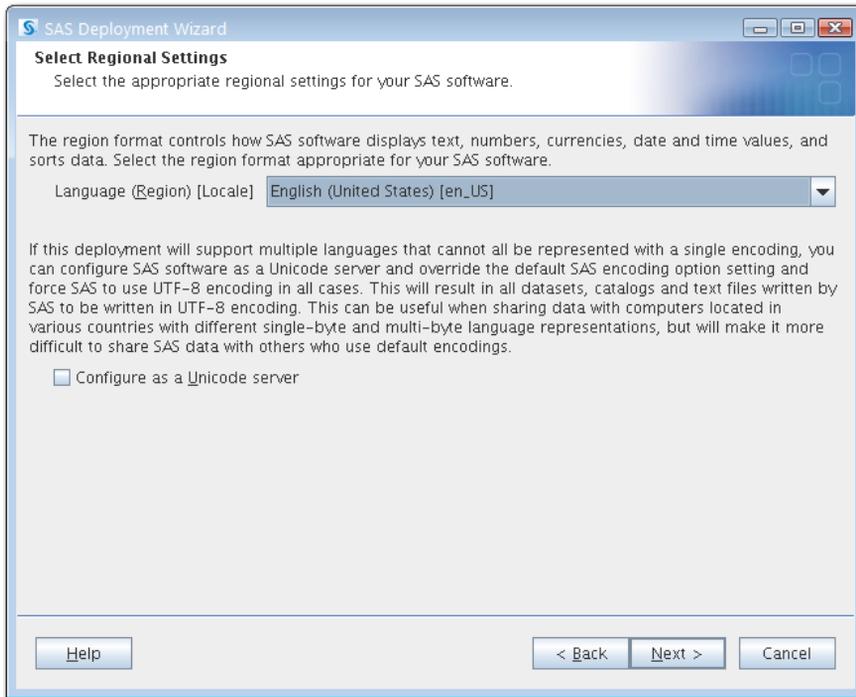
The locale (or regional) setting controls how SAS Visual Analytics displays the following:

- text

- numbers

- currencies

- dates

- times

- data (sorting)

You can choose to configure SAS Visual Analytics as a Unicode server. Unicode can be particularly useful when your SAS deployment supports multiple languages. Choosing to make SAS Visual Analytics a Unicode server means that SAS writes all of its data sets, catalogs, and text files in UTF-8 encoding. UTF-8 encoding supports 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 locales and encodings, see the *SAS National Language Support (NLS): Reference Guide*.

Deploy 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:

  - installation 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, 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 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-related pages that you will see depend on the prompt level and the contents of your SAS Visual Analytics custom order. "Configuration Options by Prompt Level" on page 89 lists which configuration options are available for each prompt level. For information about all SAS Deployment Wizard prompts, see the online Help for the wizard page in question.

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 1: Review Additional Documentation" on page 7.

2 Verify that you have performed the earlier required steps outlined in "Preparing to Deploy SAS Visual Analytics" on page 33.

   Note: A few pages into the SAS installation, the SAS Deployment Wizard prompts you for paths to the requested third-party software. You must have the necessary third-party software installed on the current machine, or the SAS Deployment Wizard will *not* let you continue with the installation. In this situation, you will have to end the SAS Deployment Wizard session and install the required third-party software before you can continue.

3 If you are deploying SAS LASR Analytic Server in non-distributed mode, you see fewer configuration prompts. You do not see any prompts regarding data providers and SAS High-Performance Management Console. For a list of the prompts you see, refer to Table 3.1 on page 36.

4 If you use any garbage collection scripts, temporarily suspend these scripts during SAS Deployment Wizard execution. If any wizard temporary files are deleted during wizard execution, configuration failures can occur.

5 Review information about where to source certain SAS content repositories described in "Content Repository Considerations" on page 39.

6 Review information about SAS Deployment Wizard configuration prompting levels described in "Configuration Options by Prompt Level" on page 87.

7 Log on to the machine on which you plan to install the SAS Visual Analytics server and middle tier (blade0). Do not use `root`.

8 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 deployment wizard writes the response file in the following location: `~/sdwresponse.properties`

You should see a welcome page similar to the following:

9 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 39.

10 Select **Install SAS Software**.

11 If you have more than one SAS software order in your depot, the wizard prompts you to select the order that you want to deploy.

12 Select **Perform a Planned Deployment**, and make sure that **Install SAS Software** and **Configure SAS Software** are both selected.
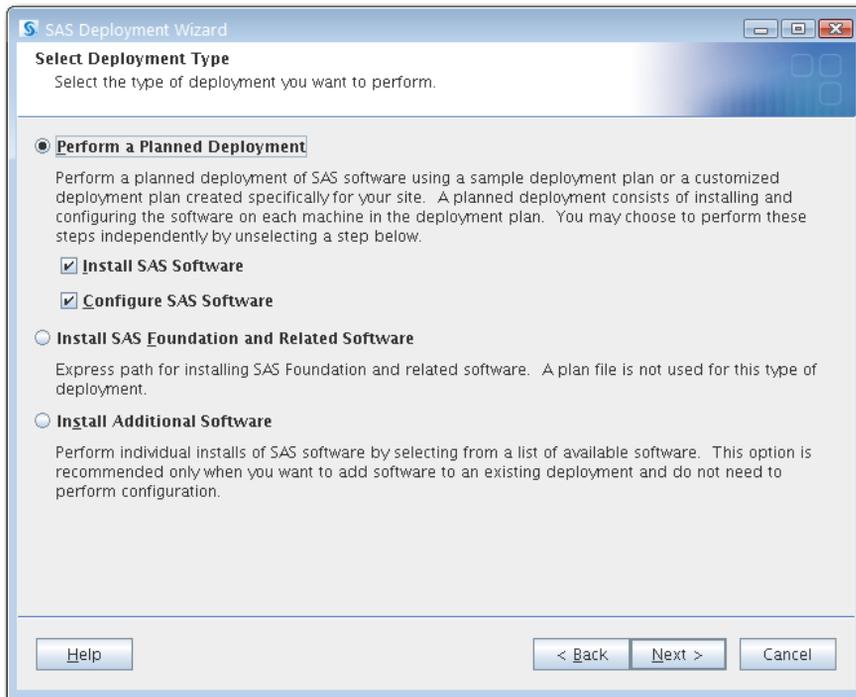
13 Specify the location (SAS Home) where you want to install SAS. For more information, see "SAS Installation Directory (SAS Home) Considerations" on page 38.

Note: The deployment wizard prompts you for SAS Home the first time you run the wizard. On any subsequent sessions on this machine, the wizard uses the previously specified location for SAS Home.

Note: SAS Home should *not* be a directory within your SAS Software Depot.

14 Choose **Specify the full path to a customized deployment plan**, and then enter the path to the deployment plan provided to you by your SAS representative.

For more information, see "About Deployment Plans" on page 34.
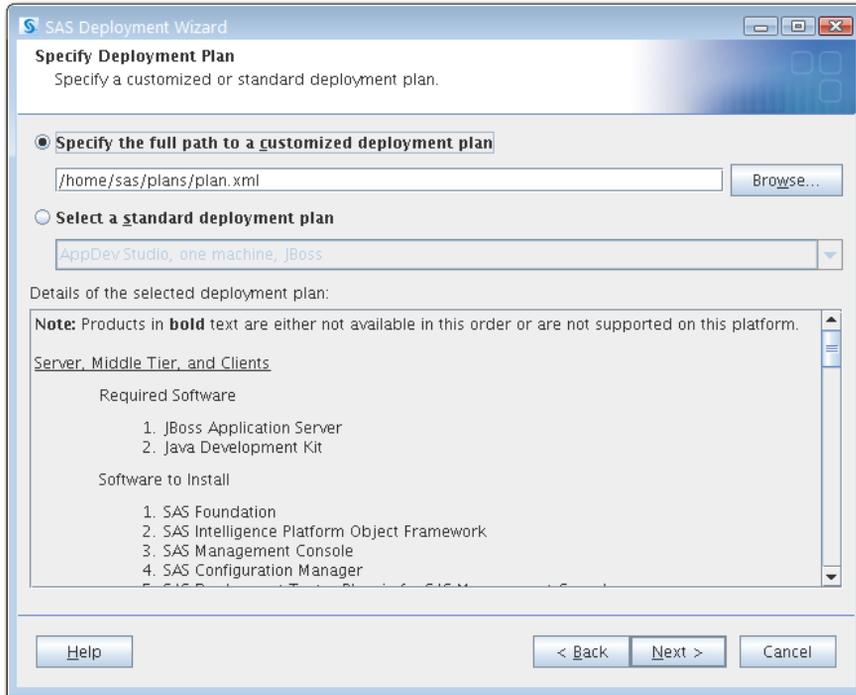
15 Select the machine on which you are installing software, and select the SAS products that you want to install, by doing the following:

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

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

16 Specify the location of 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.
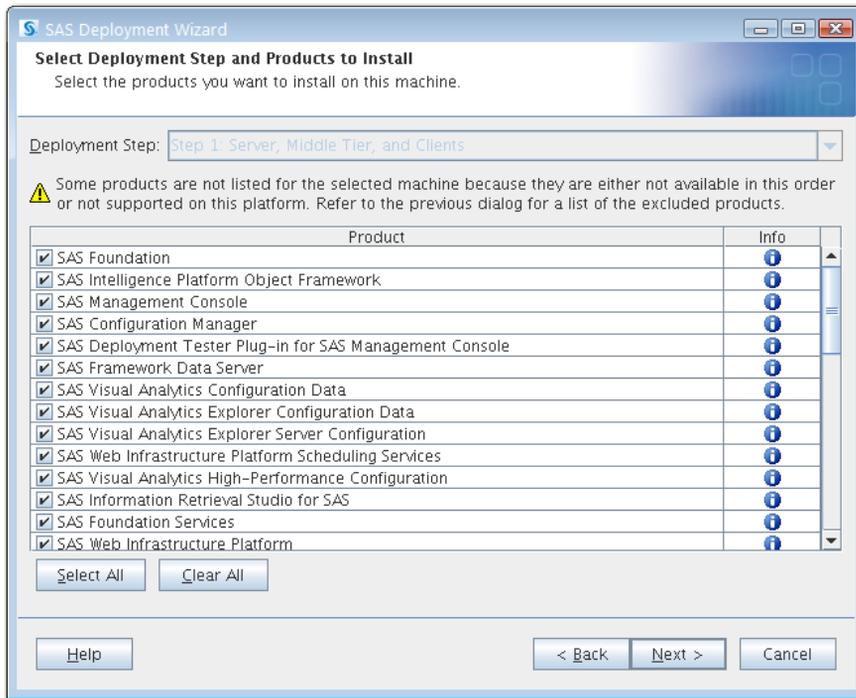
17 Deselect any languages that you do not want SAS to support. By default, SAS attempts to support all languages that your machine's operating system is configured for.

18 Select the locale, which affects how SAS displays text, numbers, currencies, dates, times, and sorts data. If you want to configure SAS as a Unicode server, do that here.

For more information, see "Locale and Encoding Considerations" on page 39.

19 The deployment wizard prompts you to do one of the following:

Use the recommended Java Runtime Environment
 (Recommended) select to have the deployment wizard install the required JRE on this machine.

Specify in the text field where you want the deployment wizard to extract the JRE.

Select an existing Java Runtime Environment
Select to specify the path to a JRE that you have already installed on this machine.

For more information, see `http://support.sas.com/resources/ thirdpartysupport/v93/jres.html`.

20 The deployment wizard scans your machine to determine whether any pre-existing SAS files are locked or do not have Write permission. 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. When you are finished, click **Next**.
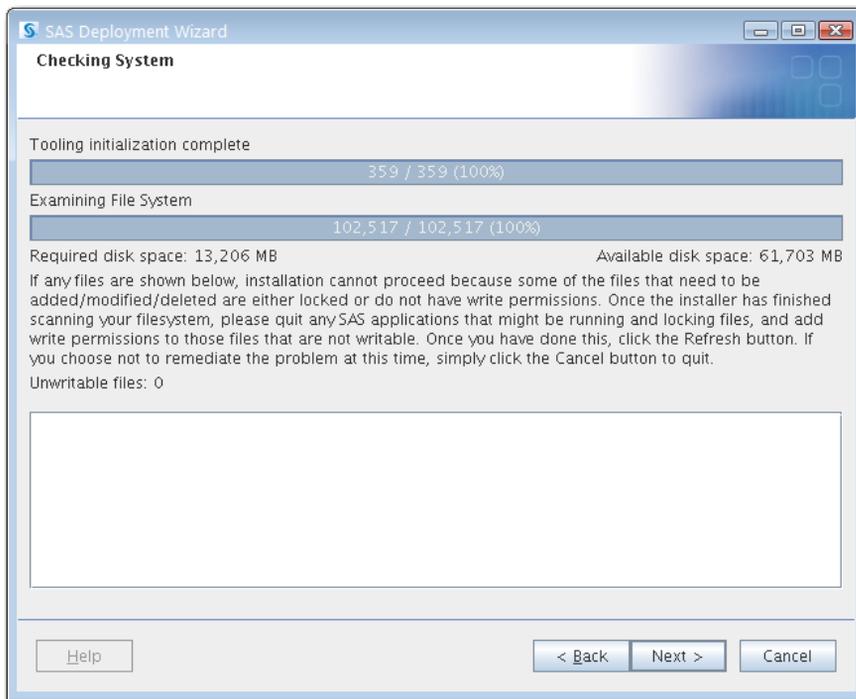
21 If you use a third-party database and SAS/ACCESS is a part of your order, select the software version for the third-party database.

The deployment 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 the SAS Install Center at `http://support.sas.com/documentation/installcenter/93`, and use the operating system and SAS version to locate the appropriate SAS Foundation Configuration Guide.

22 If your system uses Pluggable Authentication Modules (PAM), select **Use PAM Authentication**. In addition, you might also need to update your PAM configuration files in order for SAS Visual Analytics to use PAM authentication. For more information, see the *Configuration Guide for SAS 9.3 Foundation for UNIX Environments*.

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/password` or `/etc/shadow` authentication.

23 Review the list of third-party software that is required for the SAS software that you are installing on the current machine. (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. For more information about the third-party software versions that SAS 9.3 supports, see the *Third-Party Software for SAS 9.3* website at `http://support.sas.com/resources/thirdpartysupport/v93/index.html`. See also *System Requirements— SAS Visual Analytics*, available at `http://support.sas.com/documentation/installcenter/en/ikvisanlytofrsr/65999/HTML/default/index.html`. (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.

24 Specify the amount of information to provide to the SAS Deployment Wizard for configuring the SAS software that you are installing on the current machine. Choose one of the three prompting levels:

Note: When deploying the SAS Visual Analytics middle tier, the SAS Deployment Wizard automatically configures your web application server by default. To disable this feature, run the wizard using either the Typical or Custom prompting levels.

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

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 87 for more information about the SAS Deployment Wizard prompting levels.

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

Note: This topic describes some of the more important pages that you will 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 and, in multiple machine deployments, which machine you are currently deploying. "Configuration Options by Prompt Level" on page 89 lists which configuration options are available for each prompt level. For information about all SAS Deployment Wizard prompts, see the online Help for the wizard dialog box in question.

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).
>
> 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 Home and SAS configuration directories can share the same parent directory, one directory should not reside inside another. Defining the configuration directory under the SAS Home directory, or vice versa, can lead to file permission issues arising from the need to manage installed files differently than site-specific configurations.

If you are deploying SAS Framework Data Server, then the SAS configuration path should be a path local to the machine. The configuration path should not be on an NFS shared disk. If you want to put your configuration path on a shared disk, then you must make sure that you specify a local path for the SAS Framework Data Server content directory. You can set the content directory on the Framework Data Server Invocation Options page. This page is available only on the custom configuration prompting level.

Local Machine Name
Enter the complete name of the local host in **Fully-qualified Local Host Name**. The fully qualified local host name typically takes the form of the local host name plus the domain name server (for example, myserver.example.com). Enter a short host name in **Short Local Host Name**. The short local host name is the abbreviated, more common method of referring to the host, usually only a single word.

Migration Information
Ignore this page and click **Next**.

Authentication Domain
Accept the default value (DefaultAuth), unless you are planning to use a different SAS authentication domain for servers on this machine.

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

Integrated Windows Authentication

Select to configure workspace servers running on Windows or UNIX to use Integrated Windows authentication (IWA). IWA uses a single sign-on feature which 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 UNIX. The mechanism used is typically Kerberos, but on Windows, NTLM might also be used.

For more information, see "Integrated Windows Authentication" in Chapter 10 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/ikfdtnunxcg/64205/PDF/default/config.pdf`.

SAS Metadata Server

If you have any changes for the metadata server, enter them in this page.

The deployment wizard creates a separate server context (SASMeta) for the metadata server and the other servers required to perform metadata server utility functions, such as backup and promotion. 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. Therefore, we recommend that you not change the logical server or server prefix (SASMeta).

For more information, see "Overview of the SAS Metadata Server and Its Initial Configuration" in Chapter 2 of SAS Intelligence Platform: System Administration Guide.

Deployment Accounts: Type of Accounts

Select whether to use internal accounts when appropriate. Internal user accounts are accounts known only to SAS and are created and authenticated internally in metadata rather than externally.

For more information, see .

External Account: Installer

Enter the user ID and password for the external account to be used to install and configure SAS. Do not use `root`

For more information, see "Defining User Accounts" on page 12.

SAS Internal Account: Unrestricted Administrator

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 SAS metadata server.

For more information, see "Defining User Accounts" on page 12.

SAS Internal Account: Trusted User

Enter a password for an internal account (sastrust@saspw) that the wizard will create to enable SAS server and spawner components to communicate securely with each other.

For more information, see "Defining User Accounts" on page 12.

SAS BI Web Services: Authentication Method

This feature is not used by SAS Visual Analytics 6.1.

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. Currently, SAS BI Web Services for Java and .NET and the SAS Stored Process Web Application are the only components that support this feature.

For more information, see "Using the SAS Anonymous Web User with SAS Authentication" in Chapter 3 of SAS Intelligence Platform: Middle-Tier Administration Guide.

External account: SAS Spawned Servers Account

Enter the user ID and password for the external account to be used to start the pooled workspace server and the stored process server. On Windows, enter a domain-qualified user ID.

For more information, see "Defining User Accounts" on page 12.

Create Common Directories

Select 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.

Server Encryption

Select the encryption level and algorithm that SAS clients and servers use to connect to the metadata server.

Choose **Credentials** to encrypt only login credentials. Choose **Everything** to encrypt all communication with the metadata server. (Choosing **Everything** can affect your SAS performance.)

To specify an encryption algorithm other than SASPROPRIETARY, you must have a license for SAS/SECURE software. 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.

Client-side Credentials Policy

Select this option to set the policy to allow users to save their user IDs and passwords in client-side connection profiles on the metadata server for desktop applications. This input sets the value for OMA_SASSEC_LOCAL_PW_SAVE in omaconfig.xml.

For more information, see "Reference Information for omaconfig.xml" in Chapter 25 of SAS Intelligence Platform: System Administration Guide.

E-mail Server

Enter the port and host name for an SMTP e-mail server that the SAS Metadata Server uses to send e-mail alerts to an administrator if journaling issues arise. 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 "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 14 of SAS Intelligence Platform: System Administration Guide.

SAS Application Server: Server Context

Enter the name of the server context for the SAS Application Server definition. 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.

Metadata Utility Workspace Server

Enter the name of the logical workspace server and the workspace in metadata. You also need to enter the name of the machine on which the workspace server runs and the port on which the object spawner will listen for client requests to launch workspace servers. The machine name should match the name specified to the object spawner.

Unlike a regular workspace server, access to this server is limited to members of the SAS Administrators group, and its use is limited to metadata server administration tasks such as promotion and backup.

In SAS 9.3, two or more workspace servers can share the same port even if they are running at the same time.

For more information about ports, see "Designating Ports and Multicast Addresses" on page 22.

SAS Pooled Workspace Server

Enter the name of the logical pooled workspace server and the pooled workspace in metadata. You also need to enter the name of the machine on which the pooled workspace server runs and the port on which the object spawner will listen for client requests to launch pooled workspace servers. The machine name should match the name specified to the object spawner.

For more information, see "Overview of Workspace Servers and Stored Process Servers" in Chapter 3 of SAS Intelligence Platform: Application Server Administration Guide.

SAS Framework Data Server

Enter the name of the logical SAS Framework Data Server in metadata. You also need to enter the name of the machine on which the SAS Framework Data Server runs and the TCP/IP port on which the SAS Framework Data Server will listen. For more information, see the *SAS Intelligence Platform: Middle-Tier Administration Guide*.

Metadata Utility SAS DATA Step Batch Server

Enter the various values required to configure a SAS DATA step batch server. The directory fields identify where the deployed SAS program is stored and the name of the deployed SAS DATA step program job. Access to this server is limited to members of the SAS Administrators group, and its use is limited to metadata server backup.

For more information, see "Contents of the Metadata Server Subdirectory (SASMeta)" in Chapter 23 of SAS Intelligence Platform: System Administration Guide.

Web Application Server: Automatic Configuration

Select this option for the deployment wizard to automatically build and configure the SAS web applications as well as configuring a sample web application server for use with SAS Visual Analytics. (To use this wizard feature, make sure that your web application server is not running before proceeding.) For more information, see "Choose Whether to Automatically Configure Your Web Application Server" in Chapter 4 of SAS Intelligence Platform: Installation and Configuration 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/v93/appservers/jbosssw.html`.

Web Application Server: Multiple Managed Servers

This feature is not supported in SAS Visual Analytics 6.1.

Web Application Server: Managed Server

Enter a logical name for your managed server. This name will be displayed in your application server administrative console and used in administrative scripting.

CAUTION! The managed server name must be unique. Non-unique names will cause your web configuration to fail.

In **HTTP Port**, enter the unsecured port on which the managed server will listen.

In **HTTPS Port**, enter the SSL port to be assigned to the managed server.

In **RMI Port**, enter a port for JBoss that maps to the default JNDI port. Clients connecting to applications running on JBoss, such as the JBoss shutdown command, would use this port.

In **Port Offset**, enter a number to be used as an offset when the binding service configures all ports in JBoss version 5 and later. See the `conf/bindingservice.beans/META-INF/bindings-jboss-beans.xml` file for the full ServiceBindingManager configuration.

In **Configured Protocol**, select the communication protocol for the administration server: HTTP or HTTPS. Automated configuration through the SAS Deployment Wizard only supports the HTTP protocol. If you perform a manual configuration, you can set up HTTPS.

In **Additional JVM Options**, enter any additional Java options that you want the managed server JVM (Java Virtual Machine) to use. These JVM options are tagged onto the end of the managed server's command line. Options that are deployment wizard defaults can be overridden in this way.

We recommend the following JVM settings for SAS Visual Analytics:

```
-Xms8192m -Xmx8192m -XX:PermSize=1024m -XX:MaxPermSize=1024m -d64
-XX:NewSize=512m -XX:MaxNewSize=512m -XX:+UseConcMarkSweepGC -XX:+UseTLAB
-XX:+DisableExplicitGC -XX:+CMSIncrementalMode -XX:+CMSClassUnloadingEnabled
-Dcom.sun.management.jmxremote -XX:+UseCompressedOops -Xss256k
-Djava.awt.headless=true -Djboss.platform.mbeanserver
-Djavax.management.builder.initial=org.jboss.system.server.jmx.MBeanServerBuilde
rImpl -Dsun.rmi.dgc.client.gcInterval=3600000
-Dsun.rmi.dgc.server.gcInterval=3600000
```

For more information, go to **http://support.sas.com/resources/ thirdpartysupport/v93/appservers/jbosssw.html**.

Database type for SAS Web Infrastructure Platform

Only SAS Framework Data Server is supported in this release of SAS Visual Analytics.

SAS Web Infrastructure Platform database properties

Enter the host name, fully qualified host name, or IP address for the host where the database is installed. Specify the port that the database server is listening to and the name of the database that will contain the SAS Web Infrastructure Platform tables.

Choose **Automatically create tables and load data** to have the deployment wizard automatically create tables and load the selected pre-existing database with initial data.

SAS Web Infrastructure Platform JDBC Properties

Enter the user account and its password for accessing the database used with your SAS Web Infrastructure Platform tables.

If you have selected to automatically configure the SAS Web Infrastructure Platform database, this user account must have the ability to create tables and insert records. If you are not automatically configuring the SAS Web Infrastructure Platform database, this user account must have the ability to insert,

update, and delete records. The default user account is the SAS Trusted User account (sastrust@saspw). For more information, see "JDBC Data Sources" in Chapter 4 of SAS Intelligence Platform: Middle-Tier Administration Guide.

In the **Directory containing JDBC driver jars** fields, enter the appropriate JDBC driver JAR files and your selected RDBMS database and version. Inappropriate or additional JAR files will cause configuration failures, so just copy the minimum required JAR files to the JDBC driver JARs directory.

Web Application Server: Automatic Deployment

Select to automatically deploy SAS Visual Analytics Web applications to the web application server. For more information, see "Choose Whether to Automatically Deploy the SAS Web Applications" in Chapter 4 of SAS Intelligence Platform: Installation and Configuration Guide.

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).

If you choose not to automatically deploy SAS web applications, the deployment wizard writes manual deployment instructions to Instructions.html during the web application deployment stage, that you will need to complete after the wizard finishes executing. For more information, go to `http://support.sas.com/resources/thirdpartysupport/v93/appservers/jbosssw.html`.

Web Application Server: Proxy Information

If you are using SAS Information Delivery Portal RSS feeds, then you will have to provide proxy server information. Enter the fully qualified host name for the proxy server and its port that your site uses to access the Internet.

For **NonProxy Hosts**, enter the DNS names of all the machines that should not be accessed through the proxy server. Be sure to include other machines where application servers are configured as part of a common WebLogic Domain or are part of a WebSphere cell. 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/v93/appservers/jbosssw.html`.

IP Multicast

Accept these IP multicast settings or enter new ones.

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" on page 22.

SAS Remote Services Application: JVM

Enter the desired initial heap size for the remote services application using the JVM option format.

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 Remote Services VM to use.

We recommend the following JVM settings for SAS Visual Analytics:

```
-Xms512m -Xmx512m -XX:+UseTLAB -XX:+UseConcMarkSweepGC
-XX:+DisableExplicitGC -Dsun.rmi.dgc.client.gcInterval=3600000
-Dsun.rmi.dgc.server.gcInterval=3600000 -Djava.awt.headless=true
-Xss256k -XX:NewSize=128m -XX:MaxNewSize=128m -XX:PermSize=64m
-XX:MaxPermSize=64m
```

In addition, 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 9.3 Web Applications: Tuning for Performance and Scalability*, available at `http://support.sas.com/resources/thirdpartysupport/v93/appservers/WebTierScalabilityAndPerformance.pdf`.

SAS Content Server: Repository Directory

Enter the location on the disk for the actual contents of the content repository.

Enable **Use configured database for content storage** if you want to store SAS Content Server content in the SAS Web Infrastructure Platform database instead of the file system. When this check box is enabled, the path identified in the **Repository Directory** is used to store configuration files and indexes only.

SAS Visual Analytics Explorer does not store explorations in the SAS Content Server, only in SAS metadata. Reports created by SAS Visual Analytics Designer, however, are stored in SAS Content Server.

(Selecting the SAS Web Infrastructure Platform database type .)

For more information, see Chapter 9, "Administering the SAS Content Server," in SAS Intelligence Platform: Middle-Tier Administration Guide.

SAS Visual Analytics Explorer Server Configuration Properties

The following properties are used to create a libref to reference the directory that contains uploaded and extracted SAS datasets.

In **Uploaded SAS Dataset Library Directory Path**, enter the relative or absolute path of a directory to contain uploaded and extracted SAS data sets.

In **Uploaded SAS Dataset Libref Name**, enter the name of the libref name that points to uploaded and extracted SAS data sets. (Libref names contain a maximum of eight characters.)

SAS Visual Analytics Explorer: Context Root

Enter the context root that ties the user to the EAR file that is specified in the Display Name field. The URL for using SAS Visual Analytics Explorer is of the form `http://`*machine:port*`/SASVisualAnalyticsExplorer`. Although the machine and port are configured elsewhere and 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).

SAS Visual Analytics High-Performance Configuration Information

In **SAS High-Performance Analytics environment Host**, specify the machine in the cluster to which the SAS clients connect.

In **SAS High-Performance Analytics environment Install Location**, specify the path to the `TKGrid` directory on the root node host (for example `/opt/TKGrid`). For more information, see *SAS High-Performance Analytics Infrastructure: Installation and Configuration Guide*, available at `http://support.unx.sas.com/documentation/solutions/hpainfrastructure/16/hpaicg.pdf#page=62`.

In **SAS High-Performance Analytics environment Port**, enter the port number in the environment through which SAS clients connect. (By default, the port is 10010.)

In **SAS High-Performance Computing Management Console URL**, enter the URL used to access SAS High-Performance Computing Management Console. (By default, this is: `http://local_host_name:10020`

SAS Visual Analytics Data Provider

Specify the co-located data provider to be used with SAS Visual Analytics. The supported values are Hadoop, Greenplum, and Teradata.

In Visual Analytics 6.1, two versions of Hadoop are supported, SAS High-Performance Deployment of Hadoop and Cloudera Hadoop.

For more information about SAS High-Performance Deployment of Hadoop, see *SAS High-Performance Analytics Infrastructure: Installation and Configuration Guide*, available at `http://support.unx.sas.com/documentation/solutions/hpainfrastructure/16/hpaicg.pdf#page=25`.

For more information about Cloudera Hadoop, see *SAS High-Performance Analytics Infrastructure: Installation and Configuration Guide*, available at `http://support.unx.sas.com/documentation/solutions/hpainfrastructure/16/hpaicg.pdf#page=75`.

SAS Visual Analytics Data Provider: Hadoop

Specify the machine in the cluster that is the Hadoop NameNode.

In **Hadoop NameNode Port**, enter the port number for Hadoop. This value maps to Hadoop's property `com.sas.lasr.hadoop.service.namenode.port`.

For more information, see *Configuration Guide for SAS 9.3 Foundation for UNIX Environments*, available at `http://support.sas.com/documentation/installcenter/en/ikfdtnunxcg/64205/PDF/default/config.pdf#page=52`.

In **Hadoop NameNode Authentication Domain**, enter the domain to use for identifying logins that access the Hadoop NameNode 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, to ensure 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 target server is registered.

In **Hadoop Data Server Library Name**, enter the library name for the Hadoop library.

In **Hadoop Data Server Database**, enter the database for the Hadoop data server.

SAS Visual Analytics Data Provider: Hadoop Ports
In **File System Default Port**, enter the port used to access the NameNode 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 he port on which the NameNode 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 NameNode backup web User Interface listens. This value will map to the Hadoop property `dfs.secondary.http.address`.

In **Job Tracker HTTP Port**, enter the port on which the JobTacker Web User Interface listens. This value will map to Hadoop's property `mapred.job.tracker.http.address`.

SAS Visual Analytics Data Provider: Greenplum

In **Greenplum Database Master Host**, enter the host name for the Greenplum Database master host.

In **Greenplum Database Master Authentication Domain**, enter the domain to use for identifying logins that access the Greenplum Database Master Host.

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, to ensure 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 target server is registered.

In **Greenplum Data Server Library Name**, enter the library name for the Greenplum library.

In **Greenplum Data Server Database**, enter the database schema for the Greenplum data server.

SAS Visual Analytics Data Provider: Teradata

In **Teradata Data Server Host**, enter the machine name in the Managed Cabinet that is the Teradata Management Server.

In **Teradata Data Server Authentication Domain**, enter the domain to use for identifying logins that access the Teradata Data Server Host.

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, to ensure 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 target server is registered.

In **Teradata Data Server Library Name**, enter the library name for the Teradata library.

In **Teradata Data Server Database**, enter the database name for the Teradata Data Server.

SAS LASR Analytic Server Monitor Configuration Information
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.

SAS Information Retrieval Studio
In **Host Name**, enter the SAS Information Retrieval Studio host name.

In **Port**, enter the SAS Information Retrieval Studio port number.

In **Log Directory**, enter the log directory.

(On the **Custom** prompting path only, there are additional ports for the various server components of SAS Information Retrieval Studio, including special ports for administrators and web administrators.)

Search Interface to SAS Content Feeder Configuration
In **Index Loader Interval In Minutes**, enter time interval in minutes to load SAS content to the indexing server.

SAS Internal Account: Search Interface to SAS Content User
This internal user account permits access to SAS content that is supplied to SAS Information Retrieval Studio for indexing.

In **Display Name**, enter the account display name stored in metadata. This is a static field.

In **Name**, enter the account name stored in metadata. This is a static field.

In **Internal User ID**, enter the account user ID stored in metadata. This is a static field.

In **New Internal Password**, enter the metadata password to be created for this account. The password must contain at least six characters.

In **Confirm New Internal Password**, reenter the metadata password to be created for this account.

SAS Visual Analytics Designer: Context Root

Enter the context root that ties the user to the EAR file that is specified in the **Display Name** field. The URL for using SAS Visual Analytics Designer is of the form `http://`*machine:port*`/SASVisualAnalyticsDesigner`. Although the machine and port are configured elsewhere and 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

Enter the context root that ties the user to the EAR file that is specified in the **Display Name** field. The URL for using SAS Visual Analytics Hub is of the form `http://`*machine:port*`/SASVisualAnalyticsHub`. Although the machine and port are configured elsewhere and 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

Enter the context root that ties the user to the EAR file that is specified in the **Display Name** field. The URL for using SAS Visual Analytics Report Viewer is of the form `http://`*machine:port*`/SASVisualAnalyticsReportViewer`. Although the machine and port are configured elsewhere and 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

Enter the context root that ties the user to the EAR file that is specified in the **Display Name** field. The URL for using SAS Visual Analytics Administrator is of the form `http://`*machine: port*`/SASVisualAnalyticsAdministrator`. Although the machine and port are configured elsewhere and 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).

Visual Analytics Admin: LASR Server

Enter the path in the High-Performance Analytics environment where signature files are created and read.

SAS Visual Analytics Administrator: LASR Library

In **LASR Data Server Library Name**, enter the library name for the LASR library.

In **LASR Data Server Libref**, enter the libref for the LASR library.

In **LASR Data Server Tag**, enter the server tag for the LASR data server.

SAS Visual Analytics Explorer SAS Geomap Communication Protocol

The protocol you specify defines how SAS Visual Analytics Explorer communicates with the OpenStreetMap server hosted by SAS.

Choose **HTTP** (default) to use the standard browser communication.

Choose **HTTPS** to use the Secure Sockets Layer (SSL) protocol for secured communication.

Using HTTPS might result in a decrease in performance, because of additional communication and encryption.

For more information, see *SAS Visual Analytics: Administration Guide* available at `http://support.sas.com/documentation/onlinedoc/va/index.html` .

SAS Visual Data Builder: Context Root

Enter the context root that ties the user to the EAR file that is specified in the **Display Name** field. The URL for using SAS Visual Data Builder is of the form `http://`*machine: port*`/SASVisualDataBuilder`. Although the machine and port are configured elsewhere and typically apply to the web container as a

whole, the **SASVisualDataBuilder** portion is the *context root*, and you can change it (within the constraints of URL rules).

SAS Visual Data Builder: Parallel Processing
This feature is not supported in SAS Visual Analytics 6.1.

26 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.

- 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.
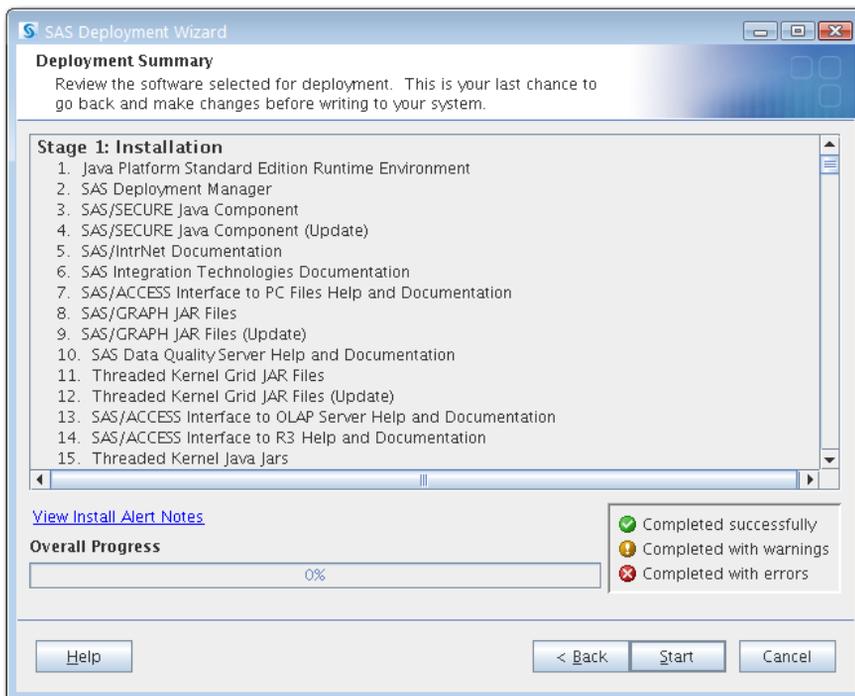
When you are installing the server tier, you will be instructed to run a script as root. As the message in the installation program explains, certain SAS products and features use functionality that requires SAS to check user ID authentication and file access authorizations. This in turn necessitates that certain files within your SAS installation have setuid permissions and be owned by root.

CAUTION! To avoid configuration failure, do not proceed until the script completes.

When you see a page similar to the following, the SAS Deployment Wizard is finished:
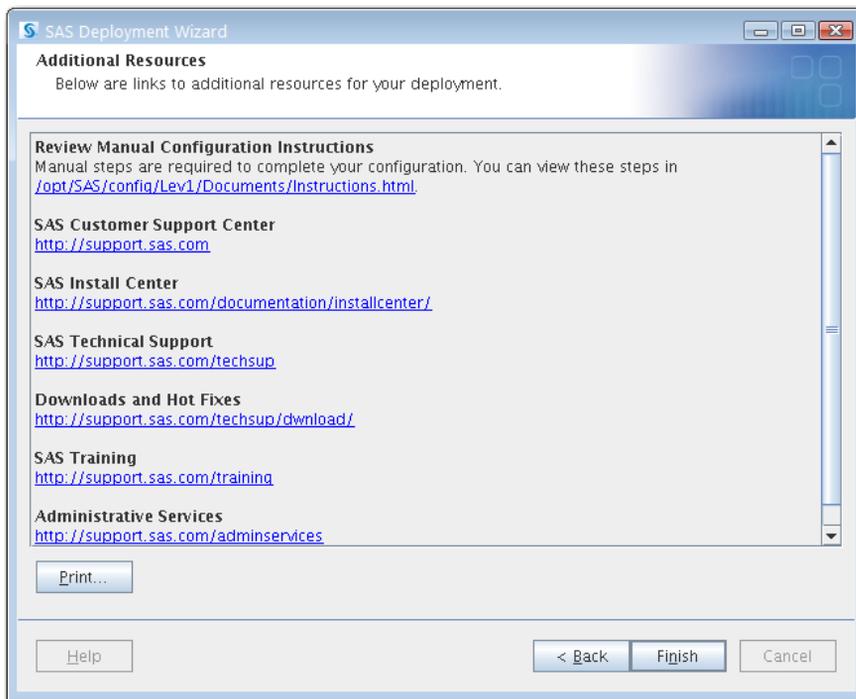
The deployment wizard has installed, configured, and started SAS processes on your machine.

27 Click **Review Manual Configuration Instructions** and complete any necessary manual configuration steps.

The SAS Deployment Wizard writes the Instructions.html file to the `Documents` directory under the SAS configuration path (for example, `/opt/SAS/Lev1/Documents/Instructions.html`).

28 Click **Finish** to close the deployment wizard.

29 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 the child directories beneath the path that you specified earlier in this procedure on the **Specify Configuration Information** wizard page.

- Back up your web application server directories.

- Back up your metadata repository and repository manager. For more information, see Chapter 11, "Best Practices for Backing Up and Restoring Your SAS Content," in SAS Intelligence Platform: System Administration Guide.

30 If you opted not to automatically deploy your SAS web applications, then you must manually deploy them. For more information, go to the Third-Party Software Downloads site at `http://support.sas.com/resources/thirdpartysupport/v93/appservers/jbosssw.html`.

31 Be sure to restart any servers that you stopped for purposes of creating a backup.

32 Proceed to the section .

Validate the SAS LASR Analytic Server Monitor Deployment

SAS LASR Analytic Server Monitor is responsible for ensuring that the In-Memory Data, HDFS content explorer, Resource Monitor, and the Process Monitor features available in the SAS Visual Analytics Data Preparation interface are functional and available to users.

To validate the SAS LASR Analytic Server Monitor deployment, follow these steps:

1   Log on to the SAS LASR Analytic Server Monitor machine (blade0) using the SAS Installer account.

    Run LASRMonitor.sh status with a user account that normally starts the server, or with a user account that has Read permissions on the lasrmonitor.pid file (in the same folder as the LASRMonitor.sh script).

2   Change to the SAS LASR Analytic Server Monitor configuration directory.

    By default this is **SAS-configuration-directory/Lev*n*/Applications/ SASVisualAnalytics5.2/HighPerformanceConfiguration**

3   Enter the following command to start SAS LASR Analytic Server Monitor:

    ```
    LASRMonitor.sh start
    ```

4   Enter the following command to confirm that SAS LASR Analytic Server Monitor is running:

    ```
    LASRMonitor.sh status
    ```

For more information, see the *SAS Visual Analytics: Administration Guide* available at **http://support.sas.com/documentation/onlinedoc/va/index.html**.

4

What to Do Next: Administration Tasks

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 74

- "Check Status for SAS Visual Analytics Servers" on page 74

- "Create SAS Users and Groups" on page 75

- "SAS Web Application Required Tasks" on page 76

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

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 JBoss Application Server instances in the middle tier is checked with the following command:

JBOSS_HOME/bin/SASServern.sh status

For more information, see *SAS Intelligence Platform: Middle-Tier Administration Guide*.

■ The status of SAS LASR Analytic Server Monitor is checked with the following command:

SAS-config-dir`/Levn/Applications/SASVisualAnalytics6.1/`
`HighPerformanceConfiguration/LASRMonitor.sh status`

For more information, see "SAS LASR Monitor Server Administration" in Chapter 13 of SAS Visual Analytics: Administration Guide.

- The status of SAS Information Retrieval Studio Server is checked with the following command:

SAS-config-dir`/Levn/Applications/`
`SASInformationRetrievalStudioforSAS1.42/irstudio.sh status`

For more information, see Appendix 2, "SAS Information Retrieval Studio Administration," in SAS Visual Analytics: 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 metadata group 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 Explorer, SAS Visual 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 web application tasks must be performed:

■ Specify the application-specific ulimit settings for JBoss Application Server and SAS Remote Services. In this document, JBoss Application Server resides either on blade 0, on the Greenplum MDW, or on the Teradata TMS.

  □ Specify the following ulimit settings in the SASServer*n*.sh file under **JBOSS_HOME/bin/**.

    For a multiple-JVM deployment, update SASServer12.sh; for a single JVM deployment, update SASServer1.sh:

    ```
    ulimit -n 20480
    ulimit -u 8192
    ulimit -s 256
    ```

  □ Specify the following ulimit settings in the **SAS-config-dir/Levn/Web/Applications/RemoteServices/RemoteServices.sh** file:

    ```
    ulimit -s 256
    ```

  Note: These ulimit settings are made 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 JBoss Application Server and SAS Remote Services. For more information, see "Web Application Server: Managed Server" on page 57 and "SAS Remote Services Application: JVM" on page 60.

  □ Enable SAS Information Retrieval Studio to support Search Interface to SAS Content.

  □ By default, SAS Visual Analytics schedules cron to run the **loadindex.sh** command on a specified interval.

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

Overview of Deploying SAS LASR Analytic Server in a Different 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.

In SAS Visual Analytics 6.1, the server is enhanced to support running on a single machine, or in *non-distributed* mode.

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 Deplopyment Wizard and the SAS Deployment Manager, you can:

■ deploy the server in non-distributed mode.

For more information, see "Deploy SAS Visual Analytics Interactively" on page 42.

■ deploy the server in distributed mode.

For more information, see "Deploy SAS Visual Analytics Interactively" on page 42.

■ 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 82.

■ 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 82.

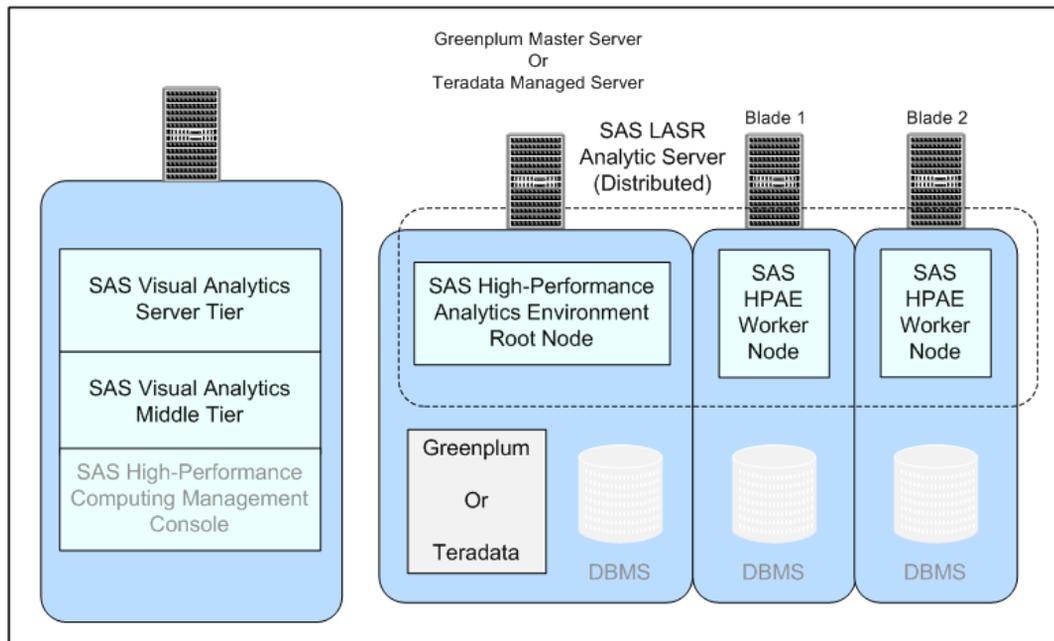*Figure A1.1* *SAS LASR Analytic Server Distributed Mode with Greenplum and Teradata*

Figure A1.2   *SAS LASR Analytic Server Distributed Mode with Hadoop*
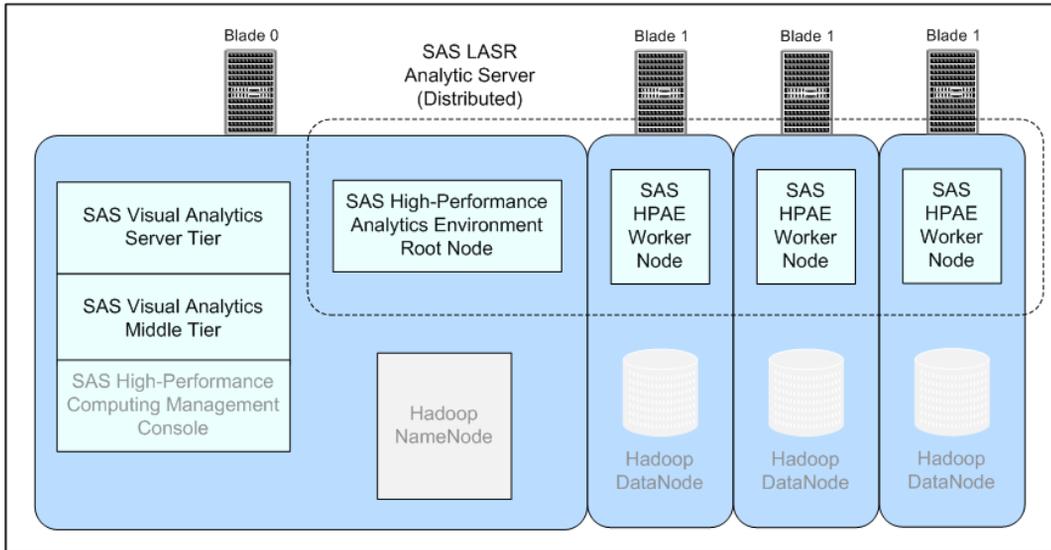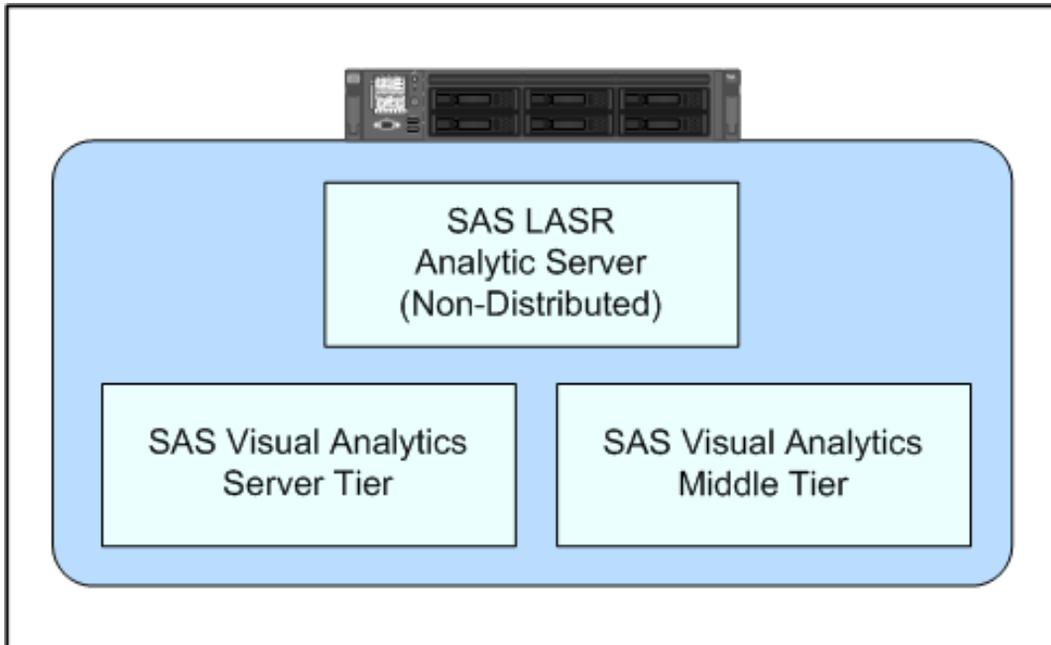

Figure A1.3   *Non-distributed SAS LASR Analytic Server*

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, refer to 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 Servers to run in distributed mode, follow these steps:

1 Shut down your SAS server and middle tiers.

   For more information, see the *SAS Visual Analytics: Administration Guide*, available at `http://support.sas.com/documentation/onlinedoc/va/index.html`.

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.unx.sas.com/documentation/solutions/hpainfrastructure/16/hpaicg.pdf#page=59`.

3 Run the SAS Deployment Wizard to install only.

Figure A1.4 SAS Deployment Wizard Install Mode
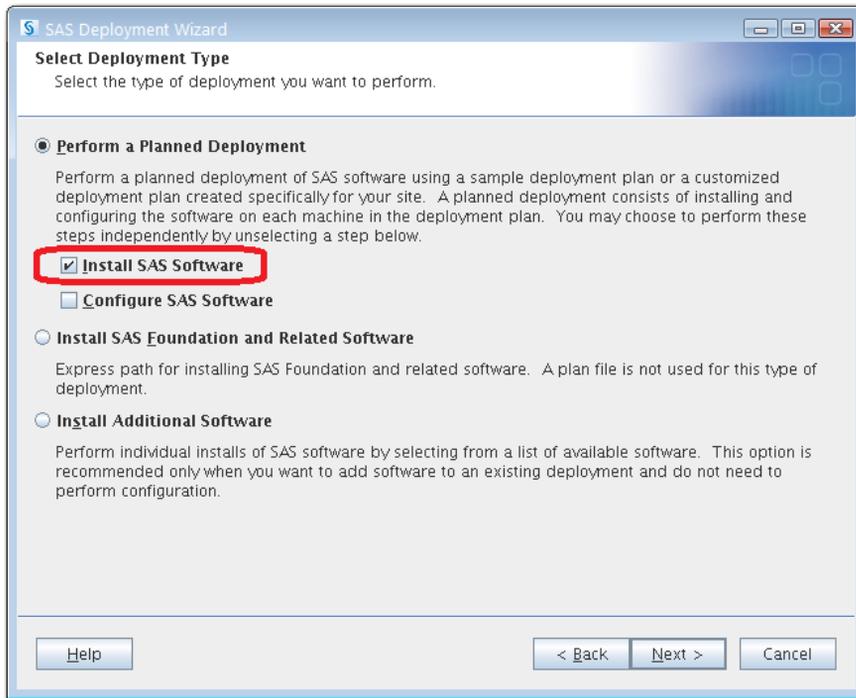
Follow the directions in the topic "Deploy SAS Visual Analytics Interactively." When the Select Deployment Type page appears, make sure that you choose **Install SAS Software**. Make sure that **Configure SAS Software** is deselected. For more information, see Step 12 on page 45.
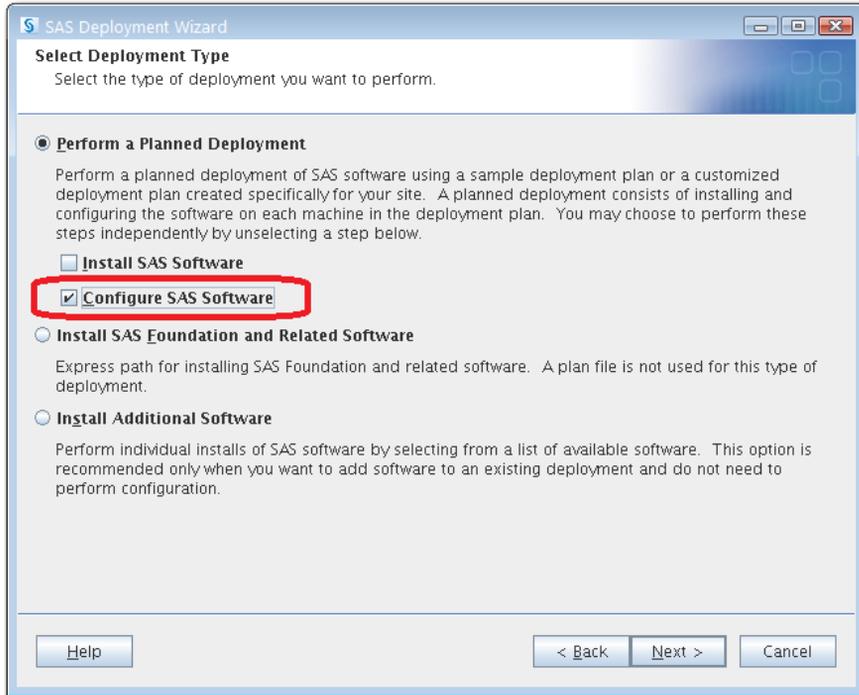
4 When the deployment wizard is finished, restart your SAS server tier.

For more information, see the *SAS Visual Analytics: Administration Guide*, available at `http://support.sas.com/documentation/onlinedoc/va/index.html` .

5 Rerun the SAS Deployment Wizard 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. For more information, see Step 12 on page 45.

Figure A1.5 SAS Deployment Wizard Configure Mode

When the deployment wizard displays the Select Products to Configure page, it is important that you choose **SAS Visual Analytics High-Performance Configuration**.

Figure A1.6 *Choose SAS Visual Analytics Configuration Data*
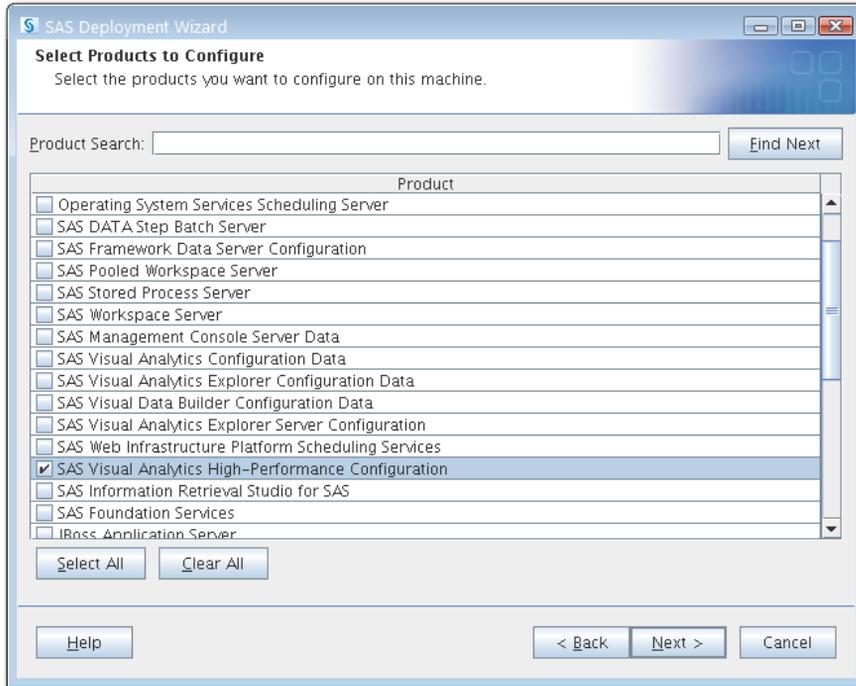
6   When the deployment wizard is finished, rebuild the SAS Visual Analytics Administrator application.

For more information, see the *SAS Intelligence Platform: Middle-Tier Administration Guide*, available at `http://support.sas.com/documentation/cdl/en/bimtag/ 65708/PDF/default/bimtag.pdf#page=137`.

7   Make sure that the signature file path for SAS LASR Analytic Server exists on the root node machine.

Appendix 2

Configuration Options by Prompt Level

Overview of Configuration Options by Prompt 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.
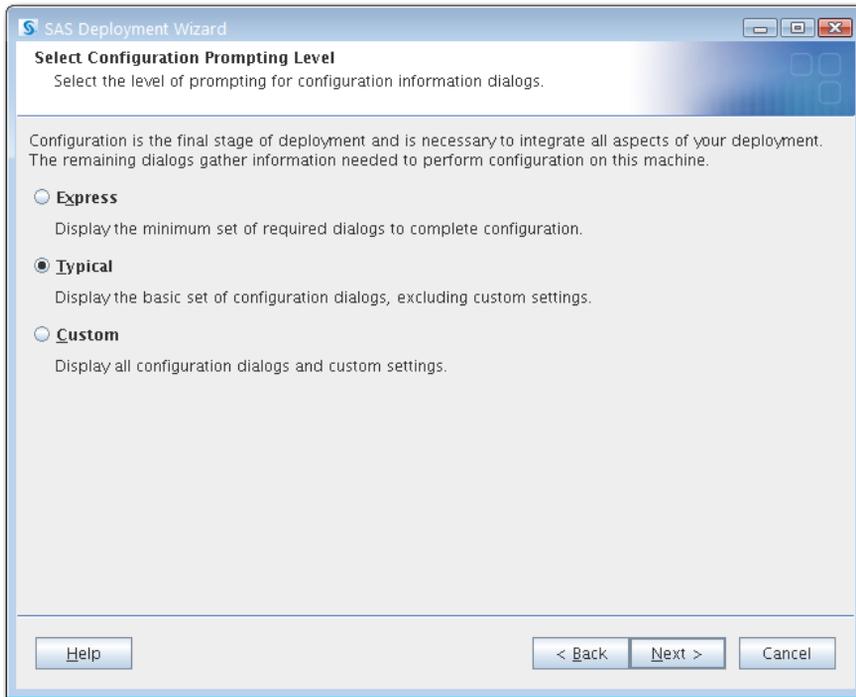
Typical
 displays the basic set of wizard pages needed to complete the SAS configuration.

Custom
 displays all the wizard pages needed to complete the SAS configuration.

Figure A2.1 *Select Configuration Prompting Level Page*

Table A2.1 on page 89 lists the SAS Deployment Wizard pages found in these prompting levels.

Note: If you are deploying the SAS Framework Data Server, then the SAS configuration path should be a path local to the machine. The configuration path should not be on an NFS shared disk. If you want to put your configuration path on a shared disk, then you must make sure that you specify a local path for the SAS Framework Data Server content directory. You can set the content directory on the Framework Data Server Invocation Options page. This option is available only on the custom configuration prompting level.

Configuration Options by Prompt Level

The following table lists the configuration options and the prompt level in which they appear for the SAS Intelligence Platform only. Depending on your configuration, you might see differences for the prompt level in which a particular option is displayed. This is one example of a prompt 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, and, in multiple machine deployments, the machine that you are currently deploying.

Table A2.1 *Configuration Options by Prompt Level*

Configuration Option in the SAS Deployment Wizard	Prompt Level That Displays the Option		
	Express	**Typical**	**Custom**
Configuration prompting level on page 50*	X	X	X
Configuration directory and level on page 50*	X	X	X
Migration on page 51*	X	X	X
Type of deployment accounts on page 52*	X	X	X
Installer account credentials on page 53*	X	X	X
Unrestricted administrator account credentials on page 53*	X	X	X
Trusted user account credentials*	X	X	X
SAS spawned server account credentials on page 53*	X	X	X
E-mail server information on page 54*	X	X	X
E-mail addresses	X	X	X
E-mail server authentication credentials	X	X	X

Configuration Option in the SAS Deployment Wizard	Prompt Level That Displays the Option		
	Express	Typical	Custom
Web application server: managed server ports on page 57*	X	X	X
SAS Web Infrastructure Platform JDBC connection credentials on page 58*	X	X	X
SAS Interface to SAS Content user account credentials on page 65*	X	X	X
Local machine name on page 51 *		X	X
Integrated Windows authentication (IWA) on page 52*		X	X
Metadata server port and host name**		X	X
Anonymous web access on page 53*		X	X
First user display name and account credentials		X	X
Metadata server encryption level and algorithm on page 54*		X	X
Object spawner port		X	X
Object spawner port bank ports		X	X
SAS Application Server: server context on page 55*		X	X
Workspace server port		X	X
Metadata utility workspace server port on page 55*		X	X
Pooled workspace server port on page 56*		X	X
Stored process server bridge port		X	X
Stored process server MultiBridge connection ports		X	X
Metadata utility SAS/CONNECT spawner port		X	X
SAS Framework Data Server port on page 56*		X	X

Configuration Option in the SAS Deployment Wizard	Prompt Level That Displays the Option		
	Express	Typical	Custom
SAS Framework Data Server transactional database files		X	X
Metadata utility SAS DATA step batch server deployed jobs information on page 56*		X	X
Operating System Services Scheduling Server port		X	X
Deployment Tester port and JUnit JAR file		X	X
SAS Remote Services application host name and port		X	X
Event broker HTTP port and admin port		X	X
Web application server automatic configuration on page 56*		X	X
Web application server scripting configuration		X	X
Web application server: managed server name and ports on page 57*		X	X
Web application server automatic deployment on page 59*		X	X
SAS Web Application Themes host name, protocol, and port		X	X
IP multicast version, address, UDP port, TTL, authentication token option on page 60****		X	X
SAS Distributed In-Process Scheduling Server ports		X	X
SAS Content Server repository directory and use database for storage on page 61*		X	X
Database type for SAS Web Infrastructure Platform on page 58*		X	X
SAS Web Infrastructure Platform database JDBC credentials and properties on page 58*		X	X
SAS Web Infrastructure Platform database JDBC driver jars directory on page 58*		X	X

Configuration Option in the SAS Deployment Wizard	Prompt Level That Displays the Option		
	Express	Typical	Custom
SAS Flex Application Themes host name, port, and protocol		X	X
SAS Visual Analytics High-Performance configuration information on page 62*		X	X
SAS Visual Analytics Data Provider on page 62*		X	X
SAS Visual Analytics Data Provider: Hadoop on page 62*		X	X
SAS Visual Analytics Data Provider: Greenplum on page 64*		X	X
SAS Visual Analytics Data Provider: Teradata on page 64*		X	X
SAS LASR Analytic Server Monitor Configuration Information on page 65*		X	X
SAS Information Retrieval Studio on page 65*		X	X
Search Interface to SAS Content Feeder Configuration on page 65*		X	X
SAS Visual Analytics Administrator: LASR Server on page 67*		X	X
SAS Visual Analytics Administrator: LASR Library on page 67*		X	X
SAS Visual Analytics: SAS Geomap Communication Protocol on page 67*		X	X
Select products to configure†			X
Authentication domain on page 51*			X
Metadata server: server librefs			X
Metadata server name and logical name on page 52*			X
Metadata server log filename and invocation options			X

Configuration Option in the SAS Deployment Wizard	Prompt Level That Displays the Option		
	Express	Typical	Custom
Metadata server backup location override			X
Metadata server foundation repository			X
SAS BI Web Services authentication method on page 53*			X
SAS General Servers group			X
SAS BI Web Services Users group			X
Common directories for logs, users, and temporary space on page 54*			X
Enable FIPS-certified encryption algorithms			X
Client-side connection profile credentials policy on page 54*			X
Object spawner name and host name			X
Object spawner object name in metadata			X
Object spawner invocation options and log filename			X
SAS Application Server librefs			X
Workspace server name, logical name, and host name			X
Workspace server invocation options and log filename			X
Metadata utility workspace server name, logical name, and host name on page 55*			X
Metadata utility workspace server invocation options and log filename			X
Pooled workspace server name, logical name, and host name on page 56*			X
Pooled workspace server invocation options and log filename			X

Configuration Option in the SAS Deployment Wizard	Prompt Level That Displays the Option		
	Express	Typical	Custom
Stored process server name, logical name, and host name			X
Stored process server invocation options and log filename			X
SAS Framework Data Server name and host name on page 56*			X
SAS Framework Data Server content directory, invocation options, and log filename			X
SAS Framework Data Server transaction database files pathname			X
Metadata utility SAS DATA step batch server name, logical name, invocation options, and deployed jobs information on page 56*			X
Operating System Services name and host name			X
Operating System Services Scheduling Server additional SAS invocation options, object server parameter, and log filename			X
Deployment Tester host name			X
SAS Remote Services JVM settings on page 60*			X
Secure JMS resources			X
Web application server: proxy information on page 59*			X
Web application server: configure multiple managed servers on page 57*			X
Web application server: managed server protocol and additional JVM options on page 57*			X
Web application server restrictive policy files			X
SAS BI Web Services: completion code values, dynamic prompt validation, execution time-out, and anonymous execution			X

Configuration Option in the SAS Deployment Wizard	Prompt Level That Displays the Option		
	Express	Typical	Custom
SAS BI Web Services: new web services base namespace, temp directory, and delete temp files			X
SAS Visual Analytics Explorer Server Configuration Properties on page 61*			X
SAS Visual Analytics Explorer: Context Root on page 61*			X
SAS Visual Analytics Data Provider: Hadoop Ports on page 63*			X
SAS Visual Analytics Designer: Context Root on page 66*			X
SAS Visual Analytics Hub: Context Root on page 66*			X
SAS Visual Analytics Report Viewer: Context Root on page 66*			X
SAS Visual Analytics Admin: Context Root on page 67*			X
SAS Visual Data Builder: Context Root on page 67*			X
SAS Visual Data Builder: Parallel Processing on page 68*			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.

**   Option available for the server tier on Typical and Custom prompt levels only.

*** Option is displayed during express and typical prompting when the configuration directory and level pre-exists.

†   Option is displayed during express and typical prompting whenever the middle tier is deployed.

Glossary

data set
See SAS data set

encryption
the act or process of converting data to a form that is unintelligible except to the intended recipients.

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

See IPv6

IPv6

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 FE80:0000:0000:0000:0202:B3FF:FE1E:8329. As an alternative, a group of consecutive zeros could be replaced with two colons, as in FE80::0202:B3FF:FE1E:8329. Short form: IPv6

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

See JDBC

Java Development Kit

See JDK

JDBC

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. Short form: JDBC.

JDK

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. Short form: JDK.

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, activity logging, event management, 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 file location 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 you install on the same machine.

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.

spawner
See object spawner

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

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